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 strategy of population-based screening for urogenital Chlamydia trachomatis infections using a home sampling programme in 15- to 24-year-old men and women. All eligible individuals received an annual direct mail invitation to be tested by means of a self-administered sample taken in the privacy of their own home, which was then sent to a central diagnostic laboratory. Men received the actual test kit comprising a urine test tube together with the invitation letter, while women received a postcard to be returned in order to have a test kit consisting of a vaginal swab mailed to them. The laboratory then mails the test result to the individual and, if positive, the individual must see a health care provider for antibiotic treatment and partner notification. The programme was compared with the current strategy of in-office screening where testing is recommended if an individual presents symptoms or signs of chlamydia during a general practitioner (GP) office visit, or if it is known that the individual has been exposed to chlamydia or another sexually transmitted disease. Partner notification is performed by means of patient referral, namely, the patient is asked to inform the partner about potential exposure and the need to seek a doctor for test and treatment.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised a hypothetical cohort of 15- to 24-year-old men and women.

Setting
The setting was the home and primary care. The economic study was carried out in Denmark.

Dates to which data relate
The clinical data came from studies published between 1975 and 2003. No dates for the resource use data were reported. The price year was 2002.

Source of effectiveness data
The clinical and epidemiological inputs of the decision model were:

- data on the number of tests and detected infections associated with the current strategy,
- data on the prevalence of infection,
- the effectiveness of the home sampling strategy,
data on partner testing,

behavioural data on sexual activity, and

the natural history of chlamydial infection (transmission risk, incubation time, recovery rates, hospitalisations, risk of complications etc.).

**Modelling**

Initially, a published epidemiological model based on Monte Carlo simulations in a population of 10,000 men and women was used to estimate the yearly incidence and prevalence of chlamydial disease in the context of different strategies for screening and partner notification. The time horizon of the model was 10 years. This model was also used to project the clinical and economic outcomes of the two screening strategies for every year. A graphical representation of the model was provided. The authors considered all potential complications of Chlamydia trachomatis, including pelvic inflammatory disease (PID), chronic pelvic pain (CPP), infertility, ectopic pregnancy and neonatal pneumonia.

**Sources searched to identify primary studies**

Data on the number of tests and detected infections associated with the current strategy were obtained from the Danish surveillance system for chlamydial disease. Data on the prevalence of infection came from a Danish observational test indication study assessing 11,423 samples. The effectiveness of the home sampling strategy was derived from a randomised clinical trial in 4,000 women and 5,000 men, carried out in Denmark during October 1997. Data on partner testing came from a randomised multi-centre study involving 414 women and 148 men in Danish centres. Behavioural data on sexual activity were obtained from a Danish survey. Information on the natural history of chlamydial infection was obtained from two reviews of the literature. Some experts’ opinions were also used.

**Methods used to judge relevance and validity, and for extracting data**

Some data were derived from published reviews of the literature. However, no systematic search for the other data used in the model was reported. The authors emphasised the fact that the use of a large, randomised clinical trial to obtain data on the new programme represented a strength of the analysis.

**Measure of benefits used in the economic analysis**

The summary benefit measure was the number of major outcomes averted (MOA), which included symptomatic PID, CPP, infertility, ectopic pregnancy and neonatal pneumonia. The number of MOA was estimated using the modelling approach. A discount rate of 3% was applied to benefits observed after the first year.

**Direct costs**

The analysis of the costs was carried out from the viewpoint of society. It included the direct costs associated with testing and treatment, hospitalisations, GP visits and drugs (mainly antibiotics). The treatment of all complications due to chlamydial infection for men, women and newborns was considered in the model. The direct medical costs were broken down into two main categories, intervention costs and averted costs. Intervention costs included changes in costs due to the increase in testing and use of antibiotics. Averted costs incorporated the costs avoided owing to the drop in the number of complications resulting from the programme. The unit costs and the resource quantities were not presented separately for all items. Resource use was mainly derived from an expert panel. The costs were derived from multiple sources, including diagnosis-related groups, GP reimbursement fees and market prices for drugs. The costs were incurred over a 10-year period and an annual discount rate of 3% was applied. The price year was 2002.

**Statistical analysis of costs**

The costs and quantities were treated deterministically.
Indirect Costs
The analysis adopted a societal perspective. It appropriately included the indirect costs associated with the value of productivity lost due to absenteeism from work in connection with chlamydial infection. This item was estimated using the human capital approach, thus the costs were derived from average labour costs in the private sector adjusted for age, gender and unemployment in the Danish setting. The unit costs and the quantities of resources used were not presented separately. As in the analysis of the direct costs, the price year was 2002 and an annual discount rate of 3% was applied.

Currency
Danish kroner (DKK) converted into US dollars ($). The conversion rate was $1.00 = DKK 8.00.

