



# Official development assistance for health—how neglected are neglected tropical diseases? An analysis of health financing

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Received 15 July 2009; received in revised form 6 August 2009; accepted 19 August 2009

## KEYWORDS

Neglected tropical diseases;  
Malaria;  
Tuberculosis;  
HIV/AIDS;  
Financing;  
Drug donations

**Summary** The increasing amounts of official development assistance (ODA) for health have been aimed primarily at fighting HIV/AIDS, malaria and tuberculosis. Neglected tropical diseases (NTD), one of the most serious public health burdens among the most deprived communities, have only recently drawn the attention of major donors. While frequently stated, the low share of funding for NTD control projects has not been calculated empirically. Our analysis of ODA commitments for infectious disease control for the years 2003 to 2007 confirms that Development Assistance Committee (DAC)-countries and multilateral donors have largely ignored funding NTD control projects. On average, only 0.6% of total annual health ODA was dedicated to the fight against NTDs while the average share of control projects for HIV/AIDS was 36.3%, for malaria 3.6%, and for tuberculosis 2.2%. This allocation of health ODA does not reflect the diseases' respective health burdens. Furthermore, the availability of cost-efficient treatments for NTDs supports the call for an increase in funds dedicated to the control of NTDs.

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## 1. Introduction

Neglected Tropical Diseases (NTDs) constitute one of the most serious public health burdens, affecting primarily people living on less than US\$2 per day.<sup>1</sup> An estimated one billion people are infected with one or more NTDs.<sup>2</sup> Social stigma, extreme poverty of afflicted populations, and relatively low mortality are some of the reasons for the neglect of these diseases.<sup>3</sup>

Since the late 1990s, developing countries have received increasing amounts of official development assistance (ODA) for health purposes.<sup>4,5</sup> However, not all diseases have benefited equally from this increase. Until recently, aid for disease control has been aimed primarily at fighting HIV/AIDS, malaria, tuberculosis and polio.<sup>3,4,6,7</sup> A comprehensive analysis of research and development (R&D) spending on neglected diseases which were defined as including HIV/AIDS, malaria, tuberculosis and diarrheal diseases shows a low share of funding for NTDs such as helminthiasis, kinetoplastid diseases (trypanosomiasis, leishmaniasis), Buruli ulcer and trachoma. HIV/AIDS, tuberculosis and malaria, however, accounted for more than 76% of the US\$2.56 billion invested on R&D on neglected diseases in 2007.<sup>8</sup>

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**Table 1** Sectors and purposes considered as ODA for health.

Sector name	Purpose code	Purpose name
Health	12110	Health policy & administrative management
	12181	Medical education/training
	12182	Medical research
	12191	Medical services
	12220	Basic health care
	12230	Basic health infrastructure
	12240	Basic nutrition
	12250	Infectious disease control
	12261	Health education
	12262	Malaria control
	12263	Tuberculosis control
	12281	Health personnel development
	Population Policies/Programmes and Reproductive Health	13010
13020		Reproductive health care
13030		Family planning
13040		STD control including HIV/AIDS
13081		Personnel development for population and reproductive health

The lack of funding for NTD control programs has been noted by the World Health Organization (WHO), academics and non-governmental organizations.<sup>9–12</sup> However, the specific amounts of ODA committed to NTD control have not been evaluated empirically. This paper attempts to do so by analyzing ODA commitments for infectious disease control derived from the OECD Creditor Reporting System (CRS) database.

## 2. Methods

The goal of our analysis is to identify ODA dedicated to health causes and specifically to NTD control for the period 2003 to 2007. We base our analysis of ODA on the OECD CRS database which collects ODA data from donors, including all 22 members of OECD's Development Assistance Committee (DAC) and — on a voluntary basis — from non-DAC countries and multilateral agencies such as The Global Fund to Fight AIDS, Tuberculosis and Malaria.<sup>4</sup> We focus on donors' commitments instead of disbursements as, for the period considered, ODA commitments are nearly 100% complete in the database while disbursements are only about 90% complete.<sup>13</sup>

Following the categorization used by the OECD report *Measuring Aid to Health*, we included all ODA commitments that were made in the sector 'Health and Population Policies/Programmes and Reproductive Health' as *ODA for health* (Table 1).<sup>4</sup> In order to identify ODA for NTD control, we studied annual ODA commitments for infectious disease control in detail.

