Annex 2

Methodology for the projection of available resources for HIV, TB and malaria

A methodology and a model were developed to project the levels of funding likely to be available for HIV, TB and malaria from domestic and other external (development assistance for health, or DAH) sources in Global Fund-eligible countries over 2027-2029.

The projection was carried out for all countries eligible for Global Fund financing according to the 2024 eligibility list, except for countries that were not historically provided with an individual country allocation, and those countries eligible under paragraph 9B of the Eligibility Policy.

The resulting projections were used as inputs to the disease transmission models, which project impact from all domestic and international financing, including the Global Fund, to generate the results presented in this Investment Case.

Domestic financing

National responses to HIV, TB and malaria are increasingly financed by domestic resources, albeit at very different levels across different countries and diseases, meaning that robust projections of domestic financing are critical for predicting impact accurately.

The domestic financing projection approach estimated baseline domestic financing of HIV, TB and malaria in 2023 for each country in the set of countries described above. Plausible growth scenarios for future financing were then applied to this 2023 baseline to generate estimates for each year/country/disease between 2024 and 2029.

In previous Investment Cases, domestic funding commitments to the Global Fund were taken as the starting point for constructing the baseline. For this Investment Case, the baseline was estimated using at least five years of historic annual expenditure data supplied by Global Fund technical partners (WHO and UNAIDS), which collect reports of disease-specific domestic expenditure from countries annually.

For most countries, the most recently reported historical expenditures were for 2022. Gaps in the historic data for some countries in some or all years meant that it was necessary to impute missing values using a Bayesian mixed effects regression model using gross domestic product (GDP) per capita and disease burden as predictors. As a result of this imputation, there was a complete data set of expenditures by country, disease and year for the time period 2018-2022. From this point, the method proceeded through three more steps to arrive at a 2023 domestic expenditure baseline.

First, a 2023 estimate of public expenditure was derived from the historical data in the following way. First, the direction of the five-year growth trend was observed using ordinary least-squares regression with annual spend as the dependent variable and year as the only predictor variable. For countries with a positive trend, the 75th percentile of historic estimates was used. For countries with a negative trend, the median value of historic estimates was used. This approach was taken to deal with year-to-year variability in reported spending within countries that resulted in imprecise estimates of annual growth rate. The method mitigates the influence of both low and high outlier values by using median instead of mean spending level. Moreover, for countries with positive growth, it is conservative, because a country's 2023 estimate could not exceed its highest observed amount of annual spending during the historical period.

Second, a projection of private domestic spending was generated in addition to public domestic spending. Private spending on health is significant in many countries, and makes an important contribution to impact, and therefore needs to be modelled, even though some forms of private expenditure may be regressive. For TB and malaria, private spending was estimated by applying a multiplier to 2023 public spending. Country-specific and disease-specific multipliers were derived from country-specific estimates of public and private spending made by the Institute for Health Metrics and Evaluation for TB[1] and malaria.[2] For HIV, estimates of private spending by country income group were provided by UNAIDS, and private spending within the income group was allocated to countries according to their share of total people living with HIV (PLHIV) in the group.

[1] Tracking total spending on tuberculosis by source and function in 135 low-income and middle-income countries, 2000-17: a financial modelling study. Su Y, Garcia Baena I, Harle AC, Crosby SW, Micah AE, Siroka A, Sahu M, Tsakalos G, Murray CJL, Floyd K, Dieleman JL. Lancet Infect Dis. 2020 Aug;20(8):929-942. doi: 10.1016/S1473-3099(20)30124-9. Epub 2020 Apr 23. PMID: 32334658; PMCID: PMC7649746.

[2] Tracking spending on malaria by source in 106 countries, 2000-16: an economic modelling study. Haakenstad A, Harle AC, Tsakalos G, Micah AE, Tao T, Anjomshoa M, Cohen J, Fullman N, Hay SI, Mestrovic T, Mohammed S, Mousavi SM, Nixon MR, Pigott D, Tran K, Murray CJL, Dieleman JL. Lancet Infect Dis. 2019 Jul;19(7):703-716. doi: 10.1016/S1473-3099(19)30165-3. Epub 2019 Apr 26. PMID: 31036511; PMCID: PMC6595179.

