Economic evaluation of an HIV prevention intervention for gay and bisexual male adolescents

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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
An HIV prevention programme for gay and bisexual male adolescents; the prevention programme consisted of individual risk assessment and risk reduction counselling, peer education, optional HIV antibody testing and counselling, referral to medical and psychosocial services as needed, and longitudinal follow-up.

Type of intervention
Primary prevention.

Economic study type
Cost-utility analysis.

Study population
13 to 21 year-old men who were self-identified as gay or bisexual or who had sex with men.

Setting
Hospital. The economic study was carried out in Minnesota, USA.

Dates to which data relate
The main effectiveness data were collected between 1989 and 1994. Some of the clinical probabilities were obtained from published studies or reports between 1987 and 1997. The date to which the resource use data related was not explicitly specified. Some cost data were extracted from the published literature between 1993 and 1997. Some price data related to 1990 and 1992, and these were adjusted to 1994 using the consumer price index.

Source of effectiveness data
Effectiveness data were derived from a single study, a review of the literature, and assumptions made by the authors.

Link between effectiveness and cost data
The costing was retrospectively performed on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. The study sample included a total of 501 patients.

Study design
The study was a case series, carried out in a single centre. The mean duration of follow-up was 4.5 months. Loss to
follow up was 25%. The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not explicitly specified. The health outcomes and clinical probabilities were the frequency of anal intercourse, the consistent use of condoms, substance abuse severity scores, use of amphetamines and amyl nitrite, quarterly average number of risky partners of uninfected non-participants, quarterly average number of risky partners of infected non-participants, quarterly average number of risky partners of uninfected participants, quarterly average number of risky partners of infected participants, and initial HIV prevalence. The health outcomes were derived using initial and follow-up interviews.

**Effectiveness results**
The decrease in the frequency of anal intercourse was 23%. There was a 50% increase in the consistent use of condoms and a 13% decrease in substance abuse severity scores. Use of amphetamines and amyl nitrite, declined by 6% and 9% respectively. The quarterly average number of risky partners of uninfected non-participants was 1.232 (range used in the sensitivity analysis: 0.652 - 1.812) and the quarterly average number of risky partners of infected non-participants was 1.232 (range: 0.652 - 1.812). The quarterly average number of risky partners of uninfected participants was 0.645 (range: 0.345 - 1.232) and the quarterly average number of risky partners of infected participants was 0.645 (range: 0.345 - 1.232). Initial HIV prevalence was 0.02 (range: 0.016 - 0.04).

**Clinical conclusions**
The intervention decreased the risk of HIV transmission, thus affecting the HIV prevalence in the population.

**Modelling**
A mathematical model was used to project the observed behavioural effects into future outcomes.

**Outcomes assessed in the review**
The published literature was used to provide clinical probabilities, including a parameter to adjust HIV prevalence at each year end due to general ageing in and out of the 13 to 21 year-old cohort, the probability of HIV transmission in each infected-uninfected partnership, and the percentage of gay and bisexual adolescents recruited into the intervention.

**Study designs and other criteria for inclusion in the review**
Not reported.

**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**
Not reported.

**Number of primary studies included**
A total of 8 studies or reports were included.

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

Results of the review
A parameter to adjust HIV prevalence at each year end due to general ageing in and out of the 13-to 21-year-old cohort was estimated at 0.15 (range used in the sensitivity analysis: 0.05 - 0.25). The probability of HIV transmission in each infected-uninfected partnership was estimated to be 0.06 (range: 0.025 - 0.105) and the percentage of gay and bisexual adolescents recruited into the intervention was 8 (range: 2 - 15).

Methods used to derive estimates of effectiveness
Assumptions about effectiveness were also made by the authors.

Estimates of effectiveness and key assumptions
It was assumed that:
(1) without intervention, no changes would occur in risky behaviours in the target population over time;
(2) less risky behaviour due to the intervention would last for only 1 year before relapsing to the previous level of risk;
(3) the selection of partners would occur without consideration to their HIV serostatus;
(4) the age distribution in the target population was equal;
(5) a zero growth rate was assumed for the target population during the 10-year period.

Measure of benefits used in the economic analysis
The benefit measure was quality-adjusted life years (QALYs) saved. HIV seroprevalence in the target population by the end of a 10-year period, and number of infections averted were also reported. Benefits were discounted at a rate of 3%.

Direct costs
Costs were discounted. Quantities were generally reported separately from the costs. Cost items were reported separately from the costs. The cost analysis covered the operative and overhead costs and medical savings due to the intervention programme. A societal perspective was adopted in the study. The sources of cost data were medical records of the study centre and the literature. 1994 price data were used. The cost data from 1990 and 1992 were adjusted to 1994 using consumer price indices.

Indirect Costs
Costs were discounted. Quantities and costs were not reported separately. Human capital gains (the present value of expected lifetime earnings minus the productivity gains over the 10 year time frame of the study) were calculated using the human capital approach. Details were given for the method of estimation of the productivity gains. The price year was 1994.

Currency
US dollars ($).

Sensitivity analysis
One-way simple sensitivity analyses were performed on almost all parameters of the model.

**Estimated benefits used in the economic analysis**  
The prevalence at the end of a 10-year period without intervention was estimated to be 6.1% versus 5.6% with intervention. 13 infections were averted. 180 QALYs were saved, equivalent to 16.9 QALYs saved per HIV infection averted. The discount rate was 3%.

**Cost results**  
The discount rate was 3%. The total cost of the intervention was $1.1 million for a 10-year period. The human capital gains were estimated to be $1,112,466.

**Synthesis of costs and benefits**  
The incremental cost per QALY and total benefit minus total cost were used to combine the costs and benefits. The incremental cost-utility ratio was $6,180 per QALY saved. The net benefit to society was about $10 million over the 10-year time frame of the study. The sensitivity analysis established the relative robustness of the results to changes in the parameters of the model in reasonable ranges.

**Authors' conclusions**  
This study highlights that an HIV prevention programme can be cost-effective even if the effects on behaviour are partial and short term.

**CRD COMMENTARY - Selection of comparators**  
The reason for the choice of the comparator is clear.

**Validity of estimate of measure of benefit**  
The authors acknowledged that the internal validity of the estimates of benefit may have been weakened by "the use of a volunteer sample and a simple pretest and posttest design". As insufficient details of the literature search were provided it was not possible to assess the extent to which this was systematic.

**Validity of estimate of costs**  
Quantities were generally reported separately from the costs, and adequate details of the methods of cost estimation were given. Cost results are specific to the USA and may not be generalisable to other settings or countries.

**Other issues**  
Sensitivity analyses were used to explore the robustness of the model findings and the authors made appropriate comparisons with other studies.

**Implications of the study**  
As stated by the authors, further research based on more data when they become available, would be very useful to decision makers in the process of allocating resources to those HIV prevention interventions, which produce the greatest benefits to society.

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