Definitions of NTDs used by different institutions and authors vary. For example, WHO lists 20 diseases to be addressed by the Global Plan to Combat Neglected Tropical Diseases.<sup>14</sup> The Global Network for Neglected Tropical Diseases includes 13 diseases in its list of NTDs while the Neglected Tropical Disease Control Program targets 5 diseases.<sup>15,16</sup> For our purposes, we define NTDs in accordance with Hotez et al., who use one of the most comprehensive lists of 37 NTDs including 13 core NTDs with some of the highest disease burdens (Table 2).<sup>17</sup>

We calculated a range instead of a single number for NTD control commitments since we were not always able to identify the specific amount spent. In some cases, projects were labeled with generic project titles and short descriptions, e.g. infectious disease control. In order to identify the project's purpose, we conducted internet and literature searches. However, in some cases, especially when the name

**Table 2** Neglected tropical diseases (NTDs) considered<sup>17</sup>.

Helminth infections	Ascariasis; <sup>a</sup> trichuriasis; <sup>a</sup> hookworm infection; <sup>a</sup> strongyloidiasis; toxocariasis and larva migrans; lymphatic filariasis; <sup>a</sup> onchocerciasis; <sup>a</sup> loiasis; dracunculiasis; <sup>a</sup> schistosomiasis; <sup>a</sup> food-borne trematodiasis; taeniasis cysticercosis; echinococcosis
Protozoan infections	Leishmaniasis; <sup>a</sup> Chagas disease; <sup>a</sup> human African trypanosomiasis; <sup>a</sup> amoebiasis; giardiasis; balantidiasis
Bacterial infections	Bartonellosis; bovine tuberculosis; buruli ulcer; <sup>a</sup> leprosy; <sup>a</sup> leptospirosis; relapsing fever; rheumatic fever; trachoma; <sup>a</sup> treponematoses
Viral infections	Dengue fever; yellow fever; Japanese encephalitis; rabies; haemorrhagic fever
Fungal infections	Mycetoma; paracoccidiomycosis
Ectoparasitic infections	Scabies; myiasis; tungiasis

<sup>a</sup> 13 core NTDs.

**Table 3** Health and population commitments by purpose, 2003–2007 (in millions of constant US\$, 2006 base year).

Year	HIV/AIDS control	Malaria control	Tuberculosis control	Infectious disease control, excl. NTDs	NTD control	Health sector development <sup>a</sup>	Population excl. HIV/AIDS <sup>b</sup>	Total
2003	2971	207	168	826	54	3179	1326	8731
2004	2835	262	120	679	46	3900	1330	9171
2005	3984	516	183	1058	115	4545	948	11350
2006	4673	418	461	1192	51	5061	1858	13713
2007	6793	757	422	1098	86	3438	1783	14377
Average annual growth rate	18.0%	29.6%	20.3%	5.9%	9.9%	1.6%	6.1%	10.5%

NTD: neglected tropical disease.

<sup>a</sup> Includes commitments with purpose codes 12110, 12181, 12182, 12191, 12220, 12230, 12240, 12261, 12281 (see Table 1).

<sup>b</sup> Includes commitments with purpose codes 13010, 13020, 13030, 13081 (see Table 1).

**Table 4** Percentage of health and population commitments by purpose, 2003–2007.

Year	HIV/AIDS control	Malaria control	Tuberculosis control	Infectious disease control, excl. NTDs	NTD control	Health sector development	Population excl. HIV/AIDS	Total
2003	34.0	2.4	1.9	9.5	0.6	36.4	15.2	100.0
2004	30.9	2.9	1.3	7.4	0.5	42.5	14.5	100.0
2005	35.1	4.5	1.6	9.3	1.0	40.0	08.4	100.0
2006	34.1	3.0	3.4	8.7	0.4	36.9	13.5	100.0
2007	47.2	5.3	2.9	7.6	0.6	23.9	12.4	100.0
Average	36.3	3.6	2.2	8.5	0.6	36.0	12.8	100.0

NTD: neglected tropical disease.

of the recipient was not specified, we were not able to identify the specific purpose of the commitment. In other cases, when commitments were made for projects that included non-NTD as well as NTD control activities, we could not identify the share of funding that was allocated to NTDs. The numbers reported in Table 3 represent the upper bound for possible NTD control ODA as they include all commitments that (1) were explicitly identified as NTD control, (2) were identified as both non-NTD control and NTD control and (3) had an unspecified purpose. Table 5 provides a detailed breakdown.

