Effectiveness and cost-benefit of enhancements to a syphilis screening and treatment program at a county jail


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 evaluation of a screening and treatment programme for syphilis at a US county jail. The screening procedure involved the use of the rapid plasma reagin (RPR) test. Positive results were verified with the fluorescent treponemal antibody absorption test (FTA-ABS).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised male and female inmates of the Nassau County Correctional Centre (NY). All of the inmates were eligible for entry to the study. Those inmates who were not available for blood testing, due to being transferred or released, were excluded from the study.

Setting
The setting was an institution (US county jail). The study was conducted in Nassau County (NY), USA.

Dates to which data relate
The data were collected between 1 June 1993 and 31 May 1995. The resource use data were collected alongside the trial. The costs of treating syphilis were derived from studies published between 1992 and 1997.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costs for the screening and treatment procedure were calculated on the basis of the screening protocol, rather than using the actual costs incurred by the patients.

Study sample
The use of power calculations was irrelevant in this study, as it did not detect differences in the outcomes between the two treatment strategies. There was no active sample selection since the aim was to screen as many inmates as possible.

The study sample was appropriate for the evaluation of a screening programme in this setting. The total number of
inmates screened over the two years was 18,442. This represented 69% of all the inmates admitted over the study period.

**Study design**
This was a case-series study conducted in a single centre. A follow-up period was unnecessary, as this was a cost study limited to a screening programme. In addition, the study did not evaluate the treatment outcomes experimentally.

**Analysis of effectiveness**
The analysis was conducted on an intention to treat basis. No health outcomes were evaluated in the study as it was assumed that the patients receiving the treatment were cured.

**Effectiveness results**
Of the 26,829 inmates incarcerated at the jail over the 2 years, 18,442 (69%) were tested.

Of those inmates tested:

- 606 inmates (3.3%) tested positive with the RPR test;
- 323 cases (53.3%) were classified as requiring treatment following a case registry search, although only 257 cases were confirmed positive with the FTA-ABS test; and
- 183 (71.2%) of the confirmed cases were offered treatment, of which 11 inmates (6%) refused.

Sixty-nine inmates with syphilis were released before treatment had commenced, and only 13 of these were eventually tracked down and treated.

**Clinical conclusions**
The screening protocol was effective in identifying patients and offering prompt treatment.

**Modelling**
A decision tree analytic model was used to estimate the outcomes from untreated syphilis and thus the associated costs. This was then used to calculate the costs avoided by the screening and treating programme.

**Measure of benefits used in the economic analysis**
The authors did not derive a summary measure of health benefit. The study should therefore be classified as a cost-consequences analysis.

**Direct costs**
The unit costs and quantities of screening were reported separately. The direct costs included were relevant to the payer of the health care and screening programmes in an institutional setting (in this case, a county jail).

The direct costs were those that were directly relevant to, and paid for by the screening protocol. These included the laboratory personnel, supplies and antibiotic treatment. The costs of the laboratory personnel and supplies were considered to have been the cost of the 2-year grant for the study. The costs of the antibiotics were taken from nationally published sources.

When evaluating the costs avoided by treating syphilis, the authors included the costs related to the treatment of congenital syphilis acquired by children from their mothers. This included medical costs, and the cost of potential institutionalisation of the infant or any special schooling required.
The costs of late syphilis and neurosyphilis were taken from a published study (see Other Publications of Related Interest). This considered lifelong home or nursing care, surgical intervention for cardiovascular syphilis, and acute hospitalisation and medical costs.

A model was used to estimate the total costs avoided by the screening programme.

The study reported marginal costs.

The costs of screening were in 1993 to 1995 prices. The costs of treating congenital, late and neurosyphilis were from national schedules published in 1992 and 1997. All prices were converted to 1994 US dollars.

The discounting of future costs would have been relevant, as the study was carried out over a 2-year time period, and the costs averted by treatment would also occur sometime in the future. However, there was no evidence that the future costs were discounted, except for the cost of treating a child with congenital syphilis.

Since the clinic, staff, laboratory facilities and the programme co-ordinator were in place at the start of this study, their start-up costs were excluded from the analysis. The authors stated that the study occupied slack time in the laboratory, hence there was no marginal cost for the use of such facilities.

