Voluntary screening program for HIV in pregnancy: cost effectiveness
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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 evaluation of a voluntary human immunodeficiency virus (HIV) screening programme for pregnant women. Women who declined the test were offered a later test. The time point of pregnancy at which the test was offered was not mentioned.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised pregnant women who were either naval personnel or the beneficiaries of naval personnel.

Setting
The setting was a hospital. The economic study was carried out in San Diego, USA.

Dates to which data relate
The effectiveness data were collected between 1995 and 1997. The prevalence rates used related to 1987 (civilian applicants for military service), 1995 (pregnant women in the USA) and 1995 to 1997 (active duty naval personnel). The cost data for treating an HIV-positive newborn were published in 1996. The screening costs related to the period in which the screening was performed (1995 to 1997).

Source of effectiveness data
The analysis used a single study with other model parameters derived from published sources.

Link between effectiveness and cost data
The total screening costs were derived from the same patient sample as that used in the effectiveness study.

Study sample
The study sample consists of 11,948 pregnant women. Of these, 11,925 women accepted the screen and 23 declined. It appears that all the women attending this centre for antenatal care were included in this study, thus the sample was representative of the study population. The number of non-pregnant active duty personnel was not reported. No power calculations were performed to determine the sample size.
Study design
This was an uncontrolled single-centre descriptive study.

Analysis of effectiveness
The number of HIV cases of HIV identified was considered. All patients included in the study were accounted for in the analysis.

Effectiveness results
In the study, no cases of HIV were identified among the pregnant women (the incidence of HIV seroprevalence was zero). During the same period, the prevalence of HIV among active duty personnel receiving mandatory testing was 0.024%.

Clinical conclusions
No cases of HIV were identified among the pregnant women. This may be due to the low sample size or incidence of HIV in the study population. The authors viewed this screening programme as effective, since 99.78% of the pregnant women accepted the test and those who did not continued with their antenatal care at the clinic.

Modelling
A "business decision theory analysis model” (a decision tree) was used to estimate the costs and outcomes of the patients' two options, test or no test.

Measure of benefits used in the economic analysis
The measure of benefit used was cases of HIV identified.

Direct costs
The direct costs included the costs to the hospital of a screening test ($8.70) and a course of neonatal treatment ($100,000 - $200,000). The cost of the screening test was obtained from the author's centre, whilst the cost of neonatal treatment was obtained from published literature. The quantities and the costs were reported separately. The price years were 1996 (screening test cost) and 1995 to 1997 (treatment cost).

Indirect Costs
The indirect costs were not included in the analysis.

Currency
US dollars ($).

Sensitivity analysis
The authors presented separate results using three alternative estimated seroprevalence rates:

the 1995 rate among pregnant women in the United States (0.0015);
the rate among non-pregnant civilian applicants for military service in Los Angeles (0.0022); and
the rate among non-pregnant active duty naval personnel during the study period (0.00024).

The first two prevalences were obtained from observational studies; the latter was obtained from the authors' own
setting. This sensitivity analysis was performed to address uncertainty about the actual prevalence rate in the study population (zero). In addition, to enhance the generalisability of the results to other study populations.

**Estimated benefits used in the economic analysis**
The numbers of cases identified per 11,925 people tested were:

- 17.89 when using the rate of HIV among pregnant women in the general civilian population;
- 26.24 when using the rate of HIV among civilian applicants to the military; and
- 2.86 when using the rate of HIV among active duty naval personnel.

**Cost results**
The total cost of testing during the study period was $103,747.50 (11,925 tests).

Without antenatal treatment, the total costs of neonatal treatment were $447,000 to $894,000 for the general civilian population, $656,000 to $1,312,000 for civilian applicants, and $72,000 to $143,000 for active duty naval personnel.

With antenatal treatment, the total costs of neonatal treatment were $143,000 to $286,000 for the general civilian population, $210,000 to $420,000 for civilian applicants, and $23,000 to $46,000 for active duty naval personnel.

**Synthesis of costs and benefits**
The cost per case identified was estimated. This was an incremental estimate as, presumably, when no tests were offered the cost of a test and the number of cases identified were both zero. The cost per case identified was $5,799.19 for the general civilian population, $3,953.80 for civilian applicants, and $36,275.35 for active duty naval personnel.

**Authors' conclusions**
This voluntary screening programme was considered to be effective. However, the cost of the screening programme should be weighed against the cost of treating newborns positive for human immunodeficiency virus (HIV).

**CRD COMMENTARY - Selection of comparators**
The "No screening programme" was the implicit comparator. This is unlikely to be relevant to the National Health Service, or other Western health care systems, where antenatal HIV screening is established.

**Validity of estimate of measure of effectiveness**
The analysis was based on an uncontrolled study, which was inappropriate for the study question. The true effectiveness of the voluntary screening programme cannot be estimated since women may have been diagnosed by other means. The study sample was representative of the study population. The estimation of benefits was modelled using appropriate techniques. The health outcomes, such as the newborn infections prevented or the quality-adjusted life-years gained, were not discussed in the analysis. The authors acknowledge that further epidemiological research is warranted for the study population since there is likely to be some seroprevalence of HIV.

**Validity of estimate of costs**
All the categories of cost relevant to the perspective adopted appear to have been included in the analysis. The resource costs and the unit quantities were reported separately. No statistical or sensitivity analyses of the prices were performed. Some relevant costs were omitted from the analysis, namely treatment for women diagnosed with HIV and antenatal treatment. The authors described the education and reassurance provided to women who agreed to be tested. They also mentioned that close observation and neonatal testing is required in cases where the woman refuses to be tested.
However, these costs were not included in the analysis.

**Other issues**
The authors did not compare their findings with those from other studies. The issue of generalisability to other settings was not addressed directly. However, the authors estimated the cost-effectiveness results for the study population using the prevalence of HIV in active duty naval personnel, general civilian and civilian applicant populations. The cost-effectiveness results obtained are likely to be more applicable to those populations than to the study population. The authors did not present their results selectively. Seroprevalence was estimated for pregnant, active duty naval personnel and this was reflected in the author's conclusions. The authors presented a decision tree diagram, although it was not always clear how they used this tree to generate their results. For example, the total cost of treating HIV-positive newborns was based on the assumption that treating and not treating HIV-positive women were mutually exclusive decisions. In reality, some women will receive treatment for HIV and some will not. Thus, the total cost of treating the neonates should be a weighted average cost.

**Implications of the study**
This study revealed uncertainty as to the estimated prevalence of HIV in the study population, which was found to be zero. The authors recommend further epidemiological studies in the military.

**Source of funding**
None stated.

**Bibliographic details**

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

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