Cost effectiveness of enzyme immunoassay and immunoblot testing for the diagnosis of syphilis

Chuck A, Ohinmaa A, Tilley P, Singh A, Jacobs P

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 assess the cost-effectiveness of two strategies for the diagnosis of syphilis. The authors concluded that the enzyme immunoassay strategy was more cost-effective than the rapid plasma reagin strategy. Due to limited reporting it is not clear if the authors' conclusions were appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to compare the cost-effectiveness of two syphilis tests in prenatal and non-prenatal populations.

Interventions
The two tests were the rapid plasma reagin assay followed by a treponemal assay with Treponema pallidum particle agglutination or fluorescent treponemal antibody absorption as a confirmatory test compared with enzyme immunoassay, which was a treponemal assay, followed by Inno-Lia as a confirmatory test.

Location/setting
Canada/primary care.

Methods
Analytical approach:
The diagnostic test and health outcome probabilities were combined in a model to determine the costs and health outcomes. The time horizon of the analysis was 30 years. The authors reported that the health service perspective was adopted.

Effectiveness data:
The effectiveness data were derived from a variety of sources including an evaluation conducted in regional health authorities in Alberta, by the Alberta Provincial Laboratory for Public Health (ProvLab), and published literature. The data on treatment and routine follow-ups were obtained from personal communication with the Infectious Diseases Medical Consultant (IDMC) in the Alberta Health Ministry. The key clinical parameters were the sensitivity and specificity of the tests and the probability of developing neurosyphilis and congenital syphilis.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The number of correct diagnoses was the measure of benefit.

Cost data:
The economic analysis included the costs of the tests, labour for administering treatment, treatment follow-up, community search and patient contacting, chart reviews of bloods samples from the IDMC, and false-negative results, including treatment for neurosyphilis and congenital syphilis. The resource quantities and unit costs were mainly derived from the IDMC records and the ProvLab accounts. Syphilis treatment costs were based on published US data.
and were converted to Canadian dollars. All costs were in Canadian dollars (CAD) for the price year 2006. Future costs for treating neurosyphilis were discounted at an annual rate of 5%.

Analysis of uncertainty:
The parameter uncertainty was investigated through probabilistic sensitivity analysis using 100,000 Monte Carlo simulations. The assigned probability distributions were reported and cost-effectiveness acceptability curves were generated.

Results
An incremental analysis was performed. In the prenatal population, the enzyme immunoassay protocol, when compared with the reagin protocol, resulted in an incremental cost of CAD 1,358 per additional correct diagnosis. In the non-prenatal population, the enzyme immunoassay protocol was the dominant strategy as it produced in more correct diagnoses at a lower cost.

The probability of the enzyme immunoassay protocol being more cost-effective than its comparator at a willingness-to-pay threshold of CAD 0 per additional correct diagnosis was 0.45 in the prenatal population and 0.8 in the non-prenatal population. At a threshold of CAD 50,000 there was a 100% probability for both populations.

Authors' conclusions
The authors concluded that enzyme immunoassay plus Inno-Lia was more cost-effective than the reagin protocol, at a willingness-to-pay threshold of CAD 20,000 per additional correct diagnosis. They stated that it should be adopted for the testing and diagnosis of syphilis.

CRD commentary
Interventions:
The interventions were clearly reported. The coverage of the available interventions appears to have been thorough and the current practice in the authors’ setting was included.

Effectiveness/benefits:
The effectiveness data were mainly based on actual data from a health authority that provided syphilis testing and data from the Canadian Ministry of Health, which could be of relatively good quality, depending on the recoding methods. The details on the studies used as the primary sources of data were not reported, which makes it difficult to assess the validity of these estimates. There was no indication that a systematic review was conducted and so it is unclear if the best available evidence was used. Extensive sensitivity analysis was conducted to assess whether or not the findings were robust. It is not clear what the health benefits of the tests were as the measure of benefit was limited to the number of correct diagnoses.

Costs:
All the costs relevant to the stated perspective were reported. The resource and cost estimates were representative of the population and setting and a breakdown of the cost items was given. The resource use, the price year, and discounting were appropriately reported, enhancing the transparency of the economic analysis.

Analysis and results:
The model structure was not described nor presented in a diagram. The incremental cost-effectiveness analysis was appropriately performed and clearly presented. The parameter uncertainty was extensively investigated using a probabilistic approach, and the results were well reported. The authors discussed some limitations to their study.

Concluding remarks:
Due to limited reporting, it is unclear if the authors’ conclusions were appropriate.

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