An economic evaluation of alternative test-intervention strategies to prevent spontaneous pre-term birth in singleton pregnancies

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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 investigate the potential cost-effectiveness of test-and-treat strategies to prevent spontaneous birth before 34 or 37 weeks gestation. The authors concluded that an effective, affordable and safe intervention for all pregnant women, without prior testing, was likely to be the most cost-effective strategy. On the whole, the methods seem to have been appropriate and were clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
To investigate the cost-effectiveness of alternative test-and-treat strategies in the prevention of spontaneous pre-term birth before 34 or 37 weeks gestation.

Interventions
There were 22 tests and 40 interventions, which were combined, in all possible test-and-treat strategies, for six population and outcome combinations.

The tests included foetal fibronectin, measurement of cervical length, amniotic fluid interleukin-6, interleukin-8, cervico-vaginal interleukin-6, absence of foetal breathing movements, and previous history of either spontaneous or iatrogenic pre-term birth.

The treatments for symptomatic women included indomethacin, terbutaline, nitric oxide donors, magnesium sulphate, terbutaline, calcium-channel blockers, and atosiban. There were several different therapies for asymptomatic women.

The populations were symptomatic with a viable pre-term birth experiencing threatened pre-term labour, or asymptomatic. Outcomes were birth before 37 or 34 weeks, within seven days of treatment, or within 48 hours of treatment, or spontaneous threatened labour before 37 or 34 weeks.

Location/setting
UK/clinics, general practices, health centres, or any setting delivering antenatal care.

Methods
Analytical approach:
A decision-tree model was developed using data from systematic reviews. Six versions were developed for the six population and outcome combinations. The perspective was reported by the authors to be that of the health payer.

Effectiveness data:
Test accuracy and the effectiveness of the interventions were from a systematic review that included meta-analyses carried out as part of the study and which was reported in detail elsewhere (Honest, et al. 2009, see 'Other Publications of Related Interest' below for bibliographic details).

Monetary benefit and utility valuations:
Not relevant.
Measure of benefit:
The measure of benefit was the number of cases of spontaneous pre-term labour avoided at different gestations, depending on the model used.

Cost data:
The cost data were from literature reviews and the Birmingham Women’s Hospital, UK. The cost of spontaneous pre-term birth was the cost of looking after the infant (not the mother) for the initial period in hospital. The authors used a combination of data, including the average birth weight and the number of survivors by gestational age. Costs were expressed in UK £, at 2006 rates.

Analysis of uncertainty:
For each model, a deterministic and a probabilistic sensitivity analysis were carried out, if necessary. The authors included only those interventions for which the 95% confidence interval for the relative risk was less than one, to avoid including interventions that might be deemed harmful.

Results
Testing prior to intervention was not the most cost-effective strategy in the main analyses for 34 and 37 weeks. The incremental cost per case avoided ranged from £16,336 for symptomatic women avoiding birth before 37 weeks (model one) to £23 for asymptomatic women avoiding labour before 37 weeks (model five).

In asymptomatic women, prophylactic fish oil for all women was potentially cost-effective in preventing threatened labour before 34 weeks (model six). In symptomatic women, indomethacin without prior testing was potentially cost-effective in preventing birth before 37 weeks (model one).

According to the sensitivity analysis, the results were more dependent on the relative risk of the strategies than on their costs.

Authors’ conclusions
The authors concluded that the most cost-effective strategy to prevent spontaneous pre-term labour and birth was an effective, affordable and safe intervention for all pregnant women, without testing. The results of this analysis should be used to prioritise research worldwide.

CRD commentary
Interventions:
The interventions were described and the usual practice was appropriately included as a comparator.

Effectiveness/benefits:
The authors referred to another publication for the full details of the systematic review and meta-analyses of the effectiveness data; these methods cannot be assessed without consulting this report. The measure of benefit appears to have been appropriate. There was no discussion of side-effects.

Costs:
The analysis of the costs was performed from the perspective of the health payer, and all the relevant costs were included. The sources for the cost estimates were well reported and relevant to the setting.

Analysis and results:
The reporting of the study was adequate. According to the uncertainty analysis, the authors stated that the main driver for the results was the poor accuracy of many tests and the risk ratio for the interventions. The costs did not have a significant impact on the results. The main limitation, identified by authors, was the need for a good quality randomised controlled trial. The probabilistic sensitivity analysis was not described in detail.

Concluding remarks:
On the whole, the methods seem to have been appropriate and were clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.
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