Prioritization of prevention activities to combat the spread of HIV/AIDS in resource constrained settings: a cost-effectiveness analysis from Chad, Central Africa
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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 use of the following interventions to reduce the number of new cases of human immunodeficiency virus (HIV) infections:

- mass media and social marketing of condoms;
- peer education for high-risk groups (high-risk men, young people and sex workers);
- the prevention and treatment of sexually transmitted infections;
- anti-retroviral therapy to prevent mother-to-child transmission;
- breast feeding advice to prevent mother-to-child transmission;
- the testing of donated blood; and
- voluntary testing and counselling.

Type of intervention
Primary and secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population was the population of Chad.

Setting
The interventions considered in this study were set in the community, and in primary and secondary care. The economic study was carried out in Chad, Africa.

Dates to which data relate
The effectiveness evidence was taken from papers published between 1995 and 2001. The resource use data was taken from studies published between 1993 and 2001. The price year was 2002.

Source of effectiveness data
The effectiveness data were derived from a review or synthesis of completed studies, augmented by estimates based on the authors’ opinion.
Outcomes assessed in the review
The following effectiveness results were derived from the literature;

- the reduction in HIV infection incidence due to mass media and social marketing of condoms;
- the numbers of high-risk men, young people and sex workers that need to be targeted by peer education to prevent one HIV infection;
- the reduction in HIV prevalence due to the prevention and treatment of sexually transmitted infections;
- the reduction in transmission of HIV infection from mother to baby through the treatment of HIV-positive pregnant women with AZT (zidovudine) and breast feeding advice; and
- the increase in condom use following voluntary testing.

Study designs and other criteria for inclusion in the review
Although inclusion criteria were not reported, the authors stated that two recently completed systematic reviews were heavily drawn upon for effectiveness estimates (Yha et al. 2001 and Kumararayake et al. 2001, see 'Other Publications of Related Interest' below for bibliographic details).

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
The clinical effectiveness data were derived from approximately 13 primary studies.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
The following effectiveness results were derived from the literature:

- reduction in HIV infection incidence due to mass media, no value was available;
- reduction in HIV infection incidence due to social marketing of condoms, 5% (range: 0 - 30);
- number of high-risk men that need to be targeted by peer education to prevent one HIV infection, 116 (range: 92 - 150);
number of sex workers that need to be targeted by peer education to prevent one HIV infection, 1 (range: 1.5 - 0.6); 
reduction in HIV prevalence due to the prevention and treatment of sexually transmitted infections, 40% (range: 0 - 60); 
reduction in transmission of HIV infection from mother to baby through the treatment of HIV-positive pregnant women with AZT, 50% (range: 37 - high value not given); 
reduction in transmission of HIV infection from mother to baby through breast feeding advice, 17% (range: 10 - 30); and 
increase in condom use following voluntary testing, 100% (range: 50 - 200)

Methods used to derive estimates of effectiveness
The authors made assumptions about several of the effectiveness estimates used in this study. No details of how these assumptions were made were given.

Estimates of effectiveness and key assumptions
The authors assumed the following estimates of effectiveness:

- a 10% increase in condom use amongst young people due to peer education; and
- a 90% reduction in HIV infection due to the screening of donated blood used for transfusions.

Measure of benefits used in the economic analysis
The measure of health benefit used was the number of HIV infections prevented. This information was derived directly from the effectiveness evidence.

Direct costs
The perspective of the study was unclear and it seems to have varied depending on the interventions considered. Consequently, it was not possible to identify whether all the appropriate costs were included. All the resource use and cost data were taken from published studies. Some breakdown of the unit costs and resource quantities was provided in the paper, but there was no information on discounting of the costs. The price year was 2002.

Statistical analysis of costs
The cost data were treated deterministically.

Indirect Costs
No indirect costs appear to have been included in the study.

Currency
US dollars ($).

