Determinants of the cost-effectiveness of intermittent preventive treatment for malaria in infants and children

Ross A, Maire N, Sicuri E, Smith T, Conteh L

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to investigate the influence of different variables on the cost-effectiveness of intermittent preventive treatment for malaria in infants and children. The authors concluded that intermittent preventive treatment was cost-effective in most of the scenarios investigated. The methods that were presented were reasonable and the conclusions were appropriate for the findings presented, but the quality of these findings depends on data published elsewhere.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to investigate the influence of different variables on the cost-effectiveness of intermittent preventive treatment for malaria.

Interventions
The intervention was intermittent preventive treatment for infants (at three, four, or nine months old) or children (three months to five years old). This consisted of a full course of anti-malarial treatment for a population at risk of infection, at specified time points (every two months throughout the year or three monthly doses during the malaria season), whether or not they were infected. Treatment was sulphadoxine pyrimethamine or a combination of amodiaquine and artesunate.

Location/setting
East Africa/community care.

Methods
Analytical approach:
A published dynamic, individual-based, stochastic simulation model was used to simulate the outcomes and costs (Smith, et al. 2006, see 'Other Publications of Related Interest' below for bibliographic details). Two analyses were conducted; one for child treatment and one for infant treatment. Each cohort consisted of 100,000 people aged up to 90 years. The time horizon was 10 years from treatment initiation. The authors did not explicitly state the perspective.

Effectiveness data:
The clinical and effectiveness data were from published studies. The authors provided brief details of these parameters, and further details were published elsewhere (Smith, et al. 2006).

Monetary benefit and utility valuations:
Disability weights for the different malaria disease states were from the Global Burden of Disease study.

Measure of benefit:
The measure of benefit was disability-adjusted life-years (DALYs) prevented. The DALYs were calculated assuming age-specific life expectancies, typical of those in East Africa, with no age weighting. Future outcomes were discounted at an annual rate of 3%.

Cost data:
The direct costs included those of community sensitization (awareness and education), behaviour change, and communication; drug distribution and administration; training; and supervision. These were based on trial budgets and primary resource use data. All costs were inflated to 2009 values, using US inflation rates. They were reported in US dollars ($) and future costs were discounted at an annual rate of 3%.

**Analysis of uncertainty:**
One-way sensitivity analyses were undertaken by varying: the transmission intensity (the infected bites per person per year before treatment); the proportion of fevers treated; the timing of seasonal delivery; the choice of drug; the frequency of drug resistance; and the target age for treatment (up to 40 years old).

**Results**
The results were presented narratively or in diagrams. Intermittent preventive treatment for children and for infants were both cost-effective in a wide range of simulated settings.

With constant malaria transmission rates, year-round treatment was more cost-effective than seasonal treatment. With variable malaria transmission rates, treatment in the high season was more cost-effective than year-round treatment.

In all the simulated scenarios, sulphadoxine pyrimethamine was more cost-effective than the amodiaquine and artesunate combination.

Intermittent preventive treatment for children or adults over five years old prevented fewer DALYs.

**Authors’ conclusions**
The authors concluded that both intermittent preventive treatment for infants and for children were cost-effective in most of the scenarios investigated.

**CRD commentary**

**Interventions:**
The authors did not report the comparator, but this might have been reported in the original model publication (Smith, et al. 2006).

**Effectiveness/benefits:**
The authors provided very few details on the clinical and effectiveness parameters. As a result, it is not possible to determine the quality of the evidence, nor whether all the relevant information was included. These details should be available in Smith, et al. (2006).

**Costs:**
The perspective was not explicitly reported, but the direct health care costs to providers and households were included and indirect costs were excluded. The cost of the intervention to households was negligible and therefore excluded. It appears that all the major costs relevant to a health care system perspective were analysed. The sources for the unit costs and resource use were reported, as were the price year, time horizon, and discount rate.

**Analysis and results:**
The evidence on costs and outcomes gathered by the authors was synthesised using a published decision analytic model. The authors reported that this model had been validated using the results of numerous trials and they provided the references for these. As intermittent preventive treatment had been shown to be cost-effective, the authors performed multiple one-way sensitivity analyses to analyse the settings and scenarios in which the intervention was most cost-effective. The findings were reported narratively and the actual costs and outcomes were not provided. The authors reported the main limitations of their study.

**Concluding remarks:**
The methods that were presented were reasonable and the conclusions were appropriate for the findings presented, but the quality of these findings depends on data published elsewhere.
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