

## **Has HIV/AIDS displaced other health funding priorities? Evidence from a new dataset of development aid for health**

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### Abstract

In recent times there has been a sense that HIV/AIDS control has been attracting a significantly larger portion of donor health funding to the extent that it crowds out funding for other health concerns. Although there is no doubt that HIV/AIDS control attracts a larger proportion of development assistance for health (DAH) and that HIV/AIDS should be a DAH priority, whether HIV/AIDS is actually diverting funding away from other health concerns has yet to be analyzed fully. To fill this vacuum, this study aims to test if a higher level of HIV/AIDS funding is related to a displacement in funding for other health concerns, and if yes, to quantify the magnitude of the displacement effect. Specifically, we consider whether HIV/AIDS DAH has displaced i) TB, ii) malaria iii) health sector and ‘other’ DAH in terms of the dollar amount received for aid. We consider this question within a regression framework controlling for time and recipient heterogeneity. We find displacement effects for malaria and health sector but not TB. In particular, the displacement effect for malaria is large and worrying.

Keywords: HIV, AIDS, TB, Malaria, Health Sector, Funding Displacement, DAH, Development Assistance for Health

## **Background**

In recent times there has been a sense that HIV/AIDS control has been attracting so much donor health funding that it crowds out funding for other health concerns. The intuition is that donor funding is a scarce resource derived from a hard budget, forcing different health concerns to compete for it. As such, diseases that have more public and media attention, like HIV/AIDS, could cause other health concerns to be overlooked in aid allocation. This issue has been raised by many with respect to various health concerns (Crossette, 2005; Shiffman, 2006a; Shiffman, 2008; Raviglione and Pio, 2001). Some even suggest that more cost effective options are being overlooked (Molyneux, 2004).

Globally 33.4 million people live with HIV/AIDS (World Health Organization, 2010a) and there is a substantial social impact associated with the disease (Danziger, 1994). While international funding has helped increase access to antiretroviral therapy (ART), there is still a shortage in ART coverage globally, as it reaches only 42% of the 9.5 million people who are in need (World Health Organization, 2010a). Given the burden this illness places on individuals, especially those residing in developing and least developed countries, HIV/AIDS is warranted as a global health priority.

The international aid required to finance development assistance for health (DAH) in least developed and developing countries was estimated to be \$27 billion (WHO Commission on Macroeconomic and Health, 2001), however, the actual spending was less than a quarter of this at about \$6 billion per year in 2001. Furthermore, the allocation of DAH amongst different health concerns varies substantially. While global DAH has increased for HIV/AIDS in the past decade (Gordon, 2008), figures show that the resources committed to other health concerns have seen only modest increases, or even a relative decline (Shiffman, 2008). Given this, it is obvious that there is a trade-off in the donor's eyes between different health concerns.

Whether HIV/AIDS is diverting funding away from other health concerns has yet to be analyzed fully. To fill this vacuum, this study aims to test if a higher level of HIV/AIDS

funding leads to a displacement in the funding for other health concerns, and if yes, to quantify the magnitude of the displacement effect. Specifically, we consider whether HIV/AIDS DAH has displaced the funding devoted to i) TB, ii) malaria iii) health sector and iv) ‘other’ health concerns. We restrict the analysis to a set of countries where HIV/AIDS, malaria, TB and health sector are known priorities to allow a meaningful analysis.

This analysis is important for two reasons. Firstly, suggestions that HIV/AIDS DAH is displacing other health concerns are based on either anecdotal evidence or descriptive statistics. A more scientific assessment of the available data is therefore needed. Secondly, one cannot exclude the possibility that HIV/AIDS funding actually crowds in funding for other health concerns (Yu et al., 2008; Piot et al., 2009).

To date, the notion that HIV/AIDS DAH may displace funding for other causes has been explored only descriptively by Shiffman (2006a) and Shiffman et al. (2009) who document the percentage of health and population commitments from all donors by i) HIV/AIDS, ii) infectious disease control, iii) population, and iv) health system strengthening using the Creditor Reporting System (CRS) database of the OECD. In addition, the author documents commitments from all donors across the same items in constant USD. Based on these descriptive statistics the author concludes that HIV/AIDS control may have caused health system strengthening and population funding to stagnate, but may also have had positive effects on the allocation to some other health priorities.

