



## Provider-initiated HIV testing and counselling for TB in low HIV prevalence settings: is it worthwhile?

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**Background:** We assessed the HIV-positive yield of offering provider-initiated HIV testing and counselling (PITC) for TB and the costs, in Madagascar, which has a low HIV prevalence and a high TB burden.

**Methods:** A cross-sectional study of routinely collected records from January 2010 to June 2011.

**Results:** A total of 37 596 TB patients were registered in 205 TB centres. HIV testing was available in 95 (46%) of centres where 7524 (40%) of those offered testing accepted it. Only 35 (0.5%) individuals were found HIV positive. Initial costs were about US\$1.4 million and annual recurrent costs about US\$0.1 million.

**Conclusion:** There are concerns of cost investment for countrywide introduction of PITC in a low HIV prevalence setting.

**Keywords:** HIV, Operational research, Provider-initiated HIV testing and counselling, TB, WHO

### Introduction

The 2004 WHO interim policy for collaborative TB and HIV related activities had set a threshold of 5% HIV prevalence among patients with TB for offering provider-initiated HIV testing and counselling (PITC).<sup>1</sup> PITC is the routine offer of HIV testing for all patients with TB at the time of TB diagnosis. In early 2012, new WHO HIV-TB policy stipulated that routine HIV testing should be offered to all patients with presumptive and diagnosed TB: the notion of thresholds was removed.<sup>2</sup>

Madagascar is a resource-limited sub-Saharan African country with 22 million inhabitants, a relatively low HIV prevalence of 0.5%<sup>3</sup> and a high TB burden (annual case notification rate=116/100 000).<sup>4</sup> Because HIV prevalence among patients with TB is only 0.9%,<sup>5</sup> the country has been contemplating whether PITC for patients with TB is really justified as this will require considerable additional infrastructure, human resources and materials. Madagascar has recommended PITC for patients with TB but budget requirements were not estimated. The question asked is whether available resources are being correctly allocated when balanced against health priorities.

In Madagascar, where we have been trying to implement PITC on a countrywide level since 2010, we report on the HIV positive yield and discuss the implications (mainly cost) of countrywide introduction of this intervention.

### Methods

This was a cross-sectional study of routinely collected records from January 2010 to June 2011.

For reporting the HIV positive yield, we reviewed national TB programme data from all 205 TB diagnostic and treatment centres (TB centres) in Madagascar. In order to better understand the public health implications of introducing countrywide PITC, we estimated required costs. Direct cost estimates were calculated for initial costs as infrastructure and human resources, and for annual recurrent costs as materials. Cost estimates were based on standard cost tables available at the Ministry of Health. Infrastructure space within TB centres in Madagascar is limited and 'counselling guidelines'<sup>6</sup> stipulate minimum requirements to ensure an appropriate and conducive environment for

counselling. To ensure adherence with these guidelines, full or partial rehabilitation of all centres was judged to be required. HIV testing had been introduced in 95 (46%) of TB centres that were included in this study.

## Results

There were 37 596 patients registered with TB in the 205 TB centres in Madagascar. HIV testing was performed in 95 (46%) centres where 18 993 (51%) patients were registered. There were 7524 (40%) who accepted HIV testing of whom 35 (0.5%) were found positive for HIV.

Table 1 shows the maximum and minimum estimated first year costs in US\$ for offering countrywide PITC in Madagascar. The total cost requirements, including infrastructure, human resource and materials, ranged between about US\$775 000

(minimum) to US\$1 530 000 (maximum) and over 90% of them were initial costs.

## Discussion

Despite scaling up HIV testing to over half of all TB centres in Madagascar, only 35 patients were found positive for HIV, giving a low HIV-positive yield of 0.5%. In this setting of low HIV prevalence, this raises questions on the justification of large investments required for implementing the new WHO recommendations of universal HIV testing for patients with TB.

First, the required initial investment to implement PITC country-wide is huge and will amount to between 19 and 30% of the annual Global Fund round 8 funds allocated to TB in Madagascar.<sup>7</sup> Although this is a simplistic calculation, it raises concerns around the cost-benefit of such an intervention and the possibility that

**Table 1:** Estimated first year costs (US\$) for offering countrywide PITC<sup>a</sup> in Madagascar

	Maximum estimation <sup>b</sup>			Minimum estimation <sup>c</sup>		
	Price/unit	Number	Cost (US\$)	Price/unit	Number	Cost (US\$)
<b>Initial costs</b>						
<b>Infrastructure</b>						
Rehabilitation for counselling rooms <sup>d</sup>	6429	205	1 317 857	6429	110	707 143
Additional registers for PITC	5	615	2929	2	615	1171
Subtotal			1 320 786			708 314
<b>Human resources</b>						
PITC Training for staff in TB centres						
Logistics	250	410	102 500	250	110	27 500
Documents	21	410	8590	21	110	2305
Subtotal			111 090			29 805
Total			1 431 876			738 119
<b>Annual recurrent costs</b>						
<b>Materials<sup>e</sup></b>						
HIV test kits						
1st test (Détermine)	2	30 000	71 429	2	10 000	23 810
2nd test (Rétrocheck)	3	600	1571	3	200	524
3rd test (Unigold)	4	600	2486	4	200	829
<b>Consumables</b>						
Cotton	10	410	3905	10	410	3905
Alcohol	4	820	3514	4	820	3514
Gloves	0.14	30 600	4371	0.14	10 200	1457
<b>Health education kits</b>						
Awareness Leaflets	0.24	25 000	5952	0.24	10 000	2381
Condoms	0.59	24 000	14 057	0.02	24 000	571
Total			107 286			36 991
Grand total			1 539 162			775 110

<sup>a</sup> Provider-initiated HIV testing and counselling (PITC) is the routine offer of HIV testing for all patients with TB at the time of TB diagnosis.