Third, an adjustment was made to align historic data on TB disease program spending with modeled estimates of the cost of the TB response. This adjustment for TB introduces the health systems costs incurred in detecting, diagnosing and treating TB that are not included in TB disease program expenditure reported to WHO by countries. Reported expenditures normally include the costs of commodities, technical staff and diagnostics equipment purchased for TB, but may not account for, amongst others, health worker time, facilities or inpatient costs. In addition, reported expenditures may not include sub-national spending or spending through health insurance schemes. To make this adjustment, we compared estimates of cost for historical TB programs modeled using the TIME (TB Impact Model and Estimates) suite of models[3] for 29 countries with reported external and domestic spending for the same period. Any gap was attributed to under-reported domestic spending, and domestic spending was adjusted (upwards) accordingly. No adjustment to reported domestic spending was made for countries in which reported spending exceeded modeled costs. The ratio of adjusted to unadjusted TB spending was calculated for the modeled countries and the median value of this ratio was used to adjust TB spending in non-modeled countries.

We performed exploratory analysis of four ways to model the future of domestic disease financing and two were shortlisted – one conservative and one optimistic. The conservative "Economic Growth" scenario assumes that domestic financing will grow from its 2023 baseline in each country in proportion to the growth in non-debt service government expenditure forecast for that country in the International Monetary Fund's October 2024 World Economic Outlook.[4]

[3] TIME Impact – a new user-friendly tuberculosis (TB) model to inform TB policy decisions. Houben, R.M.G.J., Lalli, M., Sumner, T. et al. BMC Med 14, 56 (2016).

[4] World Economic Outlook Database. International Monetary Fund. October 2024. https://www.imf.org/en/Publications/WEO/weo-database/2024/October.

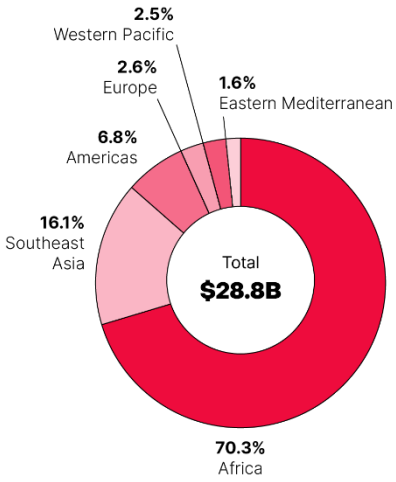
The more optimistic “Closing the Prioritization Gap” scenario builds on the Economic Growth scenario by assuming that countries that are lagging behind in their prioritization of domestic disease spending will catch up to their peers over the period 2024-2029. Specifically, lagging countries are defined as those spending relatively less on a disease, after adjusting for their economic capacity (government health spending) and their disease burden (disease-specific disability-adjusted life years (DALYs)), than the median of their income-level peer group. These countries catch up by closing an additional 20% per year of the gap between their economic growth forecasted spending and the spending that would be considered median level of prioritization, between 2024 and 2029, thereby reaching the median level of disease spending priority by 2029. Those that spend more than their peers remain on the Economic Growth path described above. In some cases, domestic financing forecasts for future years exceed estimates of total resources required to fully fund robust national disease responses. It would not be logical to use these estimates as inputs to the modeling exercise planned for the Investment Case. Therefore, we capped the domestic expenditure projection for each country within each three-year grant cycle period such that they do not exceed the resource need estimate values for that country.

For our projections for the Investment Case, we used the more conservative Economic Growth scenario for all countries and diseases, except for projected domestic spending for TB in India, where recent strong political will has been demonstrated to end TB and the fiscal space exists in the country to do so. For TB in India, the “Closing the Prioritization Gap” scenario was therefore used.

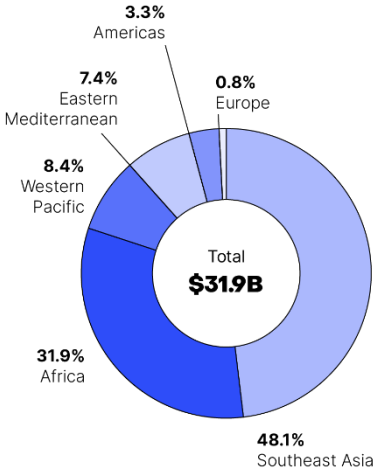
Finally, we considered the cost implications of malaria and possible TB vaccines through the Eighth Replenishment period. Using the co-financing assumptions set out in our partner Gavi’s Investment Opportunity (2026-2030), we attributed additional domestic financing of US$173 million across three years for malaria vaccine rollout. We assumed US$2 billion of costs in 2029 for TB vaccine rollout and assumed that the same proportion would be funded domestically as the wider global TB response, resulting in an additional US$1.287 billion in domestic funding for TB.

The figures below show the total forecast and breakdown for HIV, TB and malaria domestic financing by region, excluding vaccines. The total projection of US$69.7 billion (2022 US$) including vaccines represents an increase from the US$56.8 billion (2022 US$) that the model projects for the period of the Seventh Replenishment.

