Background: As prevalence of undiagnosed HIV declines, it is unclear whether testing programmes will continue to 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.