Routine pre-cesarean Staphylococcus aureus screening and decolonization: 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.

CRD summary
The study assessed the cost-effectiveness of routine preoperative Staphylococcus aureus screening and decolonisation for women who underwent planned caesarean delivery. The authors concluded that, from their model, routine screening and decolonisation was not cost-effective from the perspective of the third-party payer. The study used transparent methods that considered the impact of alternative assumptions on the model results, although little information on clinical sources was reported. The authors’ conclusions appear robust.

Type of economic evaluation
Cost-utility analysis

Study objective
The cost-effectiveness of routine preoperative Staphylococcus aureus screening and decolonisation was assessed for women who underwent planned caesarean delivery.

Interventions
The intervention was routine preoperative Staphylococcus aureus screening and decolonisation for women with planned caesarean delivery. Screening took place alongside testing for Group B Streptococcus at their routine 35 to 37 week prenatal visit. The two testing procedures were agar culture and polymerase chain reaction (PCR). The comparator was no routine testing with standard antibiotic prophylaxis. The laboratory techniques for screening and testing wound isolates were agar-agar, PCR-agar, and PCR-PCR.

Location/setting
USA/secondary care and hospital.

Methods
Analytical approach:
The analysis was based on a decision analytic model with a lifetime horizon; the timeframe for the screening intervention was one month. The authors stated that the perspective of the third-party payer was adopted.

Effectiveness data:
Clinical inputs for the model were derived from various sources, including large-scale national databases (USA), previous studies, and literature review. These were supplemented with data from the experience at a large teaching hospital in Pittsburgh (Pennsylvania). Some assumptions were also made. No further details on sources used for clinical data were provided. The sensitivity and specificity of the screening tests were key inputs of the model.

Monetary benefit and utility valuations:
Utility valuations were derived from a previous cost-effectiveness analysis (1997) that reported utility decrements associated with appendectomy wounds.

Measure of benefit:
Quality-adjusted life-years (QALYs) were used as the summary benefit measure; they were discounted at an annual rate of 3%. The number needed to screen to prevent one post-caesarean wound infection was calculated.
Cost data:
The costs included laboratory tests, pharmaceuticals, hospitalisations for wound infection, home health supplies, home visits, and open wound incision (in outpatient setting, in the operative room, or on the ward). Patterns of resource consumption were taken from the literature. Costs were based on data from typical US sources: the Healthcare Cost and Utilization Project's Nationwide Inpatient Sample for hospital costs; the Red Book (Pharmacy's Fundamental Reference) for drug costs; and Medicare databases for laboratory and procedure costs. Costs were in US $. A 3% annual discount rate was applied. The price year was not reported.

Analysis of uncertainty:
A probabilistic sensitivity analysis was performed using probability distributions for model inputs. Additional one-way sensitivity analyses were carried out on selected inputs such as the effect of varying colonisation prevalence, the probability of successful decolonisation, type of screening (differences in cost, availability, and turn-around times), and hospitalisation costs.

Results
Total costs and total QALYs associated with the two strategies were not reported.

Results were presented for a range of colonisation prevalence and decolonisation success rates.

At a rate of decolonisation success of 50% and a probability of colonisation of 20% (intermediate condition), the incremental cost per QALY gained with screening over no screening was $184,171 with agar-agar, $706,479 with PCR-agar, and $761,849 with PCR-PCR laboratory techniques.

Screening was not cost-effective at thresholds of $50,000 and $100,000 except when using the agar-agar at relatively high colonisation prevalence rates and high probability of decolonisation success; for example, agar-agar was cost-effective at colonisation prevalence rate of 40% or more and decolonisation success of 50% or more, or at colonisation prevalence of 20% or more and decolonisation rate of 75% or more. PCR techniques were not cost-effective.

The number needed to screen to prevent one post-caesarean wound infection ranged from 21 to 2,294 women depending on the model assumptions.

Authors' conclusions
The authors concluded that, from their model, routine Staphylococcus aureus screening and decolonisation of pregnant women before caesarean delivery was not cost-effective from the perspective of the third-party payer. Further studies were needed to determine the safety and efficacy of decolonising for this population.

CRD commentary
Interventions:
The selection of the comparators was appropriate. Routine testing was compared against no testing, which was the standard care in several settings.

Effectiveness/benefits:
Clinical data for the model came from a variety of published sources, but the details were not reported individually. Typical databases appear to have been used to estimate clinical inputs. Most data were retrieved from the real-world implementation of the screening strategy at a single teaching hospital. Some assumptions were made when published data were unavailable, so it was difficult to objectively assess the validity of the clinical analysis. QALYs appear to have been a valid benefit measure given the impact of the disease on health-related quality of life for this specific group of patients. In view of the lack of published utility values for pregnant women, these estimates were taken from similar populations.

Costs:
The categories of costs included in the analysis and the sources used reflected the perspective of the third-party payer (as stated by the authors). Unit costs were presented for most items with some resource quantities; this increased the transparency of the economic analysis. Typical US sources were used and appeared to be appropriate. Some costs were varied in the sensitivity analysis. Costs were discounted in accordance with US guidelines, but the price year was not
reported.

Analysis and results:
A description of the model structure was presented. A short time horizon was selected to represent the impact of screening duration of the puerperal period (approximately one month post-delivery), but an appropriate lifetime perspective was considered in the cost-effectiveness model. Only incremental ratios were reported for all the scenarios studied; the expected QALYs and costs associated with each screening strategy were not reported. However, results were presented for various scenarios based on model assumptions. The transferability of the results was not discussed, so these findings should be considered specific to the USA.

Concluding remarks:
The study used transparent methods that considered the impact of alternative assumptions on the model results, although little information on clinical sources was reported. The authors' conclusions appear robust.

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