<sup>b</sup> Cost estimates for 205 TB centres.

<sup>c</sup> Cost estimates for 110 TB centres where HIV testing is not yet available and provide minimum/cheaper materials.

<sup>d</sup> Including tables, chairs and bookshelves. Rehabilitation is estimated to serve for 10 years and, as such, the yearly cost would be divided by 10. e.g. US\$70 714 (70 7143/10 years).

<sup>e</sup> Including transportation fees.

such investments may divert resources from existing TB services. Alternative cost-saving rehabilitation techniques that are less costly and alternative less expensive infrastructure are warranted.

Second, HIV testing uptake in centres offering TB registration services was low at 40%. Fear of knowing HIV sero-status, stigma and discrimination may be factors that influenced uptake.<sup>8</sup> A standardised, clinic-based, testing strategy that is being used in Madagascar might be less effective in low HIV prevalence settings. Alternative approaches, including community-based testing, with appropriate support services yields better dividends as has been seen in Tanzania, Zimbabwe and Thailand.<sup>9</sup>

Our study is limited by the fact that we do not know if HIV prevalence among patients with TB in centres without HIV testing is different from that of patients with TB in centres with HIV testing. Although this could potentially influence the HIV-positive yield, it is unlikely to make a considerable difference since overall HIV prevalence in patients with TB is generally low. We also do not know the reasons why patients with TB did not accept HIV testing and this merits specific research. Finally, as rehabilitation costs will be spread over time (years), the overall cost shown in this study may taper over time. However, this does not deter from the overall message that considerable initial investment is needed for offering countrywide PITC. Our study is also focused on one geographic region and may not be widely generalisable.

In conclusion, we have raised concerns over the cost implications of the new WHO recommendation of offering universal PITC in low HIV-prevalence settings.

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**Authors' contributions:** SN and RR conceived the study. SN, SGH, ADH and RZ designed the study protocol. RR, JRR, SJR, DAR, TR, LR, AR and SN implemented the study, analysis and interpretation of these data. SN and RZ wrote the first draft of the manuscript. All authors reviewed and approved the final version. SN is the guarantor of the paper.

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**Ethical approval:** This study was approved by the National Ethics Committee of Madagascar (No. 80- MISAN/CE on 21 September 2011) and the Union Ethics Advisory Group, Paris, France (EAG No: 29/11 on 16 August 2011).

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## References

- 1 WHO. Interim policy on collaborative TB/HIV activities. Geneva: World Health Organization; 2004. [http://whqlibdoc.who.int/hq/2004/WHO\\_HTM\\_TB\\_2004.330.pdf](http://whqlibdoc.who.int/hq/2004/WHO_HTM_TB_2004.330.pdf) [accessed 10 December 2013].
- 2 WHO. WHO policy on collaborative TB/HIV activities: guidelines for national programmes and other stakeholders. Geneva: World Health Organization; 2012. [http://www.who.int/tb/publications/2012/tb\\_hiv\\_policy\\_9789241503006/en/index.html](http://www.who.int/tb/publications/2012/tb_hiv_policy_9789241503006/en/index.html) [accessed 10 December 2013].
- 3 UNAIDS. Epidemiological Fact Sheet on HIV and AIDS. Geneva: UNAIDS; 2012. <http://www.unaids.org/en/regionscountries/countries/madagascar/> [accessed 10 December 2013].
- 4 WHO. Global Tuberculosis Control 2013. Geneva: World Health Organization; 2013. [http://www.who.int/tb/publications/global\\_report/en/](http://www.who.int/tb/publications/global_report/en/) [accessed 10 December 2013].
- 5 Ministère de la Santé Publique Madagascar. Rapport du Programme Conjoint TB/VIH, 2009-2010. Antananarivo: Madagascar; 2010.
- 6 PNLS/ Ministère de la Santé Publique Madagascar. Counseling et Dépistage du VIH a Madagascar: Normes et Procédures. Antananarivo: Madagascar; 2011.
- 7 The Global Fund to Fight AIDS, Tuberculosis and Malaria. Download Grant Data <http://portfolio.theglobalfund.org/en/Grant/Index/MDG-810-G14-T> [accessed 10 December 2013].
- 8 Seyoum A, Legesse M. Knowledge of tuberculosis (TB) and human immunodeficiency virus (HIV) and perception about provider initiated HIV testing and counselling among TB patients attending health facilities in Harar town, Eastern Ethiopia. BMC Public Health 2013; 13:124.
- 9 Sweat M, Morin S, Celentano D et al. Community-based intervention to increase HIV testing and case detection in people aged 16-32 years in Tanzania, Zimbabwe, and Thailand (NIMH Project Accept, HPTN 043): a randomised study. Lancet Infect Dis 2011;7:525-32.