Updates of cost of illness and quality of life estimates for use in economic evaluations of HIV prevention programs
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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
Three scenarios for the detection of HIV infection and progression of related disease were presented.

In scenario 1, diagnosis occurs when the CD4 cell count is between 200 and 499/mm$^3$ after 6 years of undiagnosed infection. No viral load monitoring is conducted and only zidovudine (ZDV) monotherapy is used.

Scenario 2 assumes that diagnosis is made after 2 years of undiagnosed infection, the patient progresses through periods of viral load monitoring only, 2-drug combination therapy (2'-deoxy-3'-thiacytidine (3TC)) and 3-drug combination therapy which adds a protease inhibitor (saquinavir) to the 2-drug combination. This regimen is in accordance with IAS recommendations and standard dosing schedules are assumed.

Scenario 3 assumes diagnosis immediately follows infection and that the patient is given viral load monitoring and 3-drug therapy from diagnosis.

The authors labelled the three scenarios low-cost, intermediate-cost and high-cost.

Type of intervention
Secondary prevention; Treatment.

Economic study type
Cost-utility analysis.

Study population
HIV infected persons in the USA.

Setting
Institutions and the community. The economic study was carried out in the USA.

Dates to which data relate
QALY valuations were based on studies published between 1990 and 1996. Assumptions of disease progression were based on a study published in 1994. Costs are presented as June 1996 dollars.

Source of effectiveness data
Estimates of quality of life in various health states were based on a survey of studies. Other estimates of final outcomes were based on opinion.
Modelling
None was used.

Outcomes assessed in the review
The outcomes assessed were quality of life estimates for stages 2, 3 and 4 of the disease.

Study designs and other criteria for inclusion in the review
The authors included empiric studies purporting to measure the perceived value of HIV-related health states. Studies whose results could be matched to the disease phases used in the present study were used. Studies where HIV-infected patients formed the study population were preferred, although one study surveying physicians as proxies for their patients was also used. Only studies carried out in the United States were considered relevant.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Six studies were used.

Methods of combining primary studies
The median value of all estimates within each phase of the disease was used.

Investigation of differences between primary studies
Not stated.

Results of the review
The median value of 1 year in phase 2 was 0.76 QALY. The median value of 1 year in phase 3 was 0.65 QALY. The median value of 1 year in phase 4 was 0.62 QALY.

Methods used to derive estimates of effectiveness
Estimates of time spent in various health states for scenario 1 ("low-cost") were based on previous studies, however the authors described these previous estimates as assumptions. Scenarios 2 and 3 were based on the authors' assumptions, and they stated clearly that there was uncertainty in a number of these. Benefits are discounted at 0%, 3% and 5%, with the base case given as scenario 2 (intermediate cost) discounted at 3%.

Estimates of effectiveness and key assumptions
QALY values were:

phase 1A: 0.94,
phase 1B: 0.91,
phase 1C: 0.87,
phase 1D: 0.82.

In scenario 1 ("low cost") the patient is assumed to spend 6 years in phase 1A, 3 years in phase 2, 1 year in phase 3 and 2 years in phase 4. Total survival from infection is 12 years, 9.93 QALYs or 26.85 QALYs saved by avoiding the infection.

In scenario 2 ("intermediate cost") the patient is assumed to spend 2 years in phase 1A, 1 year in phase 1B, 3 years in phase 1C, 4 years in phase 2, 1 year in phase 3 and 2 years in phase 4. Total survival from infection is 16 years, 12.79 QALYs or 23.87 QALYs saved by avoiding the infection.

In scenario 3 ("high cost") the patient is assumed to spend 12 years in phase 1D, 6 years in phase 2, 1 year in phase 3 and 2 years in phase 4. Total survival from infection is 21 years, 16.29 QALYs or 20.37 QALYs saved by avoiding the infection.

Discounting by 3%, 13.18 QALYs would be saved by avoiding infection in scenario 1, 11.23 in scenario 2 and 9.34 in scenario 3. Discounting by 5%, 8.57 QALYs would be saved by avoiding infection in scenario 1, 7.10 in scenario 2 and 5.87 in scenario 3.

Measure of benefits used in the economic analysis
The measure of benefits used in the economic analysis were QALYs saved by avoiding a case of HIV.

