Cost-benefit analysis of first-void urine Chlamydia trachomatis screening program
Paavonen J, Puolakkainen M, Paakkun M, Sintonen H

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
Chlamydia trachomatis screening programme based on first-void urine testing.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
Asymptomatic women.

Setting
Family planning clinic or student health clinic. The study was carried out in Finland.

Dates to which data relate
The effectiveness data were retrieved from studies previously published between 1980 and 1997. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a review of previously published studies and expert opinion.

Modelling
A decision analytic model was constructed to simulate the set of possible events associated with each strategy and to estimate and combine the measures of costs and effectiveness. A probabilistic sensitivity analysis was carried out with a Monte Carlo simulation of 1,000 cases to test for the statistical significance of cost differences between the screening and no-screening alternative and to account for uncertainty in some parameters.

Outcomes assessed in the review
The outcomes assessed included the prevalence of C. trachomatis infection, the participation rate, the percentage of women who could be reached for therapy when test results were positive, the sensitivity and specificity of the PCR test, the effectiveness of treatment, compliance rate with treatment, the post-pelvic inflammatory disease (PID) infertility rate, and the post-PID tubal pregnancy 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
Approximately 30 primary studies were included in the review.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The prevalence rate of C. trachomatis infection was 5%. The sensitivity and specificity of the PCR test were estimated as 91% and 99%, respectively. It was assumed that 25% of all chlamydial infections in women seen in family planning clinics or student health clinics are symptomatic. The effectiveness of treatment of PID was estimated as 60%. 20% of women with C. trachomatis infection develop symptomatic PID. The prevalence of subclinical PID among those positive for C. trachomatis is 60%. The hospital admission rate among all women with PID was 20%. The overall post-PID infertility rate was estimated as 20%. The post-PID tubal pregnancy rate was estimated as 25%. These data were used as input parameters to the model.

Methods used to derive estimates of effectiveness
Estimates of effectiveness were also derived from expert opinion.

Estimates of effectiveness and key assumptions
The participation rate in the screening programme was assumed to be 75%. 90% of women who had positive test results could be reached for therapy. The proportion of inpatient PID patients treated conservatively was 90%. 90% of individuals with asymptomatic or symptomatic C. trachomatis infection comply with treatment. The prevalence of inpatient PID among those positive for C. trachomatis is 20%. The infertility rate without further evaluation was 25%. These data also formed part of the input parameters to the model.

Measure of benefits used in the economic analysis
The measures of health benefit were the proportion of cured patients and the proportion of patients with long-term complications.

Direct costs
The costs of long-term complications arising in the future were discounted at 4%. Quantities and costs were not reported separately. Direct costs included laboratory and outpatient visit costs, and the costs of long-term complications. The costs of counselling, health education, and contact tracing were assumed to be the same in both arms. The quantity/cost boundary adopted was that of the health care service. The estimation of quantities and costs was based on actual data. The source of cost estimates was the National Research and Development Center for Welfare and Health, Finland. The price year was not stated.

**Statistical analysis of costs**
Mean and standard deviation of the costs for each alternative were calculated. P-values were reported.

**Indirect Costs**
Not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analysis was carried out on the following variables: the prevalence of C. trachomatis infection (2-10%), participation rate in the screening programme (50-100%), proportion of infected women reached for therapy (50-100%), compliance rate (50-100%), proportion of PID patients treated as inpatients (10-30%), and effectiveness of treatment (55-75%).

**Estimated benefits used in the economic analysis**
These are reported in the cost results and synthesis of costs and benefits for the cost-benefit analysis. The proportion of cured patients increased by approximately 62% and approximately 50% fewer had long-term complications with the intervention.

**Cost results**
The cost of screening compared with no-screening was 9% less for a participation rate of at least 75%. The average cost per case was $46 for the screening alternative and $50 for the no-screening alternative (p<0.001). Cost savings increased with an increasing prevalence rate. The threshold value - the value resulting in equal health care costs for screening and no-screening - for the prevalence of C. trachomatis infection was 3.9%. The threshold values were 8.5% for the discount rate, 77% for the compliance rate, and 74% for C. trachomatis infected individuals reached for therapy.

**Synthesis of costs and benefits**
The net savings from a single screening programme in Finland would amount to $3.5 million compared with no-screening.

**Authors' conclusions**
Screening for chlamydial infections is cost-effective even in low-prevalence populations. Compared with a symptom-driven no-screening situation, the PCR test will save money, when the baseline prevalence of C. trachomatis infection exceeds 3.9%.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator was clear.
Validity of estimate of measure of benefit
The measure of benefit seems to be valid. The authors acknowledged that some of the probabilities used in the decision tree were based on clinical studies carried out many years ago and which may no longer be appropriate today. They also conceded that some conditions occur at different rates in different countries with different health care systems. The effect of the screening strategy on the prevalence of chlamydial infections in the population at risk was not examined.

Validity of estimate of costs
The costs of obtaining urine specimens, the value of productivity loss, child-care costs, and costs of psychologic burden were not included. The effect of repeat screening on costs was not examined. No sensitivity analysis was carried out on the costs. Costs were relevant for Finland and may be different for other countries.

Other issues
The no-screening strategy described may differ from actual clinical practice such as syndromic management. The authors did not compare the PCR test with conventional diagnostic methods, such as cell culture or enzyme immunoassays. The authors classified their study as a cost-benefit analysis but did not meet the criteria for this in their analysis. The study was classified as a cost-effectiveness analysis according to the inclusion criteria of NHS EED.

Implications of the study
Future research should compare all the various screening methods for chlamydia trachomatis. Another question which needs to be answered is whether specific subpopulations of women can be selected for screening.

Source of funding
None stated.

Bibliographic details

PubMedID
9699769

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Chlamydia trachomatis/isolation & purification; Cost-Benefit Analysis; Decision Trees; Female; Humans; Mass Screening/economics; Middle Aged; Polymerase Chain Reaction; Sensitivity and Specificity; Urine
microbiology

AccessionNumber
21998001132

Date bibliographic record published
31/07/1999

Date abstract record published
31/07/1999