The current study extends the work of Shiffman (2006a) and Shiffman et al. (2009) in terms of methodology and data quality. Firstly, the study uses regression methods to isolate the potential displacement effects from other factors that could affect DAH allocation, including country characteristics and time varying factors. Secondly, it allows for displacement to take place either contemporaneously or with a time lag. Thirdly, it considers inertia in DAH funding allocation. Fourthly, it uses a new dataset that was developed purposefully to track the actual disbursement of DAH.

## **Framework**

According to the recipient need framework (MacKinlay, 1977), the aid received by a recipient country should be proportional to its need. This framework has been adopted in the literature previously to evaluate the allocation of other types of aid (Alesina and Dollar, 2000;

Lewis, 2003; Meernik et al., 1998). For DAH, this framework posits that factors such as disease burden should influence funding levels, as donors seek to address the greatest threats to health. Therefore, if a disease is more of a threat than HIV/AIDS it should receive more funding, and vice versa if it is less of a threat.

There are two channels of displacement: i) within-country-between-health-concern displacement and ii) between-country-between-health-concern displacement. In the first case, if a country gets more DAH for HIV/AIDS, displacement occurs if monies are diverted from that country's other health concerns. In the second case, if more DAH is allocated for HIV/AIDS in one country it is funded by diverting monies from other health concerns in other countries. These two effects are not mutually exclusive and thus can happen simultaneously. Also, either of these two effects can be positive. That is, an increase in HIV/AIDS funding could attract more funding to other areas.

There is a third case of between-country-within-health-concern displacement in that if more DAH is allocated for HIV/AIDS in one country, it is funded by diverting monies from other countries' HIV/AIDS funding. We do not consider this because there is not even anecdotal evidence of such a case, and it is outside the objective of this work.

There are two ways to measure displacement. The first is 'dollar displacement'. Here displacement is measured as the actual amount of aid distributed, which corresponds to the concept of absolute commitment (MacKinlay, 1977) and indicates the 'gross importance' attached by a donor to a particular recipient/health concern. The second definition is 'share displacement'. Here, HIV/AIDS DAH has displaced other funding if its share has increased relative to other health funding priorities. We argue that dollar displacement is appropriate for our work for two reasons. Firstly, given that all shares must sum to 100%, any increase in the DAH share of HIV/AIDS must by construction be balanced by a reduction in the share of one or more health concerns. However, the reduction in the share of other health concerns, say malaria, does not in itself constitute a real loss to the malaria campaign, provided that the DAH in dollar terms devoted to malaria programs does not decrease. In fact, if a recipient country's HIV/AIDS program has attracted more funding, not only to itself but also to the country's other health concerns but by a smaller amount in dollar terms, then looking at share displacement leads to a misleading conclusion that the DAH for other concerns is 'displaced' by that of HIV/AIDS. Secondly, increases in the funding for HIV/AIDS may displace funding for other health concerns with time lags due to, for instance, pre-commitment of

DAH for other concerns. Since the total DAH received by a country varies annually, the shares of HIV/AIDS and other health concerns are thereby measured based on different total DAH values and are not commensurable. As a result, even if an increase in the DAH share of HIV/AIDS in the last period is found to be associated with a fall in the DAH share of malaria in the current period, no definite interpretation can be made regarding whether HIV/AIDS funding has displaced malaria funding. Therefore, we focus on the dollar displacement effect.

In order to test the dollar displacement effect of HIV on various health concerns, we estimate:

$$W_{jt} = \alpha_1 HF_{jt} + \alpha_2 (HF_t - HF_{jt}) + \alpha_3 HF_{jt-1} + \alpha_4 (HF_{t-1} - HF_{jt-1}) + \alpha_5 W_{jt-1} + \beta' x_{jt} + \mu_j + \nu_t + \varepsilon_{jt} \quad (1)$$

In equation (1)  $W_{jt}$  represents the funding received by country  $j$  at time  $t$  for the health concern under consideration,  $HF_{jt}$  represents HIV funding received by country  $j$  at time  $t$ ,  $HF_t$  is the total HIV funding paid to all recipient countries at time  $t$  so that the term  $(HF_t - HF_{jt})$  represents the HIV funding paid to countries other than  $j$ .

