

TITLE

Cost-of-testing-per-new-HIV-diagnosis as a metric for monitoring cost-effectiveness of testing programmes in low income settings in Southern Africa: Health economic modelling analysis

PRESENTER

Andrew Phillips

AUTHORS

A. Phillips¹, V. Cambiano¹, L. Bansi-Matharu¹, F. Nakagawa¹, D. Wilson², I. Jani³, T. Apollo⁴, M. Sculpher⁵, T. Hallett⁶, C. Kerr⁷, J. van Oosterhout^{8,9}, J. Eaton⁶, J. Estill¹⁰, B. Williams¹¹, N. Doi¹², F. Cowan^{13,14}, O. Keiser¹⁰, D. Ford¹, K. Hatzold¹⁵, R. Barnabas¹⁶, H. Ayles^{17,18}, G. Meyer-Rath^{19,20}, L. Nelson²¹, C. Johnson²², R. Baggaley²², A. Fakoya²³, A. Jahn²⁴, P. Revill⁵

INSTITUTIONS

¹UCL, London, United Kingdom, ²Burnet Institute, Melbourne, Australia, ³National Institute of Health, Maputo, Portugal, ⁴Ministry of Health and Child Care, Harare, Zimbabwe, ⁵University of York, York, United Kingdom, ⁶Imperial College London, London, United Kingdom, ⁷University of Sydney, Sydney, Australia, ⁸Dignitas International, Zomba, Malawi, ⁹College of Medicine, University of Malawi, Department of Medicine, Zomba, Malawi, ¹⁰University of Geneva, Geneva, Switzerland, ¹¹Stellenbosch University, Stellenbosch, South Africa, ¹²CHAI, New York, United States, ¹³CeSHHAR Zimbabwe, Harare, Zimbabwe, ¹⁴Liverpool School of Tropical Medicine, Liverpool, United Kingdom, ¹⁵PSI Zimbabwe, Harare, Zimbabwe, ¹⁶University of Washington, Seattle, United States, ¹⁷London School of Hygiene & Tropical Medicine, London, United Kingdom, ¹⁸Zambart, Lusaka, Zambia, ¹⁹Boston University, Boston, United States, ²⁰University of the Witwatersrand, Johannesburg, South Africa, ²¹CDC, Kampala, Uganda, ²²WHO, Geneva, Switzerland, ²³The Global Fund, Geneva, Switzerland, ²⁴Ministry of Health, Lilongwe, Malawi

Background: As prevalence of undiagnosed HIV declines, it is unclear whether testing programmes will continue be cost-effective. The cost-of-testing-per-new-HIV-diagnosis is a potentially useful metric for monitoring country programmes.

Methods: We simulated 1000 setting-scenarios for adult HIV epidemics and ART programmes typical of southern Africa using an individual-based model, and projected 50 years from 2018, during which a minimum package of “core” testing in pregnant women, for diagnosis of symptoms, in sex workers, and in men coming forward for circumcision was assumed to be conducted. For each setting scenario we compared this policy of core testing only with a policy of also having an additional programme of testing (in men only, women only, or both genders). For each setting scenario we randomly selected from various possible rates of testing and degrees to which those with HIV are more likely to test than those without, and considered a range of a unit costs. Our aim was to assess the relationship between the cost-of-testing-per-new-HIV-diagnosis and the cost-per-DALY averted (the incremental cost-effectiveness ratio; ICER) of the additional testing programme. Cost-effectiveness of the programme was defined by an ICER below US\$500. Discount rate 3%/annum.

Results: There was a strong relationship between the cost-of-testing-per-new-HIV-diagnosis and the ICER (illustrated for testing programmes in men in Table). In general, the ICER was below US\$500 per DALY averted so long as the cost-of-testing-per-new-HIV-diagnosis was below US\$315. Results were similar when we restricted to setting-scenarios with specific epidemic and programmatic features, such as prevalence of undiagnosed HIV, HIV incidence and the proportion of HIV diagnosed people with viral suppression. When the testing programme was restricted to testing in women beyond the

core testing this was not cost effective. However, for over 50% of setting scenarios testing programmes in men were cost-effective when the cost-of-testing-per-new-HIV-diagnosis was < US\$585 (and 80% when the cost-of-testing-per-new-HIV-diagnosis was < US\$312), regardless of unit cost of testing.

Conclusions: The cost-of-testing-per-new-HIV-diagnosis can be used to monitor the cost-effectiveness of testing programmes. Programmes aimed at men in low income settings in southern Africa are likely to be cost-effective if they cost below US\$585 per new diagnosis.