Is travel prophylaxis worth while? Economic appraisal of prophylactic measures against malaria, hepatitis A and typhoid in travellers

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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.

Health technology
Prophylaxis against travel acquired malaria, typhoid fever and hepatitis A.

Type of intervention
Primary prevention

Economic study type
Cost-effectiveness analysis.

Study population
British travellers who travelled to disease endemic regions in 1991.

Setting
The practice setting was primary care. The economic study was conducted in the U. K.

Dates to which data relate
Resource data were derived from sources published between 1990-1994. Effectiveness data related to studies published in the period 1990-1993. The prices used were 1991 prices.

Source of effectiveness data
Review of previously completed studies.

Outcomes assessed in the review
Protective efficacy of the vaccine and the number of deaths prevented.

Study designs and other criteria for inclusion in the review
Not reported.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.
Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Six studies were included.

Methods of combining primary studies
The studies were not combined.

Investigation of differences between primary studies
Not investigated.

Results of the review
From the literature, the authors reported the following:

(1) All typhoid vaccine preparations provided a similar protective efficacy of 70%.

(2) The duration of protection against hepatitis A of a single 5ml dose of human normal immunoglobulin was 6 months. A 3 dose course of the vaccine protected for a minimum of a year. Both regimens were assumed to protect 90% of those immunised against the disease.

(3) The antimalarial regimens were attributed a protective efficacy of 72% for chloroquine and proguanil and 92% for mefloquine. The number of deaths prevented by prophylaxis against typhoid, hepatitis A and malaria were 0.55, 0.29 and 9.57 respectively.

Measure of benefits used in the economic analysis
Number of cases of illness prevented.

Direct costs
Costs and quantities were reported separately.

Costs considered were the costs to the health sector and to the travellers: costs of treating patients, cost of inpatient stay, laboratory costs, costs of the vaccine and its administration, consultation and prescription charges of the GP, costs of travel to GP surgery and hospital.

Costs were derived from hospital records, 1991 government data and other published data.

Prices used were unit costs recorded in the British National Formularies (1991 and 1993) for existing and new vaccines and drugs. Costs were discounted at the rate of 6% to calculate the present value of prophylaxis at future administration. 1991 prices were used.

Indirect Costs
Costs and quantities were reported separately. Costs to the individual and the community were considered. Costs to the individual were based on estimated time off work, costed according to wages. Costs to society were the lost productivity due to illness and death. Costs were mainly derived from 1991 government data. 1991 prices were used.
Currency
UK pounds sterling

Sensitivity analysis
Sensitivity analyses was performed by varying the incidence rate of the diseases and the seroprevalence rate, efficacy of vaccines and costs of illness. A 95% confidence interval was used to provide maximum and minimum estimates.

Estimated benefits used in the economic analysis
The number of cases of illness prevented were 2653 and 3144 for malaria prophylaxis with chloroquine+proguanil and mefloquine respectively; 183 for typhoid; and 291 for hepatitis A.

Cost results
During 1991, the costs of chemoprophylaxis for malaria for three months were 3,607,308 for chloroquine + proguanil and 12,822,363 for mefloquine, whereas treatment costs were much higher at 24,469,387.

The costs of prophylaxis against typhoid, single journey with Ty 21a, Typhoid Vi and Whole cell killed vaccines were 36,925,695, 30,247,947 and 30,343,095 respectively. And the cost of treating cases had the disease not been prevented was only 3,013,955.

The costs of Hepatitis A vaccine and immunoglobulin, were, respectively, 54,471,134 and 20,145,455 for a single journey and 54,471,134 and 70,407,014 for 4 journeys. The cost of treatment was only 6,829,434.

During 1991, the avoided costs of illness were:
(1) 19,116,709 and 22,656,840 for malaria prophylaxis for 3 months with chloroquine + proguanil and mefloquine respectively.
(2) 1,676,747 for prophylaxis against typhoid for a single journey
(3) 3,451,187 and 12,061,666 for prophylaxis against hepatitis A, in the case of a single journey and four journeys (in 5 years) respectively.

Synthesis of costs and benefits
The cost-effectiveness figures for the vaccines were as follows: 1,360 for chloroquine+proguanil and 4,078 for mefloquine; 202,207 for typhoid 21a vaccine, 165,639 for Typhoid Vi vaccine and 166,160 for Whole cell killed typhoid vaccine; 69,210 and 187,137 respectively for Human normal immunoglobulin and Hepatitis A for a single journey, and 241,885 and 187,137 for the two vaccines respectively, in the case of 4 journeys.

Authors' conclusions
The authors conclude that neither hepatitis A prophylaxis nor typhoid prophylaxis is cost effective, but the costs of treating malaria greatly exceed the costs of chemoprophylaxis, which is therefore highly cost effective.

CRD Commentary
1) This study is not a cost-benefit analysis, as the authors stated since the benefits have been measured as savings of resources. The study does not represent an appropriate cost-effectiveness analysis. The incremental cost should not be identified as the prophylactic cost only, since the cost of disease management is different under the two alternatives.
2) It is not clear whether and how the authors considered the value of lost lives in the calculation of the final results.
3) The issue of the opportunity costs for the whole programme was mentioned although opportunity costs were
identified with financial expenditures.

**Implications of the study**
A national policy of immunising British travellers against typhoid and hepatitis A should be critically reviewed.

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