Rapid HIV versus enzyme-linked immunosorbent assay screening in a low-risk Mexican American population presenting in labor: a cost-effectiveness analysis

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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
A rapid test (Oraquick) for the human immunodeficiency virus (HIV) screening was evaluated. The comparator was an enzyme-linked immunosorbent assay (ELISA).

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised Mexican American pregnant women of unknown HIV status who were in labour.

Setting
Although the setting was not explicitly stated, it seems to have been secondary care. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness evidence was obtained from studies published between 1999 and 2005. The price year and the dates for the resource use data were not reported.

Source of effectiveness data
The effectiveness data were derived from a review of published studies.

Modelling
A decision tree model was used to compare the costs and benefits of Oraquick and ELISA screening strategies. It appears that the time horizon of the model was lifetime since the lifetime costs of treatment were included in the analysis.

Outcomes assessed in the review
The outcomes assessed were the incidence of HIV infection, the incidence of mother-to-child transmission (MTCT), and the accuracy of the HIV tests (sensitivity and specificity).

Study designs and other criteria for inclusion in the review
Studies were included if they analysed HIV in Mexican American pregnant women.

**Sources searched to identify primary studies**
MEDLINE was searched using the keywords "HIV", "AIDS", "pregnancy", "cost analysis", "diagnosis", "rapid test", "prevalence", "ELISA" and "Mexican American".

**Criteria used to ensure the validity of primary studies**
Not reported.

**Methods used to judge relevance and validity, and for extracting data**
Not reported.

**Number of primary studies included**
Thirteen studies were included in the review.

**Methods of combining primary studies**
Not reported.

**Investigation of differences between primary studies**
Not reported.

**Results of the review**
The incidence of HIV in pregnant women in a low-prevalence Mexican American population was 0.05%.

The incidence of MTCT with no treatment was 25%.

The incidence of MTCT with treatment in labour was 10%.

The sensitivity of the ELISA was 0.98 (Range: 0.97 to 0.999) and the specificity 0.995 (Range: 0.987 to 0.999). The positive predictive value of ELISA was 0.10.

The sensitivity of the Oraquick test was 0.996 (Range: 0.90 to 0.999) and the specificity was 1.00 (Range: 0.90 to 1.00). The positive predictive value of Oraquick was 1.00 (Range: 0.83 to 1.00).

The sensitivity of Western blot was 0.97 (Range: 0.96 to 0.99) and the specificity was 0.99 (Range: 0.99 to 0.999).

**Measure of benefits used in the economic analysis**
The summary measures of health benefit were the cases of MTCT averted, the cases of HIV prevented and the life-years gained (LYG).

**Direct costs**
The unit costs and the quantities of resource used were reported separately. The direct costs included in the analyses comprised the costs of the tests (Oraquick, ELISA and Western blot), the cost of testing and counselling for an HIV-positive woman, the cost of testing an HIV-exposed infant, the lifetime cost of treatment for an HIV-positive infant, and the cost of antepartum treatment. The authors stated that actual costs were used. The costs were obtained from published literature and from the authors’ county and private hospitals. Discounting was applied, although the discount
rate was not stated. The price year was not reported.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs were not included in the analysis.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were performed. The parameters varied were the sensitivity, specificity and positive predictive values of each screening test and confirmatory Western blot test, the cost of each test, and the cost of treatment. Threshold analyses were also performed.

**Estimated benefits used in the economic analysis**
The benefits were not reported separately from the costs.

**Cost results**
Only the cost-effectiveness ratios were reported.

**Synthesis of costs and benefits**
The cost and benefits were combined by calculating mean and incremental cost-effectiveness ratios.

The cost for each child who was HIV negative was $98 with the Oraquick test and $491 with ELISA. The cost of the strategy that used Oraquick as the primary screening test was $217,718 per HIV case prevented and $3,111 per LYG. Most of the costs of the ELISA strategy were from unnecessary treatment of women and infants with false-positive test results.

The sensitivity analyses showed that the results were robust. The threshold analyses showed that Oraquick would be the dominant strategy if its costs were less than $409.90 under the baseline assumptions.

**Authors' conclusions**
Oraquick rapid testing in a low-risk population is cost-effective because of the low rate of false-positive results, thus preventing the emotional and economic costs of unnecessary treatment for the human immunodeficiency virus (HIV).

**CRD COMMENTARY - Selection of comparators**
The Oraquick rapid test was compared with an ELISA. It would have been interesting to have considered other HIV rapid tests available on the market in the analysis. You should consider whether the screening strategies analysed in this study are relevant to your own setting.

**Validity of estimate of measure of effectiveness**
A systematic review of the literature was undertaken, thus the validity of the results should be high. However, the criteria used to ensure the validity of the primary studies and the methods used to extract the data were not reported.
Nevertheless, sensitivity analyses were performed on the effectiveness estimates. This mitigates, in some degree, the uncertainty about their internal validity.

**Validity of estimate of measure of benefit**
The measures of benefit used in the economic analysis seem to have been appropriate. They were derived from the effectiveness estimates by means of a model. However, the health benefits were not reported separately from the costs, which makes comparisons with studies performed in other settings difficult.

**Validity of estimate of costs**
Actual costs were used. The unit costs were reported and the lifetime costs were discounted. It seems that all the relevant costs to the perspective adopted in the study have been taken into consideration. Sensitivity analyses were performed to account for variability in the costs estimates used in the calculations.

**Other issues**
The authors did not compare their results with those from other studies. The issue of generalisability was not addressed. The authors did not report the absolute cost and effectiveness outcomes separately.

**Implications of the study**
Rapid HIV screening in a low-risk population may prevent health and social consequences of MTCT of HIV. The authors state that the Oraquick screening strategy could be implemented easily because of its accuracy and relatively modest expense. The high specificity of Oraquick prevents unnecessary treatment for false-positive cases and the concomitant economic and social costs.

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