In equation (1),  $\alpha_1$  captures the within-country-between-health-concern displacement effect, while  $\alpha_2$  captures the between-country-between-health-concern displacement effect. The model includes the lagged terms of  $HF_{jt}$  and  $(HF_t - HF_{jt})$  to allow for displacement not being instantaneous. Equation (1) also includes the lagged term of  $W_{jt}$  to allow for inertia. Inertia may arise, for example, if donor countries have committed to multiple-year programs. The closer the value of  $\alpha_5$  is to one (zero), the more (less) persistent any DAH funding change for a health concern is over time. In particular, if  $\alpha_5$  is equal to one (zero), any change in the particular health concern's funding by donors is a permanent (one year temporary) change.

The model also includes two variables to capture the capacity of the recipient's government to address its own health issues ( $x_{jt}$ ). These are GDP per capita and a set of fixed effects that capture the income group of the recipient. The latter define each recipient country as i) upper middle-income ii) lower-middle income or iii) low income. Per-capita GDP is expected to affect the inflow of aid through its affect on health expenditure. That is, richer countries can

generally afford more domestic health expenditure, which in turn reduces the need for international aid. Moreover, the income group of a country might matter (over and above the effect of the level of per-capita GDP) because it influences the way in which donors and international organization set their development and assistance priorities.

Finally the model includes country and time specific effects via  $u_j$  and  $v_t$  respectively. The country specific effects capture, among others things, environmental and institutional factors that are static over the sample period within a recipient country. The time specific effects capture time variant factors that are common to all recipient countries, such as the global trend of health aid efforts. It is expected that the explanatory variables should adequately capture factors that may influence the level of funding received by the various health concerns. In addition, we expect that standard variables that are used to explain aid in the literature (for example economic and geographical proximity) are not relevant here as there is in no reason why (say, political proximity) they should affect aid for malaria differently from aid for HIV. The main exception to this argument relates to the burden of the health disease itself, which could realistically vary in different degrees across time and across countries. This is re-visited in the sensitivity analysis with respect to malaria and TB.

The equation is estimated using linear regression techniques that utilize the within estimator to accommodate the country specific effects and impute dummy variables for time specific effects. We take the log of all the DAH variables to ease the interpretation of the coefficients.

## **Data**

The most common source of DAH data are two OECD databases: the CRS and Development Assistance Committee (DAC) databases, which have been utilized in studies on foreign aid (Shiffman, 2008; Shiffman, 2006b; Shiffman et al., 2009; Mishra and Newhouse, 2009). CRS is based on project specific reports forwarded to the OECD while DAC is based on annual reports sent by each OECD government. There are however major gaps in these data sources (Institute for Health Metrics and Evaluation, 2009). For example, the OECD (2000) has estimated that those reports are only 75% to 80% complete for the 1990s and comparisons between CRS and DAC have revealed major discrepancies (Michaud and Murray, 1994). To fill these gaps the Institute for Health Metrics and Evaluation (2009) has constructed a dataset from 1990 that details bilateral and multilateral donations given to countries for five health concerns. These data are used in this study to examine the displacement hypothesis.

In our work DAH is defined as all assistance for health channelled through public and private institutions whose primary purpose is to advance development in developing countries. The health concerns differentiated are i) HIV ii) malaria iii) TB and iv) health sector. In addition, we define a fifth category ‘other’ as the residual of total disbursements minus these four health concerns. This is a limitation of our dataset given that many concerns worthy of ‘displacement analysis’ are aggregated together. The data is aggregated over all donors to give a value of DAH for each health concern for each recipient country in each year over 1991-2007. The funding for each concern is expressed in 2007 USD.

In order to make sensible comparisons of DAH displacement this study only considers countries that have a significant burden of malaria, TB and HIV as well as a health sector that (arguably) needs strengthening. Information on the burden of malaria and TB is taken from the World Health Organisations (WHO) database. In this database, data is available up to 2003. Countries in the database that do not have available data or have no incidence of either malaria or TB are excluded. For those with a positive incidence in 2003 we retain their data for 2004 through 2007. After deleting countries with no malaria or TB incidence, the remaining countries all have a number of HIV deaths (per 100,000 people) that was higher than the OECD average, based on 2004 WHO data on the estimated deaths by cause in 2002. To identify health sectors that need strengthening, the percentage of births attended by skilled personnel as reported in the World Development Indicators is compared to the OECD norm ( $\geq 99\%$ ). All those below this number are retained. The list of included countries is provided in Table 1.

