Cost-effectiveness of a post-exposure HIV chemoprophylaxis program for blood exposures in health care workers

Marin M G, Van Lieu J, Yee A, Bonner E, Glied S

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
Post-exposure HIV chemoprophylaxis programme for blood exposures in health care workers.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
Hypothetical cohort of 100,000 health care workers.

Setting
Hospital. The study was carried out in the USA.

Dates to which data relate
Effectiveness data were collected from studies published between 1993 and 1994. Cost data were collected from 1996-1997 sources. The price year was 1996.

Source of effectiveness data
Effectiveness data were derived from a literature review.

Modelling
A decision analytic tree was used to model the cost-utility of the various treatment strategies.

Outcomes assessed in the review
The review assessed the following outcomes: failure to complete treatment, complications related to treatment, the likelihood that the source of exposure was truly seropositive for HIV, the risk that the exposed individual will seroconvert to HIV positivity, and the effectiveness of chemoprophylaxis in preventing seroconversion.

Study designs and other criteria for inclusion in the review
Not stated.
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
Summary statistics from individual studies.

Number of primary studies included
At least two studies were included in the review.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Not stated.

Results of the review
63% of health care workers who initiate zidovudine (AZT) chemoprophylaxis complete therapy. Health care workers who fail to complete therapy have a risk of seroconversion similar to that of those who are untreated. The complication rate is 44% in treated patients and 31% in those who do not complete treatment. The seropositivity rate of the source of exposures is 35%. The seroconversion rate in an untreated health care worker exposed to an HIV-positive source is 0.3%. Single drug therapy with AZT is 80% effective in preventing seroconversion. The three-drug regimen was assumed to be 100% effective in preventing seroconversion. The prevalence of HIV positivity in University Hospital patients whose HIV status is unknown was approximately 35%. The overall incidence of side effects of treatment was 39%. These data formed the principal input parameters to the decision tree.

Measure of benefits used in the economic analysis
Quality-adjusted life years (QALYs) and the number of cases that would be prevented if 100,000 exposures were treated (rather than not treated) were used as the measures of benefit. The impact of developing HIV disease on quality of life was taken from a study published in 1997. It was assumed that HIV infection occurred at 26 years of age and that patients would survive for 12 years from time of infection until death. QALYs were discounted at an annual rate of 3%.

Direct costs
Direct costs were discounted at an annual rate of 3%. Quantities and costs were reported separately. Direct costs included wholesale costs of drugs, staff time devoted to risk assessment and counselling, and the cost of follow-up laboratory testing. The quantity/cost boundary adopted was that of the health service. The estimation of cost and quantities was based on actual data. Estimated costs were based on the experience at New York Presbyterian Hospital and a study published in 1997. The price year was 1996.

Statistical analysis of costs
Not reported.
Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were performed on the following parameters: rate of completion of therapy, the proportion of patients who develop complications from drug therapy, the proportion of seropositivity of the sources of exposure, and the risk of seroconversion from an exposure.

Estimated benefits used in the economic analysis
For 100,000 exposures, AZT chemoprophylaxis versus no treatment prevented 52.92 health care workers from seroconverting to HIV positivity. The number of seroconversions prevented per 100,000 exposures increased to 66.15 for three-drug therapy. The average number of QALYs saved by preventing HIV disease was 23.87.

Cost results
Total direct costs were not presented separately.

Synthesis of costs and benefits
The cost of preventing a case of seroconversion was $1,967,746 for AZT alone, and the cost per QALY saved was $175,222. The cost of preventing a case of seroconversion was $2,138,099 for three-drug therapy, and the cost per QALY saved was $190,392. If only exposures to known seropositive sources were treated, the cost of preventing a case was decreased by 71%.

Authors' conclusions
Chemoprophylaxis with AZT is cost-effective in preventing occupationally-acquired cases of HIV, particularly when used in settings where the source of exposure is known to be positive and/or the exposure is severe.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. You, as a user of this database, should verify whether these health technologies are relevant to your setting.

Validity of estimate of measure of benefit
Two relevant measures of benefit were used. The effectiveness data, used to construct the decision tree, however, may have been derived from a non-systematic review of the literature. The internal validity of the data derived from the literature cannot therefore be fully assessed given the limited information provided about the review and the quality assessment of the primary studies. The authors noted that, because of the uncertainty of the increased efficacy of three-drug versus single drug chemoprophylaxis, it was difficult to assess the relative cost-effectiveness of the treatments. The authors were able to identify only two studies that provided effectiveness estimates.

Validity of estimate of costs
Only direct costs were considered. Other costs such as those related to lost productivity were not included but would have been relevant to a societal perspective. Costs related to further treatment of HIV-infected patients were not calculated. Cost estimates were derived from local sources, and are unlikely to be generalisable to other settings. No sensitivity analysis was conducted to test the robustness of the cost results.
Other issues
Adequate comparisons with other relevant studies were made. Although the generalisability of the results to other settings or countries was not discussed the authors do not appear to have presented their results selectively. The study examined health care workers exposed to blood and this was reflected in the authors' conclusions.

Implications of the study
The authors do not advocate abolishing post-exposure HIV chemoprophylaxis. Rather, they stressed the importance of appropriate risk stratification as an approach to making this chemoprophylactic treatment more cost-effective. Future research should focus on the benefit of three-drug therapy over single-drug chemoprophylaxis.

Source of funding
None stated.

Bibliographic details

PubMedID
10491791

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Anti-HIV Agents /economics /therapeutic use; Cost-Benefit Analysis; Decision Trees; Drug Therapy, Combination; HIV Infections /prevention & control; Health Care Costs; Humans; Infectious Disease Transmission, Patient-to-Professional /prevention & control; Middle Aged; Models, Econometric; New Jersey; Quality-Adjusted Life Years; Zidovudine /economics /therapeutic use

AccessionNumber
21999001760

Date bibliographic record published
30/09/2000

Date abstract record published
30/09/2000