Antenatal syphilis screening in sub-Saharan Africa: lessons learned from Tanzania

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
Antenatal syphilis screening and further treatment were examined. Screening was based on the rapid plasma reagin (RPR) test. Treatment for women testing positive for syphilis was based on a single dose of 2.4 million units of benzathine penicillin.

Type of intervention
Screening and treatment.

Economic study type
Cost-utility analysis.

Study population
The study population comprised pregnant women attending antenatal care.

Setting
The setting was primary care. The economic study was carried out in Tanzania.

Dates to which data relate
The effectiveness, resource use and cost data were derived from studies published between 2002 and 2003. The price year appears to have been 2001.

Source of effectiveness data
The effectiveness evidence was derived from a synthesis of published studies.

Outcomes assessed in the review
The outcomes assessed were variables related to the impact of untreated maternal syphilis, the effectiveness of syphilis treatment, and the operational performance of the syphilis screening programme. Disability-adjusted life-years (DALYs) were presumably derived from the literature, although this was not explicitly stated.

Study designs and other criteria for inclusion in the review
It was unclear whether a systematic review of the literature was undertaken. In effect, the primary studies appear to have been identified selectively. The evidence came mainly from observational studies implemented in the Mwanza region in Tanzania. The sample sizes of women enrolled and other characteristics of the studies were reported.

Sources searched to identify primary studies
Criteria used to ensure the validity of primary studies
Not reported.

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

Number of primary studies included
The clinical estimates were derived from three primary studies.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not reported.

Results of the review
A study showed that untreated maternal syphilis was strongly associated with adverse birth outcomes.

Twenty-five per cent of women with high-titre syphilis (HTS) had a stillbirth compared with 1% of seronegative women (risk ratio 18.1; p<0.001).

HTS cases were also at higher risk of low birth weight (LBW) and premature live births compared with uninfected women (adjusted risk ratios 3.3 and 6.1, respectively).

In the same study, where 5.9% of women who had not been screened for syphilis in pregnancy had HTS, 51% of stillbirths, 24% of preterm live births and 17% of all adverse pregnancy outcomes in unscreened women were attributable to HTS.

Another study showed that, of the 19,878 women screened, 1,522 (7.7%) were positive using the RPR test.

Single-dose treatment was effective in preventing adverse outcomes attributable to maternal syphilis.

There were no significant differences in birth outcomes between women treated for syphilis and seronegative women.

Stillbirth were observed in 2.3% of treated HTS cases and 2.5% of seronegative women, while LBW live births were observed in 6.3% of treated HTS cases and 9.2% of seronegative women.

After controlling for potential confounders, women treated for either HTS (odds ratio 0.76, 95% confidence interval, CI: 0.4 - 1.4) or low-titre syphilis (odds ratio 0.95, 95% CI: 0.6 - 1.5) were at no increased risk of adverse pregnancy outcome compared with uninfected women.

The syphilis serological status of male partners was also reported. It was found that the serological status of men varied according to the serological status of the female partners.

The data used to obtain the DALYs were not provided.

A further study showed that, in nine districts in Tanzania, many facilities were failing to implement the syphilis control programme. In addition, a lack of kits and drugs was observed, health care workers were not motivated and not
adequately trained, and there were no supervised visits to the health facilities.

**Measure of benefits used in the economic analysis**
The summary benefit measure used was the number of DALYs avoided using the screening and treatment approach in comparison with no screening. Discounting might not have been performed. The DALYs were calculated with both the inclusion and exclusion of stillbirths.

**Direct costs**
The perspective adopted in the cost analysis was not stated. The costs were estimated from a published study and there was only limited information on the items included in the analysis. The unit costs were not presented separately from the quantities of resources used, and the source of the data was unclear. Discounting was not relevant and was not performed as the costs were incurred during one year. The price year appears to have been 2001.

**Statistical analysis of costs**
No statistical analyses of the costs were performed in the current study.

**Indirect Costs**
The indirect costs were presumably not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
A sensitivity analysis was not explicitly reported. However, alternative sources of cost data were used to assess the possible range of cost-effectiveness estimates. The impact of different prevalence rates was also investigated.

**Estimated benefits used in the economic analysis**
The estimated number of DALYs was not reported.

**Cost results**
Syphilis screening cost $1.44 per woman screened and $20 per woman treated.

**Synthesis of costs and benefits**
An incremental cost-utility ratio was calculated to combine the costs and benefits of screening and testing versus no screening.

The cost per DALY saved was $110 for cases of LBW averted and $10.56 per DALY saved if stillbirths averted were also included.

When using alternative sources of costs, the cost per DALY averted ranged from $10.56 to $18.73.

The cost-utility ratio of syphilis screening was highly dependent on syphilis prevalence, but was still cost-effective at a relatively low seroprevalence of 2% ($33 per DALY saved).

**Authors' conclusions**
The syphilis screening strategy was highly cost-effective in Tanzania. The analysis revealed that adequate training, continuity of supplies, supervision and quality control were critical elements, limiting the efficacy of the implementation of syphilis control policies.

CRD COMMENTARY - Selection of comparators
The choice of the comparator (i.e. no screening) was appropriate as it represents the standard care in Tanzania and other developing countries. You should decide whether this is a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from published sources. However, it was unclear whether a review of the literature was performed. In effect, the primary studies appear to have been identified selectively. The sources searched to identify the primary studies were not reported. Some information on the characteristics of the primary studies, which helps in the assessment of the robustness of the primary estimates, was provided. The primary estimates came mainly from observational studies. A very limited sensitivity analysis was performed to address the issue of uncertainty in the rate of disease prevalence.

Validity of estimate of measure of benefit
The choice of DALYs as the summary benefit measure was appropriate as it represents a widely used measure in developing countries. Further, it is easily compared with the benefits of other health care interventions. The data used to calculate the DALYs were derived from published studies, but no further information was provided.

Validity of estimate of costs
The perspective adopted in the study was not explicitly stated. A detailed breakdown of the cost items was not provided as the costs were derived from a published study. Similarly, very few details of the cost calculation were reported. This limits the possibility of replicating the cost analysis in other settings. It was also difficult to assess the validity of the cost estimates. Alternative sources of costs were considered so that a plausible range of estimates could be evaluated. The price year was reported, which will facilitate reflation exercises in other settings.

Other issues
The authors did not make extensive comparisons of their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. Limited sensitivity analyses were performed, thus caution is required when extrapolating the results of the analysis to other contexts.

Implications of the study
The study results supported the development of syphilis control programmes in developing countries. The authors suggested that future studies should further investigate the specific components of syphilis screening programmes. The availability of a new diagnostic test might improve the implementation of syphilis control. The authors also pointed out that efforts to provide wide-scale programmes for the prevention of human immunodeficiency virus (HIV) could provide an excellent opportunity to strengthen antenatal syphilis screening.

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Bibliographic details