\*\*\*\*Insert Table 1 around here\*\*\*\*

## **Results**

Recalling that we control for recipient fixed effects, time effects, the recipient country’s GDP and the recipient country’s income bracket, the main results from the analysis are presented in Table 2. For health sector funding there is a negative within-country-between-health-concern displacement effect. Given the variables are measured in logarithmic terms, the results suggest that a 1% increase in HIV/AIDS funding to a particular country leads to a 0.09% decrease in health sector funding in the same country. The inertia in health sector funding, while statistically significant, is not large in magnitude. Specifically, if DAH on health sector funding increases by 1% in one year, other factors remaining constant, the

funding boost is expected to be scaled back to 0.25% in the following year, and less than 0.08% the year after. In other words, the data indicate that on average donors do not tend to make long-term commitments on health sector funding in specific recipient countries, and funding changes (increases or decreases) are mostly made on a one- to two-year horizon. This should not, however, be inferred as donors not committing to long term health sector funding because any such global commitment, if it exists, would be captured by the time fixed effect,  $v_t$ . Likewise, it also should not be inferred that donors do not commit to long-term aid for the recipient country because such country-specific commitments, if they exist, would be captured by the recipient fixed effect,  $u_j$ . Conversely, the findings do suggest that if there is a funding cut to the health sector program in individual recipient country, the cut should be expected to last for about two years.

\*\*\*\*Insert Table 2 around here\*\*\*\*

For malaria funding there is large negative within-country-between-health-concern displacement effect with a one-year lag. Specifically, the displacement results suggest that a 1% increase in funds devoted to HIV/AIDS in a particular country last year leads to an 11% decrease in funds devoted to malaria in the same country this year. We have conducted a sensitivity analysis focusing on countries that have a significantly high level of malaria, defined as those with an average prevalence of malaria that is greater than 1% of the population (using the WHO burden of malaria data described earlier). For this subset of 29 countries, the within-country-between-health-concern displacement effect with a one-year lag increases to 19%, and all other results remain stable.

The inertia of malaria funding is also noticeably stronger than that of health sector funding. A 1% increase in funding in the previous year is associated with a 0.43% increase in funding in the current year, and further down to 0.20% after two years and 0.09% after three years. This suggests that in general donors make at most medium term commitments on country-specific malaria funding.

For TB, there are no statistically discernable displacement effects. The inertia of TB funding is stronger than that of health sector but weaker than that of malaria. A 1% increase in funding in the current year is associated with a 0.38% increase in funding in the next year.

Finally, for ‘other’ health concerns, there are no statistically significant displacement effects. It is worth remembering that if this category were disaggregated it is possible that some of the disaggregated categories would show displacement effects. The inertia of ‘other’ health concerns funding is the lowest of all the categories considered here (0.1823).

### **Sensitivity Analysis**

The results in Table 2 are obtained from a baseline specification where unobserved heterogeneity is accounted for through time and country fixed effects. There are two possible criticisms of this. First, it is possible that the burden of each health concern varies differently across time within each country. In this case, the country and time fixed effects will not capture this heterogeneity and the displacement coefficients may be biased. Second, country fixed effects over control for factors that influence funding for various health concerns, such as persistent donor biases towards one country and one concern over the short or medium term.

In order to account for these criticisms and to test the robustness of our findings, we perform a few sensitivity checks. First of all, we re-estimate the basic specification dropping the country fixed effects and including the burden of TB and malaria in the TB and malaria equations respectively, along with the burden of HIV as control variables (we utilize the WHO data described earlier, and given data availability the results relate to 1990-2003. Health sector and ‘other’ are precluded from the analysis as we know of no available estimates of the burden of these concerns). We argue that these burdens, together with per-capita income (which is also a proxy for a country’s ability to finance domestic health expenditure), are the most likely country and time varying determinants of funding. Results are reported in Table 3. It is evident that the estimates are consistent with our baseline results.