### 3. Results

The health sector in developing countries has experienced a steady increase in ODA commitments in recent years.

Between 2003 and 2007, total ODA for health has risen from US\$8.73 billion to US\$14.38 billion (Table 3). The increase of US\$5.65 billion over 5 years implies an average annual growth rate of 10.5%. None of the health purposes analyzed has lost funding in absolute terms but they have grown at very different paces. Malaria control and tuberculosis control had the largest average annual growth rates, at 29.6% and 20.3%, respectively. Funding for HIV/AIDS control rose by a higher-than-average 18.0%. NTD control had an annual growth rate of 9.9%. Commitments for health sector development grew at only 1.6%, the lowest annual rate.

On average, 36.3% of total health ODA was committed to the control of HIV/AIDS in the period 2003–2007 (Table 4). Malaria, tuberculosis and NTD control attracted average shares of 3.6%, 2.2% and 0.6%, respectively. The share of projects addressing HIV/AIDS ranged between 30.9% and 47.2% of total ODA for health between 2003 and

**Table 5** Neglected tropical disease (NTD) control commitments by project focus in absolute numbers and percentage of total health ODA, 2003–2007 (in millions of constant US\$, 2006 base year).

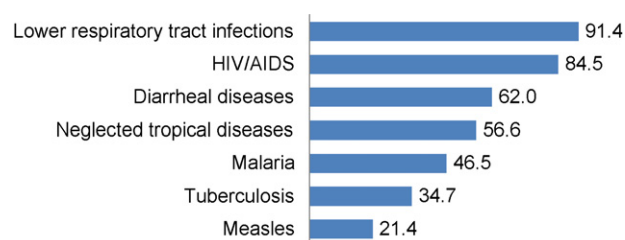
Year	NTD control	NTD and non-NTD control	Unspecified	Total	NTD control %	NTD and non-NTD control %	Unspecified %	Total %
2003	37	11	6	54	0.42	0.12	0.07	0.61
2004	14	20	12	46	0.15	0.22	0.13	0.50
2005	97	14	5	115	0.85	0.12	0.04	1.01
2006	9	15	26	51	0.07	0.11	0.19	0.37
2007	39	31	17	86	0.27	0.21	0.12	0.60

2007. Although fluctuating year-to-year, malaria control and tuberculosis control also generally received rising shares of ODA. The share of ODA for the control of infectious diseases other than HIV/AIDS, tuberculosis, malaria and NTDs decreased from 9.5% in 2003 to 7.6% in 2007. The share of ODA for NTD control remained largely constant around 0.6%.

The numbers for NTD control reported in Table 4 represent the upper bound of possible commitments to this cause. Table 5 shows a breakdown of these numbers into commitments that (1) explicitly aim at NTD control, (2) aim at non-NTD as well as NTD control and (3) had an unspecified purpose. Even when including all projects with unspecified purpose and projects that focus on both non-NTD and NTD control, NTD control could only attract between 0.37% (2006) and 1.01% (2005) of total ODA for health. When excluding unspecified projects, the share of NTD control ranges between 0.18% (2006) and 0.97% (2005).

#### 4. Discussion

An especially remarkable result of our analysis is the low share of ODA committed to NTD control. On average, annual ODA commitments to projects fighting HIV/AIDS were more than 60 times the amount dedicated to NTD control. This number contrasts with the relative burden of these diseases. Taking into account 13 core NTDs, Hotez et al. calculate



**Figure 1** Global burden of infectious diseases (in millions of disability-adjusted life years lost). Source: Hotez et al.<sup>1,12</sup>.

that the upper bound for the global burden of disease is 56.6 million disability-adjusted life years (DALYs) lost (Figure 1).<sup>12,17</sup> Hence NTDs' burden exceeds that of tuberculosis and malaria and is roughly two-thirds that of HIV/AIDS. When the lower bound of the calculations is considered, the global burden of NTDs is 19.4 million DALYs, still a significant number.<sup>17</sup> ODA funding dedicated to NTD control does not reflect this relatively high disease burden of NTDs.