Sensitivity analysis
Two-way sensitivity analyses were performed to assess the impact of variability in the data. The ranges were either taken from the literature or assumed by the authors.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

**Cost results**  
The following costs were identified:

- **mass media and social marketing of condoms**, $500,000 (no range) for a countrywide campaign and $0.145 per condom distributed (range: 0.10 - 0.20);
- **peer education for sex workers**, $15.83 per education (range: 10 - 20) and $0.02 per condom;
- **peer education for high-risk men**, $5.00 per high-risk man reached (range: 0.26 - 10);
- **peer education for young people**, $121 per secondary school teacher trained (range: 60 - 180);
- **prevention and treatment of sexually transmitted infections**, $12.65 for treatment (range: 10 - 15) and $5.00 per HIV diagnostic test;
- **anti-retroviral therapy to prevent mother-to-child transmission**, $5.70 per HIV test (no range), $0.50 per counselling session (no range) and $89.00 for anti-retroviral therapy (no range);
- **breast feeding advice to prevent mother-to-child transmission**, $10.00 per woman reached (range: 5 - 10);
- **testing of donated blood**, $5.70 per HIV test (no range); and
- **voluntary testing and counselling**, $5.7 per HIV test (no range) and $0.50 for counselling (no range).

**Synthesis of costs and benefits**  
The following cost effectiveness ratios were identified:

- **mass media and social marketing of condoms**, $534 per HIV infection prevented;
- **peer education for sex workers**, $16 per HIV infection prevented;
- **peer education for high-risk men**, $580 per HIV infection prevented;
- **peer education for young people**, $530 per HIV infection prevented;
- **targeted prevention and treatment of sexually transmitted infections**, $2,748 per HIV infection prevented;
- **mass prevention and treatment of sexually transmitted infections**, $4,617 per HIV infection prevented;
- **targeted anti-retroviral therapy to prevent mother-to-child transmission**, $939 per HIV infection prevented;
- **mass anti-retroviral therapy to prevent mother-to-child transmission**, $5,394 per HIV infection prevented;
- **targeted breast feeding advice to prevent mother-to-child transmission**, $2,424 per HIV infection prevented;
- **mass breast feeding advice to prevent mother-to-child transmission**, $3,564 per HIV infection prevented;
- **testing of donated blood**, $84 per HIV infection prevented; and
- **voluntary testing and counselling**, $1,190 per HIV infection prevented.

The sensitivity analysis showed considerable uncertainty over the cost-effectiveness ratios, with some ratios being up to four times greater than the base-case when unfavourable assumptions were used. The results of the sensitivity analysis
were presented.

Authors' conclusions
The most cost-effective interventions to prevent human immunodeficiency virus (HIV) infections were peer education of sex workers and the screening of blood donors.

CRD COMMENTARY - Selection of comparators
The authors compared nine policies to reduce HIV infections in Chad, but this was not a complete list of possible interventions. You should consider how these policies relate to your own setting, as well as other possible alternatives, before applying the results of this study.

Validity of estimate of measure of effectiveness
The estimates of the effectiveness of the various policies considered were derived from published studies, supplemented by the authors' assumptions. No details of the methods used to identify and assess the quality of the papers used to obtain the effectiveness data were provided. Consequently, it was not possible to assess the extent of bias in the methods used. Although the authors sometimes used more than one paper to obtain their estimate of effectiveness, they did not report the means by which they arrived at their final figure.

Validity of estimate of measure of benefit
The measure of health benefit used in the economic analysis was derived directly from the effectiveness data. The reader is thus referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective of the economic study was not explicitly reported. Thus, it is difficult to establish whether all the appropriate costs were included in the study, or to comment on the likely impact of omissions. It would appear that the costing perspective was intervention-specific; given the differences between the interventions considered this is likely to be a valid approach. The paper included some breakdown of the unit costs and resource quantities. The resource use and unit cost data were taken from published studies, and a sensitivity analysis was undertaken to assess the impact of variability in the data. This increases the generalisability of the study findings. No discounting of the costs was reported but, since the timeframe of the study was unclear, discounting might not have been required. A clear price year was reported which will allow future reflation exercises.

Other issues
The authors' conclusions reflected the scope of their analysis. The authors compared their findings with those from other similar studies and considered possible explanations for the differing results. They did not make any attempts to generalise their findings outside Chad. The authors also assessed the budget impact of the interventions being evaluated. These results were presented in full.

Implications of the study
The authors did not make any specific recommendations for changes in practice or for further research.

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**Other publications of related interest**


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**MeSH**
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