\*\*\*\*Insert Table 3 around here\*\*\*\*

We have also estimated a version of equation (1) that includes both the country-fixed effects and the disease burdens. Results are reported in Table 4. Although the inertia effects increase significantly for both TB and malaria, the displacement effects associated with HIV remain stable.

\*\*\*\*Insert Table 4 around here\*\*\*\*

Given the large displacement coefficients found in our analysis for malaria, an additional analysis considers the displacement of HIV/AIDS DAH on our four health concern categories for countries with a low prevalence of HIV/AIDS only. The logic is that if the displacement on health sector and malaria funding persists, even for these countries, then this is additionally worrisome. Specifically, we repeat the analysis described by equation (1) only for countries with 1% or less HIV prevalence of population between 15-49 for a particular year based on information supplied by the World Development Indicators (this resulted in some countries data being retained for some years but not others). The results are shown in Table 5 and it is clear that all displacement effects have now dissipated.

\*\*\*\*Insert Table 5 around here\*\*\*\*

## **Discussion**

Overall, the findings across the health concerns consistently suggest that there are no between-country-between-health-concern displacement effects. On the other hand, there is evidence of within-country-within-health-concern displacement effects of HIV/AIDS funding on health sector and malaria funding, but not on TB or ‘other’ funding.

The finding that there is no displacement effect on TB funding is unsurprising given the link between the incidence of HIV/AIDS and TB. Amongst those infected with TB, individuals that are HIV positive are much more likely to develop active TB (Preble, 1990). Our findings seem to indicate that donor countries appropriately consider the funding for these two health concerns as complements rather than substitutes.

For malaria funding the magnitude of the displacement effect is large, and comes with a one year lag. This lagged effect may be related to the strong inertia in malaria funding. Given that approximately 50% of all malaria funding comes from DAH (World Health Organisation, 2009), the finding on the displacement effect should raise concern. More concerning is that when we restrict our analysis to a subset of countries with at least a 1% prevalence of malaria per population, the displacement effect almost doubles. This implies that, ironically, the countries that need malaria DAH most are being displaced most.

For health sector funding the magnitude of the effect is much smaller than that of malaria. However, since the fight against HIV/AIDS cannot be conducted effectively without a

functioning health system, the finding of a negative displacement should still warrant concern.

Displacement effects disappear when we consider countries with a relatively low level of HIV/AIDS only. This is some comfort as it suggests that displacement isn't purely being driven by a sense of an 'in' disease and for these countries international media pressure on providing HIV/AIDS DAH is probably low, and hence donors do not have strong incentives/reasons to substitute dollars for other health concerns with dollars for HIV.

It should be reiterated that the definition of displacement adopted is dollar displacement instead of share displacement. A negative displacement effect in, say, malaria funding therefore means a decrement in the absolute amount of financial resources being put into the home recipient country for fighting malaria, after controlling for other factors. Therefore, it represents a loss by the home country relative to other recipient countries that do not see their HIV/AIDS funding being increased.

It is clear from our analysis that malaria is the biggest 'loser' with respect to HIV/AIDS displacement. Yet, malaria caused nearly one million deaths in 2008 alone and accounted for 20% of childhood mortality in Africa (World Health Organization, 2010b), and, at the same time, there is evidence that DAH did help reduce the incidence of malaria (World Malaria Report, 2009). From a policymaking perspective, our results immediately raise the issue of how to prevent displacement of malaria funding in the future. Clearly, increasing overall health aid might not be enough. If HIV/AIDS continues to attract attention in the media and in the political debate, extra-dollars brought into the health aid budget are likely to be absorbed disproportionately by the campaign against HIV/AIDS. Even though over the past year HIV/AIDS funding has lagged somewhat, there is still an argument for earmarking funding for malaria. In other words, the global health agenda should consider committing a given proportion of the new resources that become available in the overall health aid budget to health concerns that suffer from competing with HIV/AIDS for DAH and represent a high burden in terms of DALYs.

