Modelling the impact of opportunistic screening on the sequelae and public healthcare costs of infection with Chlamydia trachomatis in Australian 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
The study examined a one-off screening strategy for Chlamydia trachomatis (C. trachomatis).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women aged between 15 and 34 years.

Setting
The setting for opportunistic screening is primary care in Australia, as the authors assumed that only general practitioners would provide screening and treatment services.

Dates to which data relate

Source of effectiveness data
The effectiveness data were derived from published studies.

Modelling
A decision tree model was used to predict the health outcomes and public health care costs over the average reproductive life span of women aged 15 to 34 years.

Outcomes assessed in the review
The review identified:

- the rates of infection with C. trachomatis and associated complications such as acute cervicitis and pelvic inflammatory disease (PID);

- the probability that infections were symptomatic;
the probability of ectopic pregnancy or tubo-ovarian abscess following C. trachomatis PID;

the rate of tubal infertility following PID and the success of in vitro fertilisation (IVF);

the rates of complications in children born to women infected with C. trachomatis and the probability of transmission; and

the sensitivity and specificity of polymerase chain reaction (PCR) for the diagnosis of C. trachomatis.

**Study designs and other criteria for inclusion in the review**
The authors did not report the methods used for the review of the literature, but they stated that preference was given to Australian data where possible.

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

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

**Methods used to judge relevance and validity, and for extracting data**
The authors did not report the methods used to extract data from the primary studies. It appears that some parameter estimates might have been based on the authors’ opinions, informed by published estimates.

**Number of primary studies included**
The effectiveness data were derived from a review of at least 25 studies.

**Methods of combining primary studies**
The authors selected only one value for each model parameter. They do not appear to have formally combined estimates from multiple studies.

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

**Results of the review**
In women with C. trachomatis, 25% were assumed to be infected with acute symptomatic cervicitis.

The authors assumed that 20% of women with symptomatic C. trachomatis and 30% with asymptomatic C. trachomatis would develop PID, which would be symptomatic in 50% of cases.

Following PID, it was estimated that 8% of women would experience ectopic pregnancy and 8% would experience tubo-ovarian abscess.

Asymptomatic PID was estimated to lead to 12.8% of women developing tubal infertility. This figure was 35.5% for women with symptomatic PID.

The model assumed that 6% of women would have a live birth while infected with C. trachomatis.

The estimated female-to-male transmission rate was 50% (range: 37 to 68).
Measure of benefits used in the economic analysis
No summary measure of health benefits was calculated so, in effect, a cost-consequences analysis was performed.

Direct costs
The direct public health care costs included the costs of testing, treatment and any savings from prevented C. trachomatis sequelae. The costs were derived from the Medicare schedule, the Pharmaceutical Benefits Scheme, and a study reporting the public hospital inpatient and outpatient costs. The fees were assumed to represent 85% of the Medicare fee schedule, and only a proportion of pharmaceutical costs were assumed to be borne by the public health care system. The resource use quantities and the costs were not reported separately. The costs of any complications expected to occur more than 1 year after an infection were discounted at a rate of 3% per annum over 5 years. It was unclear whether the 5-year figure referred to the time horizon of the model. The authors stated that a discount rate of 3% per annum was used in the base-case. The authors did not report adjusting the costs for inflation.

Statistical analysis of costs
Patient level data were not used in the analysis, thus a statistical analysis was not relevant.

Indirect Costs
The indirect costs were not included in the analysis, which was appropriate given the study perspective.

Currency
Australian dollars (AUD). The costs were also reported in US dollars ($), although the conversion rates and price year were not provided.

Sensitivity analysis
The authors undertook one-way sensitivity analyses around probabilities and public health care costs of outcomes for different prevalence rates of C. trachomatis. The ranges for the sensitivity analysis of effectiveness parameters were predetermined and were derived in the same manner as the point estimates of effectiveness. The source of the ranges for the cost parameters was less clear.

Estimated benefits used in the economic analysis
A one-off screening strategy was estimated to prevent between 4,023 and 17,941 cases of PID, in comparison with no screening, for prevalence rates of C. trachomatis in the range 2.5 to 15%.

Cost results
At a C. trachomatis prevalence rate of 2.5%, the no screening strategy was estimated to cost AUD 17 ($13) per woman, compared with AUD 37 ($28) for the one-off screening strategy.

Both strategies were estimated to cost AUD 39 ($29) per woman at a prevalence rate of 5.7%.

At a prevalence rate of 15%, no screening was estimate to cost AUD 103 ($77) per woman, compared with AUD 47 ($35) for the one-off screening strategy.

For prevalence rates above 5.7% the one-off screening strategy was estimated to be cost-saving to the public health care system.

Synthesis of costs and benefits
Authors' conclusions
Opportunistic screening should be considered in populations with a Chlamydia trachomatis (C. trachomatis) prevalence greater than 5.7%.

CRD COMMENTARY - Selection of comparators
The authors investigated a one-off opportunistic screening strategy as they were interested in estimating the population prevalence at which screening became clinically or economically sensible. They acknowledged that a single lifetime test is implausible as a clinical scenario. The authors compared this strategy with no screening, which was current practice in the study setting. You must decide whether this comparison is useful in your own setting.

Validity of estimate of measure of effectiveness
The authors did not state that a systematic review of the literature had been undertaken. The methodology and conduct of the review were not described, so it was unclear if all relevant studies were identified or if biases were minimised. The effectiveness estimates for each model parameter do not appear to have been combined, although this was unclear. The authors did not consider the differences between the primary studies on their estimate of effectiveness, although they did state a preference for Australian data, followed by data from industrialised Western countries, where possible. The authors stated that they specifically designed the base-case estimates to be conservative, but this obviously involves a subjective interpretation, and it is not possible to validate this from the way the results were reported.

Validity of estimate of measure of benefit
The estimation of the clinical outcomes of infection with C. trachomatis were modelled, but were generally not reported in detail. The exception was the number of cases of PID prevented. The authors did not specify a measure of health benefits for the economic analysis, which included only costs but was not based on the therapeutic equivalence of treatment alternatives.

Validity of estimate of costs
It would appear that all the categories of cost relevant to the perspective adopted were included in the study. There was minimal reporting of the cost data used in the analysis, which limits the generalisability of the study results. In addition, the costs and the quantities were not reported separately. The resource use data were obtained from published sources. The ranges tested in the sensitivity analyses were not reported, which limits the interpretation of the study findings. The cost data were based on fee schedules in the study setting, adjusted for the proportion borne by the public health care system. These are unlikely to be generalisable outside of the study setting. The authors also reported their results in US dollars, but the conversion rate and price year were not reported. The reason for reporting the costs in US dollars was not provided.

Other issues
The authors did not compare their findings with those from similar studies. The issue of generalisability to other settings was not addressed. The authors did not present their results selectively and their conclusions reflected the scope of their analysis. The authors acknowledged that they omitted some less common outcomes in which C. trachomatis may play a causative role, but that this should be conservative and underestimate the benefits of screening.

Implications of the study
The authors recommended that further studies should be conducted to develop a dynamic model that assesses a broader screening programme.
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