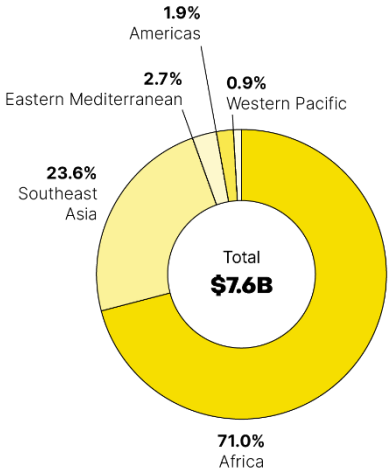
HIV domestic financing in 2027-2029



TB domestic financing in 2027-2029



Malaria domestic financing in 2027-2029



Regional charts exclude vaccine-related financing and are grouped by WHO regions.

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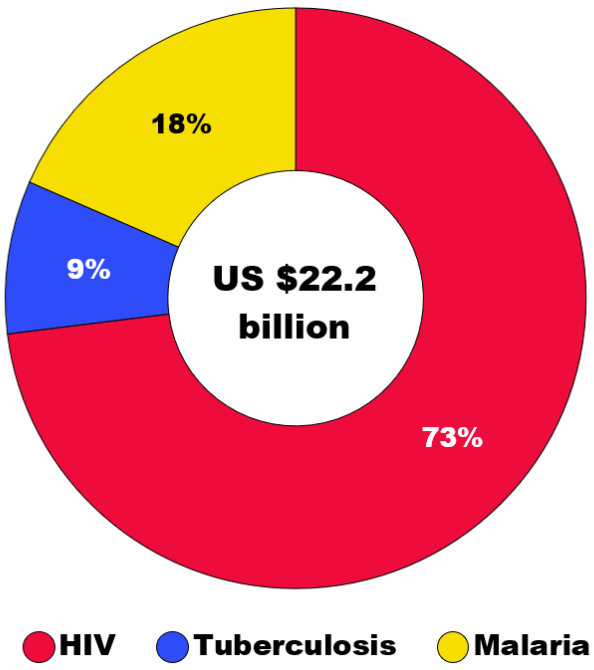
Non-Global Fund external financing

DAH from other sources, excluding Global Fund financing, was assumed constant in real terms at the same levels as the average of 2020-2022 disease-specific DAH through non-Global Fund channels, as modeled by the Institute for Health Metrics and Evaluation (IHME). This goes some way to smoothing out the spike in DAH created by the COVID-19 pandemic, and represents a relatively conservative assumption given that overall DAH has grown in real terms over the past decade. In-kind DAH reported in the IHME analysis was excluded, and disease spending not allocated to specific countries was included in aggregate results, but not in specific countries. Some of the costs of malaria and TB vaccines are introduced in line with the description above, adding US$1.4 billion across both malaria and TB vaccines in GC8. The figure below shows the breakdown between HIV, TB and malaria. In real terms, this represents a 12% reduction from the GC7 Investment Case forecast of non-Global Fund DAH for HIV, TB and malaria.

Projected non-Global Fund development assistance for HIV, TB and malaria over 2027-2029 (in 2022 US$)



Note: Excludes projected vaccine costs.
Source: Institute for Health Metrics and Evaluation.

Global Fund financing

The Investment Case assumes that Global Fund financing for the three diseases for the 2027-2029 period is US$18 billion. Based on actual expenditures of the last six years, US$1 billion is assumed for operational expenditure. The remaining US$17 billion is distributed across the three diseases according to the Board-approved global disease split for the 2026-2028 allocation methodology approved by the Global Fund Board (GF/B52/08B, 21 November 2024).[5]

Changes to methodology

The Global Fund commissioned a health decision scientist[6] on the faculty of the Department of Health Policy and Management at the Harvard T.H. Chan School of Public Health to develop the methodology and model used. A number of enhancements were made to the methodology previously applied in the Investment Case for the Seventh Replenishment, including:

- Using historic annual expenditure data provided by countries to Global Fund technical partners (UNAIDS and WHO), rather than domestic financing commitments to the Global Fund for constructing the baseline.
- Removing the "scaling" approach that aligned domestic co-financing commitments to Global Plan needs estimates by using National Strategic Plan cost estimates, unnecessary given the use of actual expenditure data.
- Applying an adjustment to the TB expenditure baseline to encompass health system costs, as described more fully above.
- Including private sector expenditures in the baseline calculation, as described above.

[5] Allocation Methodology for Grant Cyle 8: 52nd Board Meeting. The Global Fund, 2024. https://archive.theglobalfund.org/media/15310/archive_bm52-08b-allocation-methodology-gc8_report_en.pdf.

[6] Stephen C. Resch. Lecturer on Health Decision Science, Health Policy and Management, Harvard T.H. Chan School of Public Health. https://hsph.harvard.edu/profile/stephen-c-resch/.