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Cost-effectiveness of switching to second-line therapy with lopinavir/ritonavir in Africa: estimates based on DART trial results and costs for Uganda

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Background

Recent reports from a large trial in Uganda and Zimbabwe (Chimbete *et al.*, CROI 2008, poster 832) indicate substantial immunological responses for patients failing a NNRTI-based first-line regimen who switch to a PI-based antiretroviral (ARV) regimen with lopinavir/ritonavir (LPV/r) after stringent clinical or immunological failure criteria are met (clinical: new Stage 4 event or two or more new stage 3 events; immunological: CD4 decline to 100 cells/mm3 at week 48). However, the long-term health and economic consequences expected from this switch in ARV regimen are not known.

Methods

This study uses a Markov model to combine population data on CD4 cell response, infectious disease events, death rates, cost of care, and drug costs to estimate the cost-effectiveness of switching to a LPV/r regimen, as compared to remaining on the first regimen, or to discontinuing all ARV drugs. These treatment options are compared in the base estimate assuming a cost of $500/year of LPV/r, $3 per CD4+ T-cell test, concurrent use of cotrimoxazole and a 6% annual incidence of malaria for Uganda. These assumptions are varied to include no cotrimoxazole use, 12% annual incidence of malaria, and CD4+ test costs of either $11 or $25 per test.

Summary of results

The base model estimates an improvement of 19 months in average survival for the LPV/r group at an incremental cost-effectiveness ratio (ICER) of $797 per year of life saved. The ICER increases to $841 if CD4 tests cost $25, the survival benefit decreases to 13.3 months and the ICER is $625 when we assume no use of cotrimoxazole. The effect of doubling the malaria incidence or of discontinuing all ARV drugs decreases the expected average survival substantially for both treatment groups, but has little effect on the ICERs.

Conclusion

Under the WHO benchmark for cost-effective ICERs based on two times a country's per capita GDP, with Uganda's 2007 GDP of $1,100 (International Monetary Fund) a switch to a LPV/r regimen using stringent clinical or immunological failure criteria appears to be quite cost-effective for a country such as Uganda.