Sensitivity analysis
A univariate sensitivity analysis was carried out to assess the robustness of the cost-effectiveness ratios to variations in several model inputs. The inputs investigated included the discount rate, level of partner notification, expansion of age group to include all 15- to 29-year-old men and women, the risk of PID and the costs of screening tests. Alternative scenarios in which partner notification for the home sampling strategy was not considered, or the ongoing opportunistic screening was combined with the new partner notification system, were also considered.

Estimated benefits used in the economic analysis
Over a 10-year period in a hypothetical cohort of 10,000 individuals, the discounted MOA associated with the home sampling strategy in comparison with the current strategy were 136.6. The MOA were mainly PID (83%) and CPP (12%).

The number of MOA increased progressively over time from year 1 to year 10. Overall, the use of the home sampling strategy reduced the Chlamydia trachomatis prevalence from 4.2% to 1.0% over 10 years.

If no partner notification was considered, the new strategy only reduced infection prevalence to 2.9%.

Finally, if the ongoing opportunistic screening were combined with the new partner notification system, the prevalence fell to 1.8%.

Cost results
Over a 10-year period in a hypothetical cohort of 10,000 individuals, the discounted direct costs associated with the home sampling strategy over the current strategy were $49,398, while there was a saving in indirect costs of $146,626.

In total, the new strategy led to a cost-saving of $97,228. In particular, when both direct and indirect costs were considered, the home sampling strategy was more expensive in year 1 and 2, but less expensive starting from year 3, given the higher number of MOA. In year 10, even the direct costs were lower for the home sampling strategy than for the current strategy.

Synthesis of costs and benefits
Incremental cost-effectiveness ratios (ICERs; i.e. the incremental cost per MOA averted) were calculated in order to combine the costs and benefits of the alternative strategies.

Under base-case assumptions, the home sampling strategy was dominant, meaning that it led to fewer adverse outcomes and lower costs in comparison with the current strategy. This result also held when only direct medical costs were considered (perspective of the health care system).

The results of the sensitivity analysis corroborated the base-case findings, as the new strategy remained the dominant option in different scenarios. The parameters with higher impact on cost-effectiveness results were the degree of
partner referral and the estimated risk of PID for asymptomatic patients. Only when improved partner referral was not modelled did the home sampling strategy have additional costs and the ICER over the current strategy was $1,535 per MOA.

Authors’ conclusions
Home sampling screening for chlamydial infection would reduce the incidence of disease in comparison with the current strategy of in-office screening. This would result in lower costs and fewer adverse events from the perspective of society.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. The current study was based on guidelines from the National Board of Health for the diagnosis and treatment of chlamydial disease in Denmark. The new strategy had already been tested in two clinical trials and was applied to the Danish setting. You should decide whether these are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
Most clinical data came from published studies. Extensive information on the types of sources used to derive clinical inputs was provided. In general, Danish sources were used. The use of information from large clinical trials ensures the validity of the clinical estimates. The methods used to combine the primary estimates were described. The natural history of the disease came from published reviews, which would appear appropriate. Some assumptions were also made. Some key clinical inputs were tested in the sensitivity analysis.

Validity of estimate of measure of benefit
The summary benefit measure was modelled. MOA represent a disease-specific measure, which cannot be directly compared with the benefits of other health care interventions. The use of quality-adjusted life-years to compare the study findings with other published economic evaluations of screening tests would have been interesting.

Validity of estimate of costs
The analysis of the costs was consistent with the chosen perspective. The authors stated that unpaid work was not included. Other potential cost categories, such as intangible costs, were not considered since this represents a controversial item in all economic evaluations. The sources of the data were reported for most items, which were estimated using Danish sources. A breakdown of single items was not given for all costs since the costs of complications were presented as macro-categories. This might limit the possibility of replicating the analysis in other settings. Statistical analyses of the costs and quantities were not performed and only test costs were varied in the sensitivity analysis.

Other issues
No comparisons with the findings of previous studies were made. The authors stated that, given the potential differences in screening participation rates and partner notification programmes, caution should be exercised if extrapolating the results of the current study to other countries or settings. Only limited results from the sensitivity analyses were presented and this reduces the external validity of the study. The authors noted some limitations of the analysis, such as the limitations of the available data used in the model (especially data on the nature of untreated asymptomatic chlamydial infections).

Implications of the study
The study results support the implementation of a population-based home sampling programme for Chlamydia trachomatis infections.

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Other publications of related interest
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Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Chlamydia Infections /diagnosis /epidemiology /prevention & control; Chlamydia trachomatis; Cost-Benefit Analysis; Decision Trees; Denmark /epidemiology; Female; Forecasting; Health Care Costs /statistics & numerical data; Humans; Incidence; Male; Mass Screening /economics /methods; Monte Carlo Method; Office Visits /economics; Outcome Assessment (Health Care); Prevalence; Self Care /economics; Specimen Handling

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