

Results Methodology

Estimating Lives Saved and Case/Infection Averted by Global Fund-Supported Programs

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Global Fund estimations of lives saved and infection/case averted are based on the latest epidemiological data, models and assumptions of UNAIDS, WHO Global TB and Malaria Program departments^{1,2,3}. These represent updates to methodologies previously used by the Global Fund^{4,5}, that were agreed with key technical partners and advisors during the 2014 expert meeting⁶ for improving Global Fund current method for measuring the health impact and to address its limitations⁷.

Methods for estimation of lives saved

- **HIV:** lives saved from ART is estimated by the UNAIDS Spectrum/AIM model which is available for 166 countries in an annual basis³. The ‘double-counting’ of lives saved between DOTS and ART is resolved by removing lives saved from treating HIV-positive TB patients from DOTS count. The Global Fund contribution to the lives saved was estimated by applying percent share of ART supported by the Global Fund and reported to the Secretariat out of national ART reported to the UNAIDS to the estimated lives saved.
- **TB:** lives saved by the national TB programs is estimated by the WHO Global TB Program and is available for 155 countries. The estimate is derived by applying case fatality rate of untreated cases to estimate of incidence and subtract it from the estimate of TB deaths for the same years. The Global Fund contribution to the lives saved was estimated by applying percent share of smear-positive TB supported by the Global Fund

¹ WHO, *Global tuberculosis report*. 2014

² WHO, *Global malaria report*. 2014

³ HIV/AIDS, J.U.N.P.o., *National HIV Spectrum files*. <http://apps.unaids.org/spectrum>. 2014

⁴ Komatsu, R., et al., *Lives saved by Global Fund-supported HIV/AIDS, tuberculosis and malaria programs: estimation approach and results between 2003 and end-2007*.

<https://bmcinfectdis.biomedcentral.com/articles/10.1186/1471-2334-10-109> BMC Inf Dis, 2010. **10**: p. 109

⁵ The Global Fund to Fight AIDS Tuberculosis and Malaria -- Strategy Performance and Evaluation cluster, *Global Fund 2012-2016 Strategy -- Technical partner consultation on Goals, Service targets and Impact modelling, Recommendations from group*. 2011: Montreux

⁶ Expert Panel on Health Impact of Global Fund Investments Geneva, J., *Report of the First Meeting of the expert panel on health impact of Global fund investments*.

https://www.theglobalfund.org/media/8049/corporate_expertpanelhealthimpactinvestmentsmeeting_report_en.pdf 2014

⁷ McCoy, D., et al., *Methodological and Policy Limitations of Quantifying the Saving of Lives: A Case Study of the Global Fund's Approach*. PLoS Med, 2013. 10(10): p. e1001522

and reported to the Secretariat out of national smear-positive cases reported to the WHO to the estimated lives saved.

- Malaria:** lives saved by the national malaria programs is estimated by the WHO Global Malaria Program and is available for 106 malaria endemic countries. The estimate is derived by applying the estimate of malaria deaths rate in year 2000 as counterfactual (i.e. before scale up of malaria key interventions) to the population at risk over the following years and subtracting it from the actual trend in malaria deaths. The Global Fund contribution to the lives saved was estimated by applying percent share of ITNs/LLINs supported by the Global Fund and reported to the Secretariat out of total ITNs/LLINs distributed and reported to the WHO to the estimated lives saved from prevention interventions. Lives saved from prevention was estimated by applying annual rate of decline in malaria cases from the 2000 baseline to the estimated malaria deaths at 2000 to derive the estimate decline in malaria deaths due to prevention interventions. This is based on the assumption that the decline in malaria cases is largely driven by the prevention interventions. The estimate of lives saved due to case management was derived by applying percent share of ACT supported by Global Fund out of total ACT delivered to the supported countries to the estimate of lives saved due to case management. The estimate of lives saved due to case management was derived by subtracting total lives saved from lives saved from prevention interventions.

