

Pooled HIV-1 RNA viral load testing for detection of antiretroviral treatment failure in Kenyan children

Abstract:

Pooled viral load (VL) testing with two different testing strategies was evaluated as a potential cost-saving method to monitor antiretroviral therapy (ART) in HIV-infected children receiving ART in a resource-limited setting. **METHODS::** Archived samples collected from 250 HIV-1 infected children on first-line ART at various time-points post-ART initiation were evaluated for pooled VL testing using a minipool+algorithm strategy. Additionally, samples collected in real-time from 125 children on ART were assessed for virologic failure using a minipool strategy for pooled viral load testing. Virologic failure was determined as HIV-1 RNA viral loads >1500 copies/ml. **RESULTS::** Minipool+algorithm strategy for pooled VL testing of archived samples had estimated viral failure of 13.6%, with a relative efficiency (RE) of 23.6% (95% CI; 18.5, 29.4), and negative predictive value (NPV) of 88%. This testing strategy would have resulted in 24% fewer assays needed, for a cost savings of \$1,180 per 100 samples. The minipool strategy for pooled viral load testing of samples obtained in real-time yielded an estimated 23.2% of samples with viral failure and a RE of 8.0 % (95% CI; 3.9, 14.2); however had a minipool+algorithm pooling strategy been used the RE would increase to 20%. **CONCLUSIONS::** The minipool+algorithm strategy for pooled VL testing to detect virologic failure in HIV-1 infected children on ART was determined to be relatively efficient in detecting virologic failure, had high NPV, with substantial cost savings. Pooling strategies may be important components of cost-effect strategies to reduce rates of viral failure and resistance, thus improving clinical outcomes.