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 an initiative for human immunodeficiency virus (HIV) prevention that included rapid testing and counselling in high-risk communities.

Type of intervention
Public health policy (incorporating screening, diagnosis and education with the ultimate aim of primary prevention).

Economic study type
Cost-effectiveness analysis.

Study population
The target population studied was high-risk persons living in the USA.

Setting
The setting was outpatient care. The economic study was carried out in the USA.

Dates to which data relate
Calculations were made using clinical and epidemiological data from studies published between 1997 and 2006, cost data from studies published between 2003 and 2006, and adjusting the costs to 2005 dollars.

Source of effectiveness data
Key data for the model included:

- the percentage of clients HIV-positive;
- the HIV-positive annual transmission rate (unaware of seropositivity);
- HIV-positive annual transmission rate (aware of seropositivity);
- the percentage of clients testing HIV-positive already aware or who do not return for their results;
- the percentage of clients testing HIV-negative who do not return for their results;
- the annual infection rate for HIV-negative clients without counselling and testing;
- the reduction in annual infection rate for HIV-negative clients due to counselling and testing.
Modelling
A mathematical model was used to combine epidemiological, clinical and cost data from various sources. It was assumed that infections prevented were truly averted rather than delayed. Scenario analysis was required to estimate the number of clients served, the number of new seropositive cases discovered, the number of new infections prevented and the gross cost per infection averted, given the budget of $93 million for the initiative. Model inputs were presented and described in detail in the paper.

Sources searched to identify primary studies
The values for these inputs were supported by reference to published epidemiology or analytical studies or published national statistics, although it was stated in nearly all cases that the precise value used was either assumed by the author or based on a similar assumption used in other analyses.

Methods used to judge relevance and validity, and for extracting data
It was not stated whether a systematic review was performed. Most of the papers referenced were written by the same author as the present study, or published by the US Centers for Disease Control and Prevention, but it was not stated whether these were the only potential sources of the data required.

Measure of benefits used in the economic analysis
The measure of benefit used was the avoidance of HIV infection. The author stated that a cost-utility analysis was unnecessary where an intervention was cost-saving.

Direct costs
The author estimated that the costs for programme evaluation, technical assistance and surveillance information for targeting services would comprise 10% of the programme's costs, but provided no justification for this assumption. The costs of providing counselling and testing were taken from published work, inflated to 2005 values using an appropriate index, and presented for both societal and payer perspectives. The costs were not broken down by type, quantity or unit price in the paper. It was stated that administrative costs were included under both perspectives. The gross cost per infection averted was used in the economic evaluation and compared with the discounted net present value of the lifetime medical care costs of one HIV disease. An inverse form of budget impact was presented, in that the total funds available for the programme (i.e. $93 million) were used to work backwards and calculate the level of benefits obtainable for those funds, under epidemiological assumptions.

Statistical analysis of costs
The data were considered to be deterministic.

Indirect Costs
Under the societal perspective, the author stated that a valuation was included for the client's time spent receiving services and their transport, but the method of evaluation was not described. Under the payer perspective, the clients absorbed these costs, rather than the programme. The relevance of the societal perspective to the study objectives was not discussed, given that it did not appear that the programme was intended to cover these costs for clients.

Currency
US dollars ($).

Sensitivity analysis
The author appears to have carried out one-way sensitivity analyses but did not report the results, except to state that the formulae used in the model were linear and so any impact of a percentage change in the value of an input parameter on
the results could be readily anticipated.

**Estimated benefits used in the economic analysis**
Under the payer perspective, it was found that the total infections averted with a programme budget of $93 million would number 2,537. This number dropped to 1,223 when a societal perspective was adopted.

**Cost results**
The total costs were set from the beginning with a programme budget of $93 million.

**Synthesis of costs and benefits**
The gross cost per infection averted was $36,663 under the payer perspective and $76,019 under the societal perspective.

In comparison with estimated lifetime costs of $200,000 for the care of an HIV-positive patient, the prevention programme was deemed to be cost-saving.

**Authors’ conclusions**
Under the payer perspective, coverage did approach 3 million clients. Up to 26,984 persons would newly learn their seropositive status and the intervention would be cost-saving. Coverage and identification of positivity for the human immunodeficiency virus (HIV) was lower under the societal perspective.

**CRD COMMENTARY - Selection of comparators**
The implicit comparator was no prevention programme for HIV funding, that is, the funds would be diverted elsewhere. The author later acknowledged that the present study did not address the question of whether the proposed programme represented the optimal use of resources in the prevention of HIV and suggested that this should be a topic for further research. The lack of a useful comparator limits the generalisability of the study for health policy decision-makers in this way and also because the study did not consider whether HIV prevention should benefit from additional funds more than another health problem. The implication that under more general public policy the funds might be allocated entirely outside the area of health was also not addressed. You should decide whether the comparator, no prevention programme for HIV, is a reasonable and current comparator in your setting.

**Validity of estimate of measure of effectiveness**
The epidemiological and clinical data were identified from published research and national statistics. However, the collection of data was not conducted systematically and the use of author’s assumptions for many inputs, while reasonably supported by published literature, was not necessarily adequately validated within the study. Combined with the lack of multivariate sensitivity analysis and the absence of any reported sensitivity analysis, it is impossible to accurately estimate the impact of these many assumptions on the results and the conclusions of the study.

**Validity of estimate of measure of benefit**
The use of infections avoided was a reasonable benefit measure within the HIV therapy area, although it does not fully capture the benefits of the intervention or facilitate comparisons with the outcomes for other health interventions. Survival or a quality-adjusted analysis would have added some complexity to the analysis, which the author did not believe was justified in light of the cost-saving results for infections avoided. However, given that this approach does not address the question of whether the programme is cost-effective in comparison with other HIV interventions, as the author acknowledged, the use of a generic measure of benefit would have at least permitted indicative comparisons with other interventions in other therapy areas.

**Validity of estimate of costs**
It appears that relevant costs for the chosen perspectives have been captured. A lack of information on the costs and quantities prevents a realistic assessment of the quality of the cost estimation. The author noted that the important costs of partner counselling and referral services were not included in the analysis. The author did not explain the choice of a societal perspective in the study, given that federal funds for prevention programmes are not usually expected to cover patient transport and productivity costs. This was despite commenting on another payer issue whereby not all persons testing HIV-positive in the USA would actually have access to appropriate health care. The costs assumed for lifetime treatment of HIV patients included medical costs only and an appropriate figure including indirect costs was not provided.

Other issues
The author compared the findings of this study with previous studies conducted by the same author, although the studies had different objectives. The issue of generalisability was not addressed and only the US setting was considered. However, this was appropriate in light of the study objective of evaluating the proposed US prevention programme. The author does not appear to have presented his results selectively, although the absence of sensitivity analyses prevents a complete picture of the analysis being formed. The author's conclusions reflected the scope of the study. Unfortunately, the important issue of the lack of a comparator, combined with the liberal use of author's assumptions and non-systematic data collection, limits the reliability and usefulness of the study.

Implications of the study
The author concluded that the amount set aside for the prevention programme would be impactful, have very favourable public health benefits and be cost-saving. However, it does not address all unmet HIV needs in the USA. In addition, the study has not evaluated whether the planned initiative represents the best possible use of resources in HIV prevention. This should be the subject of future research to inform policy-makers.

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