Table 1: Comparison between previous and revised methods to estimate lives saved

Disease	Previous Method/Intervention Captured	Revised Method/ Intervention Captured
HIV	UNAIDS AIM model/ART ³	UNAIDS AIM model/ART ³
TB	0.33 for 1 case treated/TB treatment ⁸	Applying CFR of untreated cases/Program effect ¹
Malaria	5.5 lives saved for 1 child protected/Bed-net effect (in Africa children) ⁹	Applying 2000 rate to all years/Program effect in all endemic countries ²

Limitations of revised methods

- HIV:** the impact of prevention interventions on lives saved is not captured by the AIM model and require applying transmission models such as Goals or AEM. Although these models are calibrated for about 40 countries by the UNAIDS, but they have not been through country consultation process and therefore cannot be used for this strategy. Application of the transmission models will be considered for impact reporting over the next strategy period (2017-2022).

⁸ Tiemersma, E.W., et al., *Natural history of tuberculosis: duration and fatality of untreated pulmonary tuberculosis in HIV negative patients: a systematic review*. PLoS One, 2011. **6**(4): p. e17601

⁹ Lengeler, C., *Insecticide-treated bed nets and curtains for preventing malaria*, in *Cochrane Database Syst Rev*, E.G.C.I.D. Group, Editor. 2004. p. CD000363

- **TB:** assuming “no treatment” counterfactual might over-estimate impact of the program as some patients might be able to receive TB treatment through private sector, although, the quality of the treatment is questionable. The downstream impact of the TB program on transmission and lives saved is not captured by this model and require applying transmission models such as TIME which is currently under validation studies. Application of the transmission models such as TIME will be considered for impact reporting over the next strategy period (2017-2022). Applying percent share of smear-positive cases supported by Global Fund out of total number of smear-positive treated to the lives saved assumes that Global Fund has equally contributed to the treatment of smear-negative and extra-pulmonary cases which might not hold in all supported countries. Although about two-third of lives saved is estimated to be from smear-positive cases. The reason for applying share of smear-positive cases is that the data on smear-negative/extra-pulmonary cases were not reported to the Global Fund before the New Funding Model. Going forward, data on all forms of TB will be reported to the Global Fund Secretariat which allows resolving this limitation.
- **Malaria:** the current method (i.e. assuming year 2000 as counterfactual) does not allow differentiation of program impact from the environmental factors which might have also contributed to the impact. The method to estimate lives saved from prevention versus case management is too crude and requires further improvement. The quality and availability of data on ITNs/LLINs and ACT varies.

Methods for estimation of infection/case averted

The method used to set the strategy target for the total number of cases of incident cases/infections averted between 2012 and 2016 was based on comparing the cumulative number of cases over 2012-2016, if the incidence rate had remained constant at 2010 level compared to the scenario of a linear decline in incidence rate from 2010 onwards following from the 2005 to 2010 trend. The same method will be applied to monitor this goal which is comparing the 2010 constant level versus estimated incidence rate aggregated across all the supported countries with no measure of Global Fund attribution. This method does not differentiate secular trends from program effects and the counterfactual of 2010 would under-estimate the case averted from malaria as the gain can be quickly reversed to the 2000 baseline in the absence of intervention due to the nature of disease. Applying transmission models such as UNAIDS Goals/AEM for HIV, TIME¹⁰ for TB and Open Malaria¹¹/Malaria tool¹² would be more appropriate to and monitor goals for infection averted which is considered to be applied for the next Global Fund strategy.

Moreover, infections averted due to PMTCT is estimated by the Spectrum/AIM model and will be reported for the current strategy.

¹⁰ Houben R, et al., *TIME model documentation - draft. 2014.22*

¹¹ Swiss TPH, V.B.I., Liverpool School of Tropical Medicine, *OpenMalaria: A simulator of malaria epidemiology and control*. <https://code.google.com/p/openmalaria/>

¹² London, I.C., *MalariaTools: to aid malaria elimination scenario planning at country level*. <http://www1.imperial.ac.uk/malariamodeling/toolsdata/tools/>