Direct costs
Two estimates of total non-drug costs per patient were given, although the authors' conclusion was based on Hellinger's empirically derived cost of illness estimates, based on the AIDS Cost and Service Utilization survey. Also quoted are non-drug cost estimates by Gable et al based on expert judgements about the implementation of various protocols for treating HIV disease. Costs of drugs, using standard dosing schedules, and monitoring were obtained from a published source. The viewpoint of the analysis is not clear.

Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Using a discount rate of 3% and the low cost scenario, 13.18 QALYs would be saved before the age of 65 by avoiding the disease (or 13.18 QALYs lost through contracting the infection compared with the average person without HIV). Under the intermediate scenario 11.23 QALYs would be saved by avoiding the disease and under the high cost scenario 9.34 QALYs. Using a discount rate of 5% and low cost scenario, 8.57 QALYs would be saved before the age of 65 by avoiding the disease (or 8.57 QALYs lost through contracting the infection compared with the average person without HIV). Under the intermediate scenario, 7.10 QALYs would be saved by avoiding the disease and under the high cost scenario 5.87 QALYs. Using no discount rate and the low cost scenario, 26.85 QALYs would be saved before the age of 65 by avoiding the disease (or 26.85 QALYs lost through contracting the infection compared with the average person without HIV).
without HIV). Under the intermediate scenario, 23.87 QALYs would be saved by avoiding the disease and under the high cost scenario 20.37 QALYs. The authors proposed that a discount rate of 3% and the intermediate scenario, which gives a result of 11.23 QALYs, should be used as the base for measuring the benefits of HIV prevention programmes.

Cost results
Using a 3% discount rate and Hellinger's estimates, the cost of illness in the low cost scenario is $87,045, in the intermediate scenario it is $195,188 and in the high cost scenario it is $296,844. Using a 3% discount rate and Gable's estimates the cost of illness in the low cost scenario is $56,595, in the intermediate scenario it is $154,402 and in the high cost scenario it is $248,224. Using a 5% discount rate and Hellinger's estimates the cost of illness in the low cost scenario is $71,143, in the intermediate scenario it is $157,348 and in the high cost scenario it is $239,945. Using a 5% discount rate and Gable's estimates the cost of illness in the low cost scenario is $46,236, in the intermediate scenario it is $124,728 and in the high cost scenario it is $202,073. Using no discount rate and Hellinger's estimates the cost of illness in the low cost scenario is $118,892, in the intermediate scenario it is $274,766 and in the high cost scenario it is $424,763. Using no discount rate and Gable's estimates the cost of illness in the low cost scenario is $77,351, in the intermediate scenario it is $216,544 and in the high cost scenario it is $351,053. The authors propose that Hellinger's estimate, a discount rate of 3% and the intermediate scenario, which gives a result of $195,188, should be used as the base for measuring the benefits of HIV prevention programmes.

Synthesis of costs and benefits
Costs and benefits were not synthesised. The reason for this is that the authors' intention was not to compare results from the three scenarios used, but to provide a tool for measuring the cost/QALY of HIV prevention programmes.

Authors' conclusions
Using the recommended 3% discount rate the lifetime cost of an HIV infection is $155,000 while the number of QALYs lost to an infection is 11.23. These are the figures that should be used in evaluating HIV prevention programmes.

CRD COMMENTARY - Selection of comparators
The 3 scenarios presented in this study are not true comparators though they could have been used as such. They are used merely to exemplify differences in treatment regimens without any attempt to compare either treatments or costs.

Validity of estimate of measure of benefit
There is a high level of uncertainty over several of the survival assumptions in this study. Since the authors have pointed them out, it is valid to include them in the study. The authors have added a complication to their measurement of QALYs by subtracting the expected QALYs of HIV patients from expected QALYs of the average non-HIV United States adult under 65.

Validity of estimate of costs
Resource quantities were not given and heavy reliance was placed on previous cost estimates. No advantage was gained by presenting two estimates of non-drug costs, since the authors made no comment on the differences between the two, and recommended the use of one of them, without giving reasons for their choice.

Other issues
The authors have succeeded in their aim of demonstrating the differences in cost-utility results that can arise from using different discount rates.

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