The clinical impact and cost-effectiveness of routine, voluntary HIV screening in South Africa

Walensky RP, Wood R, Fofana MO, Martinson NA, Losina E, April MD, Bassett IV, Morris BL, Freedberg KA, Paltiel AD, Cost-Effectiveness of Preventing AIDS Complications - International Investigators

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.

CRD summary
This study examined the cost-effectiveness of three voluntary HIV screening strategies, which were screening once in a lifetime, screening every five years, and annual screening, in addition to the usual practice for identifying HIV-infected individuals. The authors concluded that annual voluntary HIV screening, in South Africa, was highly cost-effective, even with very limited uptake and access to care and treatment. The cost-effectiveness framework was valid and key areas of uncertainty were considered. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of three voluntary HIV screening strategies, which were screening once in a lifetime, screening every five years, and annual screening, in addition to the usual practice for identifying HIV-infected individuals.

Interventions
The interventions were added to the usual practice and they were screening once at 33 years old, screening every five years, and annual screening. The usual practice was to identify patients by background testing, where HIV infections were detected in voluntary counselling and testing sites, tuberculosis clinics, sexually transmitted infection centres, or antenatal clinics, or by patients presenting to a health practitioner with an AIDS-defining opportunistic disease.

Location/setting
South Africa/primary care.

Methods
Analytical approach:
The analysis was based on a population-level model of HIV detection, namely the Cost-Effectiveness of Preventing AIDS Complications (CEPAC) International model. A lifetime horizon was considered. The authors did not explicitly state the perspective adopted.

Effectiveness data:
The clinical data were estimated using data from selected studies mainly conducted in South Africa, including the Cape Town AIDS Cohort (CTAC) study, which provided the data on patients’ characteristics and epidemiology. The screening accuracy and efficacy were from other published studies. Some assumptions were made. The disease prevalence was a key input for the model.

Monetary benefit and utility valuations:
The utility values considered the decrements in quality of life due to test-associated stigma and the decrements in quality of life due to diagnosis-associated stigma. These values were from published literature.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and they were discounted at an annual rate of 3%.
Cost data:
The economic analysis included the costs of HIV testing, HIV care, routine care, in-patient and out-patient hospital care, cluster of differentiation four (CD4) count, and HIV ribonucleic acid (RNA) test. The unit costs and quantities of resources used were from the CTAC study, the Clinton Foundation HIV/AIDS Initiative 2009 list of negotiated prices, and other published sources. They were in US dollars ($) and were discounted at an annual rate of 3%. The price year was 2006.

Analysis of uncertainty:
Various alternative scenarios were considered, with different assumptions for selected model inputs. Alternative values were from published sources or authors' assumptions. One- and two-way sensitivity analyses were conducted.

Results
Considering the whole population, the projected costs per person were $2,330 with usual practice, $2,570 with screening once, $2,740 with screening every five years, and $3,330 with annual screening. The quality-adjusted life expectancy was 213.7 months with usual practice, 215.7 months with screening once, 216.8 months with five-yearly screening, and 221.0 months with annual screening.

The incremental analysis showed that screening once was weakly dominated, as it was less effective and less cost-effective, by five-yearly screening, while the incremental cost per QALY gained was $1,570 with five-yearly screening over usual practice and $1,720 with annual screening over five-yearly screening. Both strategies were economically attractive compared with the per capita gross domestic product (GDP) threshold in South Africa.

The cost-effectiveness of screening remained in several scenarios, even when assuming low baseline HIV prevalence and incidence. Antiretroviral therapy efficacy was the parameter with the strongest impact on the cost-effectiveness ratios. Annual screening was, in general, the most cost-effective strategy and this conclusion was robust.

Authors' conclusions
The authors concluded that annual voluntary HIV screening, in South Africa, was highly cost-effective, even with very limited uptake and access to care and treatment.

CRD commentary
Interventions:
A justification for the selection of the comparators was provided. The five-yearly screening strategy was an intermediate option compared with the other two strategies. The choice of the comparators appears to have been appropriate and reflected the feasibility of screening and test acceptance.

Effectiveness/benefits:
The clinical studies were selected, without a literature review, to represent the South African context. These sources were appropriate for the patients' characteristics and epidemiology. Other data were from sources that were not described, which makes it impossible to fully judge the quality of the data, but extensive sensitivity analyses were conducted and the assumptions were conservative against the screening options. These points tend to support the authors' conclusions. No information on the derivation of the utility values was provided, but the impact of varying these inputs was considered in the sensitivity analysis. QALYs were a valid benefit measure because the disease has a substantial impact on both survival and quality of life.

Costs:
The authors did not explicitly state the perspective, but the types of costs suggest a health care payer perspective. Most of the costs were presented as category totals and limited information was given on the accounting approach used in the sources for these economic data, which reduces the transparency of the analysis. Other details, such as the price year and discounting, were clearly stated. The costs were treated deterministically, but variations in the estimates were considered in the sensitivity analyses.

Analysis and results:
The results were extensively presented and an appropriate incremental approach was used to combine the costs and
benefits, allowing the exclusion of dominated strategies. The uncertainty was investigated using a deterministic approach, which focused on selected inputs to reflect variations in the model inputs and differences in the epidemiological parameters. The authors stated that their results were likely to be generalisable outside South Africa, in countries with similarly high HIV prevalence.

Concluding remarks:
The cost-effectiveness framework was valid and key areas of uncertainty were considered. The authors’ conclusions appear to be robust.

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