**Statistical analysis of costs**

No statistical analysis was carried out.

**Indirect Costs**

The indirect costs were not included in this study.

**Currency**

US dollars ($).

**Sensitivity analysis**

A sensitivity analysis was not carried out. However, a breakeven analysis was performed.

**Estimated benefits used in the economic analysis**

See the 'Effectiveness Results' section.

**Cost results**

The total cost of screening was $181,050. This comprised $3,738 for antibiotics, and $177,312 by way of grants for laboratories and staff.

The estimated cost averted due to the screening was $1,654,134. Of this, $72,207 was attributed to the prevention of congenital syphilis and $1,581,927 to the prevention of late syphilis.

**Synthesis of costs and benefits**

The authors reported a net benefit of $1,473,084 ($1,654,134 - $181,050). The costs were not discounted.

The breakeven prevalence was 0.15% (28.13 cases identified). The baseline prevalence in the study was 1.4% (257 cases).

**Authors' conclusions**
The cost-savings of the screening programme were over nine times the cost of implementing the programme. The cost of the antibiotic treatment was very small in comparison with the averted costs of late syphilis.

**CRD COMMENTARY - Selection of comparators**
The screening programme was implicitly compared with the 'no treatment' programme. You should decide if the comparator represents current practice in your own settings.

**Validity of estimate of measure of effectiveness**
The analysis was based on a case series, which was appropriate for the study question. The study sample was representative of the study population. The analysis was performed on an intention to treat basis. This is considered best practice, as, although it has the effect of widening variance estimates, it is least likely to bias the results.

**Validity of estimate of measure of benefit**
The effectiveness of the screening protocol was assessed using two parameters. First, the proportion of confirmed syphilis cases appropriately identified. Secondly, the proportion of the confirmed cases that were treated, or offered treatment, prior to release from the jail. The authors did not perform any sensitivity analysis on their parameters.

**Validity of estimate of costs**
All the cost categories relevant to the perspective of the study were included in the analysis. The authors explicitly stated that the start-up costs (the costs of establishing a laboratory and hiring staff) were excluded on the grounds that the facilities already existed in their setting. In addition, the study protocol occupied otherwise slack time. These start-up costs may have been considerable, and may have altered the conclusions of the study. You should decide whether this approach is relevant to your own setting.

The costs and quantities of the screening procedure were reported separately, thus enhancing the generalisability of the results. However, it is suggested that the paper of Schmid and Zaidi (see Other Publications of Related Interest) should be consulted for details of the costs of late syphilis. No statistical or sensitivity analyses of the quantities or prices were performed. All the prices were converted to 1994 US dollars.

The costs were not discounted. This overemphasised future costs, thus exaggerating the future savings. However, it would be difficult to assign an appropriate discount factor, due to the uncertainty over when the complications of late syphilis occur. Anyway, the programme was shown to be highly cost-saving, especially as quality of life issues and the possibility of partner infection were excluded.

**Other issues**
In this study, the costs saved by treating syphilis were considered to be benefits, and thus the authors referred to this as a cost-benefit analysis. However, this database classified the study as a cost-consequences analysis, because the cost-savings should be counted as negative costs rather than as outcomes. The consequences here would be the number of inmates treated or the number of acute cases prevented.

The authors made appropriate comparisons of their findings with those of other studies. The issue of generalisability to other settings was not directly addressed, although the authors commented that local jails offer a unique public health opportunity for intervention and prevention in an at-risk group. The authors did not appear to present their results selectively. The results did reflect the scope of the study, in that the authors attempted to enrol every inmate of the jail over the two-year period.

The authors reported some limitations to their study. These included the absence of rapid blood testing within the jail itself, which imposed delays whilst the samples were tested in a laboratory. During this time, a number of inmates were released and thus could not be included in the study.
Implications of the study
Due to the loss of considerable numbers of short-stay inmates, the authors recommended that on-site 24-hour testing facilities should be available to capture all cases of syphilis. They acknowledged that the cost may be prohibitive, but that the protocol employed in their setting appeared to be a move towards a cost-effective middle ground.

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None given.

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Other publications of related interest

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