A cost-effectiveness analysis of screening and treatment for Chlamydia trachomatis infection in asymptomatic women

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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.

Health technology
A 'no screening' strategy, screening with tissue cell culture, confirmed enzyme immunoassay, and DNA amplification assays based on either polymerase chain reaction or ligase chain reaction as well as treatment with either a single dose of azithromycin or standard 7-day, twice daily doxycycline were considered for Chlamydia trachomatis infection in asymptomatic women.

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The patient population included 1,000 sexually active women and their male sexual partners. Assumptions for this study were based on the demographic characteristics of the Swedish women's study which focused on women with a mean age of 25, 68% nonparous, 52% marriedhabiting, 85% with a steady partner, with a high minimum level of education, a mean of 11 sexual partners and with a prevalence of genital tract infection with Chlamydia trachomatis and Neisseria gonorrhoea of 8.5% and 0.1% respectively.

Setting
Youth, family planning, and gynaecology clinics. The economic study was conducted in Sweden.

Dates to which data relate
Date were not clearly stated.

Source of effectiveness data
Evidence for final outcomes was based on previously completed studies. It appears that most of the resource use information was based on opinion.

Modelling
A decision-analysis model was constructed using Microsoft Excel spreadsheet software. 1,000 random input values were used to compute outcomes for the model.

Outcomes assessed in the review
The authors explored the sensitivity and specificity of each of the three screening options, the follow-up rate for women
with positive test results and disclosed male partners, infection rates of male partners of infected women, the complication rate with the two different antibiotic regimens, the cure rate and the spontaneous cure rate.

**Study designs and other criteria for inclusion in the review**
Not stated.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

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

**Number of primary studies included**
17 primary studies were included, but the study designs were not stated.

**Methods of combining primary studies**
The narrative method was used to combine the results of the individual primary studies.

**Investigation of differences between primary studies**
Not performed.

**Results of the review**
The ranges of probabilities assigned to the chance nodes of the decision trees were as follows. The sensitivity and specificity of the tissue cell culture was 50% - 90% and 100% respectively. For the confirmed enzyme immunology, the sensitivity and specificity was 70% - 80% and 99% - 100% respectively. The follow-up rate was 75% - 90% for women with positive test results and 60% - 90% for disclosed male partners. The infection rate in male partners of infected women was 50% - 70%. The compliance rate was 50% - 100% for the doxycyline regimen and 100% for the azithromycin regimen. The cure rate was 95% - 100% and the spontaneous cure rate 5% - 10%.

**Measure of benefits used in the economic analysis**
The outcome measure used in the economic analysis was the prevalence of chlamydial infection and cure rates. A decision tree was used to estimate outcomes.

**Direct costs**
Costs were discounted at 5% and 10% per year. Quantities and costs were reported separately. Costs measured included the costs of screening strategies (if used), tissue cell culture, follow-up of a patient, medical care for the women or male partners and untreated chlamydia infection. The health service perspective was adopted. The estimation of quantities was based on a guess and was derived using modelling. Cost estimates were based on medical care costs in Sweden. The date of the price data was not provided.

**Statistical analysis of costs**
Indirect Costs
The indirect costs considered included lost wages and lost value of household management due to sickness or participation in a health care programme.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analysis was conducted to investigate the variability in data. Threshold analysis was conducted to vary the prevalence of C. trachomatis among women from 0% - 100%. Analysis of extremes was undertaken to vary the upper and lower limits for input salaries and costs. Probabilistic sensitivity analysis was conducted at the initial stage of the analysis in order to compute the outcomes of the decision analysis model.

Estimated benefits used in the economic analysis
The benefits used in the economic analysis were prevalence of chlamydial infection and cure rates. For the 'no screening' option, the spontaneous cure rate was around 7.5%. Irrespective of the prevalence rate of chlamydial infection, screening with DNA amplification assay combined with doxycycline treatment of positive patients achieved a female cure rate of 61.2% - 62.6%, 47.7% - 48.9% for their partners and overall a cure rate of 54.8% - 56.2%. In turn, with the enzyme immunoassay screening strategy the figures were 48.8% - 50.0%, 38.4% - 39.4% and 43.9% - 44.9% for women, their partners and overall respectively. Corresponding values for tissue cell culture were 44.7% - 45.7%, 36.4% - 37.2% and 40.7% - 41.7% respectively.

Cost results
The total cost for tissue cell culture varied between $22 - $34, for enzyme immunoassay between $10 - $17 and for enzyme immunoassay confirmation between $11 - $19. For DNA amplification assays the cost was between $22 - $34, for medical care for a woman between $118 - $166 and for medical care for a male partner between $114 - $160. For untreated chlamydial infection in a woman the cost was between $251 - $1,489 and for untreated chlamydial infection in a male partner between $135 - $329.

Synthesis of costs and benefits
An incremental cost per cured woman was calculated. For infected women and their sexual partners, treatment with the doxycycline regimen following screening with DNA amplification assay and enzyme immunoassay significantly reduced the cost per cured woman when compared to the 'no screening' option if the prevalence of chlamydia infection in women exceeded 9% and 14% respectively. In contrast, the tissue cell culture approach was less than the 'no screening' option. At a prevalence of under 4% the cost per cured woman was greater for the DNA amplification screening option and led to a 10.1% - 10.2% better cure rate. Similarly, the same kind of trade-off was seen for the DNA amplification strategy compared to 'no screening' and the enzyme immunoassay screening to 'no screening' option when the prevalence of infection was less than 9% and 14% respectively. Taking the azithromycin approach the overall cure rates were 11%, 13% and 15% for tissue cell culture, enzyme immunoassay and DNA amplification assay respectively and this meant a significantly reduced cost per screened woman for each screening strategy. If the prevalence was less than 6%, enzyme immunoassay was more cost-effective than DNA amplification assay when positive patients were treated with azithromycin. Screening tissue cell culture and azithromycin was cost-effective when the prevalence exceeded 14%.

Authors' conclusions
In asymptomatic female C. trachomatis carriers, if the prevalence of infection exceeds 6% then the most cost-effective
strategy is to screen with DNA amplification assay and then to treat positive patients with azithromycin. Below 6% prevalence, the choice depends on the physician's views of preventing an illness caused by untreated chlamydia infection.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of comparators is clear.

**Validity of estimate of measure of benefit**
The basis for choosing the ranges of probabilities used in the decision tree is not clear. As the authors mentioned, the treatments used may not be effective in advanced cases of the infection so that the benefits described in the study may be over-estimated.

**Validity of estimate of costs**
Resource quantities were reported separately from prices but again, it is unclear how accurate were the resource quantities used.

**Source of funding**
None stated.

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