The cost-effectiveness analysis of initiating HIV/AIDS treatment with efavirenz-based regimens compared with nevirapine-based regimens in Thailand
Maleewong U, Kulsomboon V, Teerawattananon Y

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
The objective was to examine the cost-effectiveness of efavirenz-based regimens compared with nevirapine-based regimens as first-line therapy for patients with human immunodeficiency virus (HIV) or acquired immune deficiency syndrome (AIDS). The authors concluded that starting with efavirenz was cost-effective compared with nevirapine from the perspective of the Thai health care provider. The methods were valid and the analysis was representative of the Thai setting. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The aim was to examine the cost-effectiveness of efavirenz-based compared with nevirapine-based regimens as first-line therapy for human immunodeficiency virus (HIV) or acquired immune deficiency syndrome (AIDS) patients aged 15 to 65 years.

Interventions
The nevirapine regimen comprised nevirapine, stavudine, and lamivudine. If adverse events, drug resistance, or major opportunistic infections occurred, the second-line regimen was two nucleoside reverse transcriptase inhibitors plus a non-nucleoside reverse transcriptase inhibitor and the third-line regimen was protease inhibitor-based. The efavirenz regimen replaced nevirapine with efavirenz. The second- and third-line regimens were the same as for nevirapine.

Location/setting
Thailand/out-patient.

Methods
Analytical approach:
The analysis used a probabilistic Markov model with a long-term (lifetime) horizon and a hypothetical cohort of patients aged 15 to 65 years. The authors stated that the perspective of the health care provider was adopted.

Effectiveness data:
The key clinical data were the transition probabilities. These were from a retrospective study, conducted in four regional hospitals in Thailand, which included records of 408 patients on nevirapine and 116 patients on efavirenz, who were followed-up for three years. These data were supplemented with information from a large randomised controlled trial, identified by a published Cochrane review.

Monetary benefit and utility valuations:
The disability weights were from various sources, including the Global Burden of Disease, an Australian study, and expert opinion.

Measure of benefit:
Disability-adjusted life-years (DALYs) and life-years (LYs) were the summary benefit measures and they were discounted at a 3% annual rate.
Cost data:
The economic analysis included the costs of antiretroviral drugs, laboratory tests, medical services, and in-patient and out-patient treatment of complications. These costs were presented as category totals. The drug costs were from official national sources of reference costs for antiretroviral drugs. All other costs were from the retrospective cohort of Thai patients, who produced the transition probabilities. All costs were in Thai baht (THB). Future costs were discounted at a 3% annual rate and the price year was 2006.

Analysis of uncertainty:
A probabilistic Monte Carlo simulation was undertaken on all the input parameters, which were assigned predetermined probability distributions. The details of the probabilistic simulations were reported. Cost-effectiveness acceptability curves were generated for several willingness-to-pay thresholds, including the recommended threshold of THB 300,000, which was three times the gross domestic product per capita. The results were presented for various age groups and baseline cluster of differentiation 4 (CD4) cell counts.

Results
Depending on patient age, the lifetime cost of treatment ranged from THB 1,560,000 to THB 2,027,000 for nevirapine and from THB 982,000 to THB 1,954,000 for efavirenz regimens. LYs gained ranged from 13.26 to 24.10 for nevirapine and from 13.21 to 24.13 for efavirenz. DALYs averted ranged from 4.14 to 6.08 for nevirapine and from 4.23 to 6.25 for efavirenz.

The incremental analysis showed that efavirenz dominated nevirapine, which was more expensive and less effective, except in the 20-year-old age group with a baseline CD4 cell count of 200 cells per cubic mm, where the incremental cost per DALY averted with efavirenz over nevirapine was THB 1,200,000. The incremental cost per LY gained with efavirenz over nevirapine ranged from THB 6,082,000 to THB 28,772,000 depending on patient age.

In a typical 38-year-old patient, efavirenz was dominant regardless of the baseline CD4 cell count, when using DALYs as the summary benefit measure. These results were generally confirmed in the probabilistic sensitivity analysis and efavirenz had a very high probability of being cost-effective at THB 300,000 per person.

Authors' conclusions
The authors concluded that starting therapy with an efavirenz-based regimen was cost-effective compared with a nevirapine-based regimen from the perspective of the Thai health care provider.

CRD commentary
Interventions:
The authors justified their selection of the comparators for their setting, with efavirenz being less toxic, but more expensive than nevirapine.

Effectiveness/benefits:
The clinical evidence was from a retrospective study and its methods were not reported, which makes it difficult to objectively assess the validity of the clinical data. Some adjustments for differences in age and clinical characteristics between the two groups were made. Supplementary data were from a randomised controlled trial, which was not described, but should have had high internal validity given the strengths of its design. The disability data were from published sources, which were not described. This introduced some uncertainty into the analysis, but an extensive sensitivity analysis was undertaken. Both benefit measures were appropriate and DALYs were recommended for use with low-income countries, such as Thailand.

Costs:
The economic analysis was consistent with the perspective in the cost categories and their sources. A detailed breakdown of cost items was not provided and the unit costs and quantities of resources were not presented separately. Most of the costs were reported as category totals and the approach used to derive them was not described. The price year and the use of discounting were reported. The cost estimates were treated deterministically in the base case, but probabilistic distributions were assigned in the sensitivity analysis.
Analysis and results:
The results were clearly reported and the costs, benefits, and incremental cost-effectiveness ratios were presented. The methods were valid, but the analysis focused on the specific country and care should be taken when extrapolating the results to other health care systems. The structure and assumptions of the decision model were clearly presented. The results were appropriately reported for various subgroups of patients. The issue of uncertainty was satisfactorily investigated in a probabilistic analysis. Conventional discounting was applied to both the costs and benefits.

Concluding remarks:
The methods were valid and the analysis was representative of the Thai setting. The authors’ conclusions appear to be robust.

Funding
Supported by Chulalongkorn University, Thailand; the Health Intervention and Technology Assessment Program; the Thai Health Promotion Foundation; the National Health System Research Institute; and the Bureau of Health Policy and Strategy, Ministry of Public Health.

Bibliographic details

PubMedID
19253494

Original Paper URL
http://www.mat.or.th/journal/index.php?command=preview&amp;selvol=91&amp;selno=2&amp;selids=2233

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Anti-HIV Agents /economics /therapeutic use; Benzoxazines /economics /therapeutic use; Cohort Studies; Cost-Benefit Analysis; Female; HIV Infections /drug therapy /economics; Humans; Male; Markov Chains; Middle Aged; Models, Economic; Nevirapine /economics /therapeutic use; Probability; Quality-Adjusted Life Years; Reverse Transcriptase Inhibitors /economics /therapeutic use; Thailand; Young Adult

AccessionNumber
22009101329

Date bibliographic record published
02/09/2009

Date abstract record published
30/06/2010