The relatively low amount of funding for NTD control is even more notable as it is considered a public health 'best-buy' because of the availability of cost-effective health interventions for most of the NTDs (Table 6). For example, in high prevalence areas of lymphatic filariasis (LF), the cost per DALY averted by annual drug administration to the entire population at risk is US\$5.90.<sup>18</sup> Similarly, the

**Table 6** Estimated cost-effectiveness of health interventions for selected diseases.

Intervention	Cost-effectiveness (US\$/DALY averted)	Reference
Measles: vaccination	5	19
Lymphatic filariasis: mass drug administration	5.90	18
Onchocerciasis: treatment with donated ivermectin	7	19
Soil-transmitted helminths: mass drug administration with albendazole	2–9	19
Leishmaniasis: case finding with treatment	9	19
Rabies: dog vaccination in two districts of Tanzania	10	20
Echinococcosis: deworming domestic and stray dogs	10–12	21
Malaria: insecticide-treated bed nets	5–17	19
Schistosomiasis: treatment with combined albendazole and praziquantel	8–19	19
Brucellosis: mass vaccination of cattle, sheep and goats in Mongolia	19	22
Human African trypanosomiasis: treatment with melarsoprol or eflornithine	10–20	19
Malaria: residual household spraying with DDT, malathion, deltamethrin, or cyhalothrin (sub-Saharan Africa)	9–24	19
Malaria: intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine	13–24	19
Tuberculosis: DOTS treatment	5–35	19
Leprosy: case detection and treatment	38	23
Trachoma: surgery	13–78	24
Diarrheal diseases: rehydration therapy	132	19
Chagas disease: vector control	260	19
Diarrheal diseases: provision and promotion basic sanitation facilities	270	19
Tuberculosis: management of drug resistance	70–450	19
HIV/AIDS: antiretroviral therapy	350–500	19
Dengue: improved case management	587	19

DALY: disability-adjusted life year.

cost per DALY averted by mass school-based treatment of soil-transmitted helminthiasis with albendazole is US\$2–9. The community-directed treatment of onchocerciasis with donated ivermectin costs around US\$7 per DALY averted. In comparison, the cost of antiretroviral therapy for HIV is US\$350–500 per DALY averted assuming low treatment costs and high adherence rates.<sup>19</sup>

The cost-effectiveness of some NTD control activities would be even higher when broader health gains beyond the targeted diseases are taken into account.<sup>25</sup> For example, mass drug administration of albendazole and ivermectin not only helps to fight LF and onchocerciasis but also treats soil-transmitted helminthiasis, lice and scabies leading to improvements in nutrition, growth, cognitive function, and a reduction in anemia and itching.<sup>18,26,27</sup> Further, reductions in anemia might result in lower morbidity and mortality from malaria.<sup>28</sup> In general, integration of selected NTD control activities with those for malaria or HIV/AIDS in areas where these diseases are co-endemic could lead to increased effectiveness.<sup>29,30</sup>

Molyneux et al. calculate that the treatment of five major NTDs (LF, schistosomiasis, intestinal helminths, onchocerciasis, trachoma) in sub-Saharan Africa would cost US\$200 million annually for 5 years.<sup>31</sup> This contrasts with the US\$86 million that was actually provided for all NTDs worldwide in 2007.

On the other hand, the sustained and increasing advocacy regarding NTDs seems to be bearing fruit. At the 2008 Hokkaido-Toyako Summit, G8 leaders noted that efforts 'to control or eliminate NTDs need to be reinvigorated [...] with sustained action for 3–5 years'.<sup>32</sup> In February 2008,

the USA announced a US\$350 million, 5-year initiative to control the seven NTDs that can be controlled with mass drug administration. Also in 2008, the UK committed US\$75 million (GBP 50 million) over 5 years to combat NTDs. The G8 re-emphasized their intention to increase efforts in the fight against NTDs during the 2009 Summit in Italy.<sup>33</sup> Additionally, in a speech in July 2009, President Obama explicitly reiterated the USA's commitment to combat NTDs.<sup>34</sup> These are first signs of a significant change in funding for NTDs, although the commitments have yet to be disbursed.