Our results also raise the issue of how to balance the competing need of DAH for different health concerns and how to monitor whether the actual funding allocations match the relative needs in different areas. Campaigns against HIV/AIDS, malaria and TB to some extent are better organized internationally due to the effort of the Global Fund to Fight AIDS, TB and

Malaria, yet, we still find evidence of displacement of malaria by HIV/AIDS. Whether this displacement can be justified based on the change in relative burden of disease is an important issue that warrants further investigation. In order to assess if the distribution of DAH is appropriate and efficient in improving the overall health condition in the recipient countries, we need consistent, objective measures of burden of diseases both across countries and over time. In this respect, projection of the future burden of diseases would be particularly useful.

## References:

- Alesina, A. and Dollar D. 2000. "Who gives foreign aid to whom and why?" *Journal of Economic Growth*, 5, pp 33-63
- Crossette, B. 2005. "Reproductive health and the Millennium Development Goals: the missing link." *Studies of Family Planning*, 36:1, pp. 71-9.
- Danziger, R. 1994 "The Social Impact of HIV/AIDS in developing countries." *Social Science and Medicine*, 39:7, pp 905-917.
- Gordon, J. G. 2008. "A critique of the financial requirements to fight HIV/AIDS." *Lancet*, 372:9635, pp. 333-6.
- Institute for Health Metrics and Evaluation. 2009. "Financing Global Health 2009: Tracking Development Assistance for Health." Seattle, USA: IHME, <http://www.healthmetricsandevaluation.org>, accessed 24/09/2009.
- Lewis, T.L. 2003. "Environmental aid: Driven by recipient need or donor interest?" *Social Science Quarterly*, 84:1, pp 144-161.
- Mac Kinlay, R.D. and Little R. 1977. "A Foreign Policy Model of U.S. Bilateral Aid Allocation." *World Politics*, 30:1, pp. 58-86.
- Meernik, J., Krueger, E.L. and Poe, S.C. 1998. "Testing Models of U.S. Foreign Policy: Foreign Aid during and after the Cold War." *The Journal of Politics*. 60:1, pp 63-85.
- Michaud, C. and C. J. L. Murray. 1994. "External Assistance to the Health Sector in Developing Countries a Detailed Analysis, 1972-90." *Bulletin of the World Health Organisation*, 72:4, pp. 639-51.
- Mishra, P. and D. Newhouse. 2009. "Does health aid matter?" *Journal of Health Economics*, 28:4, pp. 855-72.
- Molyneux, D. H. 2004. "Neglected diseases but unrecognised successes--challenges and opportunities for infectious disease control." *Lancet*, 364:9431, pp. 380-3.
- Organization for Economic Co-operation and Development (OECD). 2001. "2000 Development Cooperation Report." OECD Paris.

- Piot, P., M. Kazatchkine, M. Dybul, and J. Lob-Levyt. 2009. "AIDS: lessons learnt and myths dispelled." *Lancet*, 374:9685, pp. 260-3.
- Preble, E. 1990. "Impact of HIV/AIDS on African children." *Social Science and Medicine*. 31, pp 671-680.
- Raviglione, M. C. and A. Pio. 2002. "Evolution of WHO policies for tuberculosis control, 1948-2001." *Lancet*, 359:9308, pp. 775-80.
- Shiffman, J. 2006a. "Donor funding priorities for communicable disease control in the developing world." *Health Policy Plan*, 21:6, pp. 411-20.
- Shiffman, J. 2006b. "HIV/AIDS and the rest of the global health agenda." *Bulletin of the World Health Organisation*, 84:12, pp. 923.
- Shiffman, J. 2008. "Has donor prioritization of HIV/AIDS displaced aid for other health issues?" *Health Policy Plan*, 23:2, pp. 95-100.
- Shiffman, J., D. Berlan, and T. Hafner. 2009. "Has aid for AIDS raised all health funding boats?" *Journal of Acquired Immune Deficiency Syndromes*, 52 Supplement 1, pp. S45-8.
- WHO Commission on Macroeconomic and Health. 2001. "Macroeconomics and Health: Investing in Health for Economic Development." Report of the Commission on Macroeconomics and Health. World Health Organisation, Geneva.
- World Health Organization. 2009. "World Malaria Report," Geneva.
- World Health Organization. 2010a. "Fact File: 10 Facts On HIV/AIDS."
- World Health Organization. 2010b. "Fact Sheets: Malaria."
- World Malaria Report (WMR) 2009, by World Health Organization (WHO), Geneva.
- Yu, D., Y. Souteyrand, M. A. Banda, J. Kaufman, and J. H. Perriens. 2008. "Investment in HIV/AIDS programs: Does it help strengthen health systems in developing countries?" *Globalization and Health*, 4:8.

