Serologic testing for syphilis in the United States: a cost-effectiveness analysis of two screening algorithms
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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.

CRD summary
The objective was to assess the cost-effectiveness of two screening options for patients with syphilis in the USA. The authors concluded that screening with a treponemal test first cost slightly more and resulted in more unnecessary treatment than screening with a non-treponemal test first. The methods were satisfactory and they and the results were adequately reported. The authors' conclusions, given the chosen measure of benefit, appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the cost-effectiveness of two screening options for patients with syphilis in the USA.

Interventions
The two options for screening for syphilis were the non-treponemal and the treponemal algorithms. The non-treponemal algorithm was rapid plasma reagin, the non-treponemal test, with positive results confirmed by automated treponemal enzyme immunoassays and chemiluminescence assays, the treponemal test. The treponemal algorithm was the treponemal test, with all reactive specimens confirmed by the non-treponemal test and negative results of this test confirmed by a Treponema pallidum passive particle agglutination assay.

Location/setting
USA/out-patient secondary care.

Methods
Analytical approach:
An analytic decision-tree model was constructed, for a cohort of 200,000 patients, to combine evidence from published studies and expert opinion, to compare the costs and effects of the two algorithms. The authors reported that the perspective adopted was that of the US health care system.

Effectiveness data:
The effectiveness data were from sources that included expert opinion, authors' assumptions, and published peer-reviewed journals. The main effectiveness estimates were the sensitivity, specificity, and overtreatment rates of the two screening options. These were from a published source and expert opinion.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the number of cases of syphilis treated.

Cost data:
The cost categories included screening (enzyme immunoassays and chemiluminescence assays, rapid plasma reagin, and Treponema pallidum passive particle agglutination assay), treatment of syphilis (early and late latent treatment), and other costs associated with syphilis. All costs were from published literature, except those for the enzyme
immunoassays and chemiluminescence assays, which were assumed by the authors. They were adjusted to 2008 prices, in US dollars ($), using the medical care component of the consumer price index.

Analysis of uncertainty:
One- and two-way sensitivity analyses were performed on all the variables in the model, using plausible ranges. The threshold values at which one algorithm became more cost-effective than the other, within the sensitivity analysis, were determined and the results were presented in line graphs.

Results
For a cohort of 200,000 individuals, the total costs were $1.4 million for the non-treponemal algorithm and $1.6 million for the treponemal algorithm. The number of uninfected cases treated was 38 for the non-treponemal algorithm and 964 for the treponemal algorithm. The number of infected cases treated was 868 for the non-treponemal algorithm and 986 for the treponemal algorithm.

Compared with non-treponemal, the additional cost per additional infected case treated with the treponemal algorithm was $2,042.

In the sensitivity analysis, the results of the model were most sensitive to changes in the costs of screening, costs of follow-up, and the specificity and sensitivity of the screening algorithms.

Authors’ conclusions
The authors concluded that screening with the treponemal test first cost slightly more and resulted in much more unnecessary treatment than screening with the non-treponemal test first.

CRD commentary
Interventions:
The interventions were described and they appear to have been appropriate comparators. The usual practice, which was the non-treponemal algorithm, was included.

Effectiveness/benefits:
The effectiveness data were from sources that included expert opinion and published literature, but the methods used to elicit the expert opinion and a systematic review of the literature were not reported, and it is not possible to determine the reliability of these estimates nor if all the relevant information was used. The measure of benefit, the number of cases treated, was narrow, which makes it difficult to determine the threshold value at which the intervention was cost-effective. It is also difficult to compare these results with those of other interventions for other diseases.

Costs:
The perspective of the health care system was explicitly reported and it appears that no relevant major costs were omitted from the analysis. The sources for the costs were reported. The time horizon was not reported, but seems to have been less than one year, which means that discounting was not needed.

Analysis and results:
The analytic approach appears to have been appropriate and adequate details of the model were reported, including a diagram. The uncertainty in the results was tested in one- and two-way sensitivity analyses, which go some way towards assessing the uncertainty, but a probabilistic sensitivity analysis could have more thoroughly tested the overall model uncertainty. The authors reported that the main limitation of their study was the fact that inputs for the model were from a wide range of sources, including expert opinion and the authors’ assumptions.

Concluding remarks:
The methods were satisfactory and they and the results were adequately reported. The authors’ conclusions, given the chosen measure of benefit, appear to be appropriate.

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