Private philanthropy, e.g. by the pharmaceutical industry and the Bill & Melinda Gates Foundation, has filled part of the funding gap for NTD control by providing drugs and cash donations for large-scale disease control programs. The pharmaceutical industry recognizes that drug donations 'should not be promoted as the solution to the global healthcare crises'.<sup>41</sup> Furthermore, a major discussion exists about the motives, benefits and valuation methods of drug donations.<sup>42</sup>

However, the amounts of drugs donated by pharmaceutical companies to the fight against NTDs have been significant (Table 7). For instance, in 1987, Merck & Co., Inc. made an open-ended commitment to donate ivermectin for the treatment of onchocerciasis and since 1998 for LF treatments in Africa. The authors calculated that over 525 million treatments of ivermectin were donated between 2003 and 2007.<sup>43–47</sup> Albendazole, another drug for the treatment of LF, has been donated by GlaxoSmithKline (GSK) since 1998; between 2003 and 2007, GSK provided 602 million tablets.<sup>48</sup> Azithromycin, for the treatment of blinding trachoma, has been donated by Pfizer since 1998. According

**Table 7** Overview of selected neglected tropical disease (NTD) drug donation programs active 2003–2007.

Disease	Donated drug	Donor company	Duration of program	Amount of drugs donated 2003–2007	References
Onchocerciasis	Ivermectin	Merck & Co., Inc.	1987–open-ended	990 million tablets <sup>a</sup>	43–47
Lymphatic filariasis	Ivermectin	Merck & Co., Inc.	1998–2020	385 million tablets <sup>b</sup>	43–47
Lymphatic filariasis	Albendazole	GlaxoSmith-Kline	1998–2020	602 million tablets	48
Trachoma	Azithromycin	Pfizer	1998–open-ended	266 million tablets <sup>c</sup>	49–54
Leprosy	Multidrug therapy	Novartis	2000–2010	NA	35,36
Human African trypanosomiasis	Pentamidine, Melarsoprol, Eflornithine	Sanofi-Aventis	2001–2011	NA (total of 940 000 vials 2001–2006)	37
Human African trypanosomiasis	Suramin	Bayer Healthcare	2002–2012	NA	38
Schistosomiasis	Praziquantel	MedPharm	NA	NA (14 million tablets 2004)	39
Chagas disease	Nifurtimox	Bayer Healthcare	2004–2012	NA (500 000 tablets 2004–2005; 2.5 million tablets pledged 2007–2012)	38,40
Soil-transmitted helminthiasis	Mebendazole	Johnson & Johnson	2006–open-ended	NA (30 million tablets 2006)	55

NA: not available.

<sup>a</sup> 330 million treatments, 3 tablets per treatment.

<sup>b</sup> 195 million treatments, 3 tablets per treatment.

<sup>c</sup> 70 million treatments, 3.8 tablets per treatment.

to our calculations, over 70 million treatments of the drug were donated between 2003 and 2007.<sup>49–54</sup> To combat soil-transmitted helminthiasis, Johnson & Johnson committed to donate up to 50 million mebendazole tablets per year in 2006. In 2007, the company donated 30 million doses of the drug.<sup>55</sup> Although substantial, these drug donations cover only part of the global need — with the exceptions of ivermectin for the treatment of LF and onchocerciasis, and albendazole for LF treatment.<sup>17</sup>

The Bill & Melinda Gates Foundation has also been active in the combat against NTDs.<sup>56</sup> The authors calculated that, in the period 2003–2007, the Foundation awarded total grants of US\$102 million for the control of NTDs. For example, in 2005, the Foundation granted US\$25 million to The Carter Center in Atlanta, Georgia, to support the eradication of Guinea Worm Disease. In 2006, it gave almost US\$32 million to Imperial College London to support the Schistosomiasis Control Initiative in Africa.<sup>57</sup>

## 5. Conclusion

The analysis of ODA data for the years 2003 to 2007 shows that DAC-countries and multilateral donors have largely ignored funding NTD control. The low share of ODA addressing NTD control is especially unfortunate in the context of high health, economic, and social burdens of NTDs on the one hand, and availability of highly cost-effective treatments on the other. NTD control would benefit significantly from a modest rise of ODA flows dedicated to its cause. While pharmaceutical companies have donated some necessary drugs at increasing quantities, DAC-countries have yet to follow up on their commitments to fund programs that aim at controlling NTDs.

**Authors' contributions:** BHL and LS undertook all the duties of authorship. BHL is guarantor of the paper.

**Funding:** None.

**Conflicts of interest:** None declared.

**Ethical approval:** Not required.

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