**Table 1: Included Countries**

Angola	Chad	Guinea-Bissau	Paraguay
Belize	Colombia	Guyana	Peru
Benin	Congo	Haiti	Rwanda
Bhutan	Djibouti	Honduras	Senegal
Botswana	Dominican Republic	Malawi	South Africa
Brazil	El Salvador	Mali	Sudan
Burkina Faso	Equatorial Guinea	Nepal	Suriname
Burundi	Gabon	Niger	Swaziland
Cambodia	Ghana	Nigeria	Togo
Cameroon	Guatemala	Panama	Zambia
Central African Republic	Guinea	Papua New Guinea	Zimbabwe

**Table 2 Estimation results**

Health concern	Health Sector ( $HSF_{jt}$ )	Malaria ( $MF_{jt}$ )	TB ( $TBF_{jt}$ )	Other ( $OF_{jt}$ )
$HF_{jt}$	-0.0883**	0.0296	-0.0128	0.0078
$HF_t - HF_{jt}$	0.03172	0.0027	0.0031	-0.0047
$HF_{jt-1}$	-3.6393	-10.644**	-1.0789	-1.6933
$HF_{t-1} - HF_{jt-1}$	0.3653	-1.5278	-0.5831	0.0583
$HSF_{jt-1}$ or $MF_{jt-1}$ or $TBF_{jt-1}$ or $OF_{jt-1}$	0.2533***	0.4206***	0.3781***	0.1823***

\*\* and \*\*\* indicate significance at respectively the 5% and 1% levels. We have controlled for recipient fixed effects, time effects, the recipient country's GDP and the recipient country's income bracket.

**Table 3 Estimation results – Removing Country Fixed Effects & including disease prevalence**

Health concern	Malaria ( $MF_{jt}$ )	TB ( $TBF_{jt}$ )
$HF_{jt}$	0.0481	0.0443
$HF_t - HF_{jt}$	0.0090	0.0322
$HF_{jt-1}$	-9.7054***	-7.1197
$HF_{t-1} - HF_{jt-1}$	-0.7387	0.0218
$MF_{jt-1}$ or $TBF_{jt-1}$	0.5491***	0.5517***

\*\* and \*\*\* indicate significance at respectively the 5% and 1% levels. We have controlled for recipient disease prevalence, time effects, the recipient country's GDP and the recipient country's income bracket.

**Table 4 Estimation Results – Including a measure of disease prevalence**

Health concern	Malaria ( $MF_{jt}$ )	TB ( $TBF_{jt}$ )
$HF_{jt}$	0.0286	-0.0136
$HF_t - HF_{jt}$	0.0029	-0.0029
$HF_{jt-1}$	-10.791***	-1.2819
$HF_{t-1} - HF_{jt-1}$	-1.7024	-0.5873
$MF_{jt-1}$ or $TBF_{jt-1}$	0.4094***	0.3788***

\*\* and \*\*\* indicate significance at respectively the 5% and 1% levels. We have controlled for recipient disease prevalence, fixed effects, time effects, the recipient country's GDP and the recipient country's income bracket.

**Table 5 Estimation Results – Countries with 1% or less HIV Prevalence of population between 15-49**

Health Concern	Health Sector Funding ( $HSF_{jt}$ )	Malaria ( $MF_{jt}$ )	TB ( $TBF_{jt}$ )	Other ( $OF_{jt}$ )
$HF_{jt}$	-0.0366	0.0319	-0.0436	-0.0131
$HF_t - HF_{jt}$	0.0075	-0.0166	-0.1068	-0.0150
$HF_{jt-1}$	-5.6185	-4.7039	-4.1165	0.3417
$HF_{t-1} - HF_{jt-1}$	0.2123	-2.4812	-1.8429	0.4857
$HSF_{jt-1}$ or $MF_{jt-1}$ or $TBF_{jt-1}$ or $OF_{jt-1}$	0.1009*	0.3705***	0.4483***	0.3514***

\*\* and \*\*\* indicate significance at respectively the 5% and 1% levels.