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Disease burden, proportionality and the AIDS funding debate – Towards clarity on whether the world is spending 'too much' on HIV/AIDS

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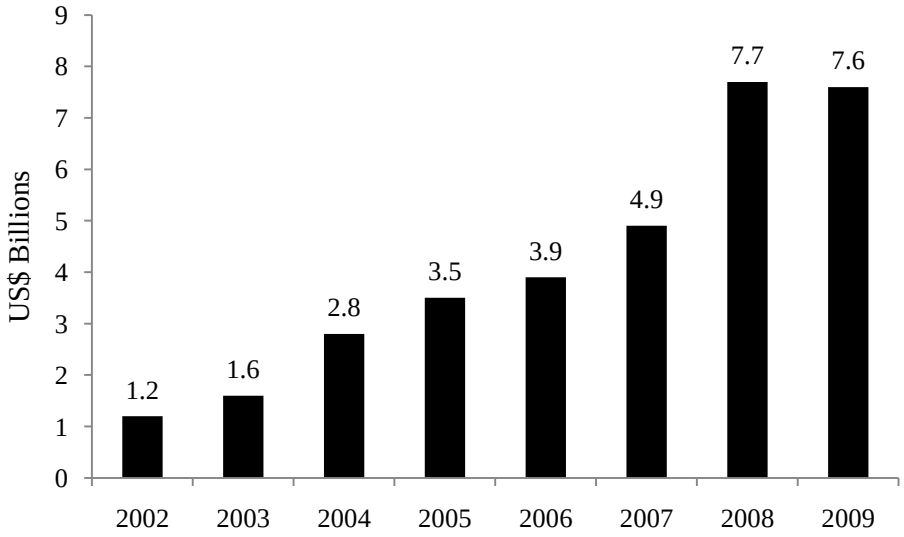
Abstract

There is currently considerable uncertainty surrounding the future of HIV/AIDS funding. With pressures from the recent financial crisis forcing donors to carefully review their spending priorities, some have claimed that HIV/AIDS receives too much money relative to its disease burden. This paper seeks to clarify this issue by examining the proportionality of HIV/AIDS funding to its disease burden in the year 2008 by measuring that percentage of total health expenditure spent on HIV/AIDS against that percentage of total disease burden attributable to the disease. It pays particular attention to a recently raised issue; namely, whether substituting OECD data for UNAIDS data has any significant effect on the number of countries spending above or below the level that is proportional to their HIV/AIDS disease burdens. Results indicate that the majority of countries in the dataset 'overspend' on HIV/AIDS relative to the most commonly employed measure of disease burden, the Disability Adjusted Life Year (DALY). This result, however, belies the fact that global 'underspending' is far more severe than overspending; while most countries 'overspend', the total amount in surplus of proportionality in overspending countries is dwarfed by the total amount still needed to reach proportionality in underspending ones. In other words, global HIV/AIDS resources are inadequate to bring all countries' spending on the disease in line with their disease burdens.

Introduction

The global catastrophe that is HIV/AIDS (henceforth AIDS) has created a powerful and dedicated machinery of activism that, since the 1980s, has roused far-reaching international, multi-sectoral responses to the epidemic (see Fabj and Sobnosky, 1995; Epstein, 1998; Heywood and Altman, 2000 and Grebe, 2008). This machinery has been very good at mobilising resources – especially in the last decade or so. In 2009, disbursements (that is, actual resources available for spending) by donor governments totaled approximately $7.6 billion (Kates et al, 2010: 2). 77% of this was provided bilaterally (country to country), but a sizeable proportion (23%) found its way through multilateral agencies (UNAIDS, 2010a: 152). Moreover, a powerful and sustained surge in international funding took place between 2002 and 2008:

Figure I.1: International AIDS assistance (disbursements), 2002-2009 (billions of US$)



Source: Adapted from Kates et al, 2010: 4

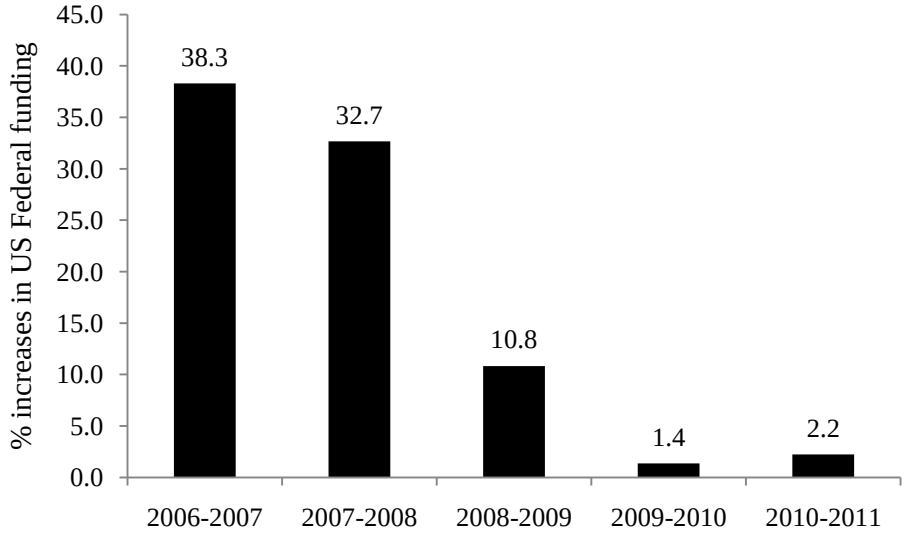
The United States (US) has been the most powerful driving force behind the AIDS response. First providing funding for global AIDS interventions in 1986, its international efforts in this regard have been steadily expanding – both absolutely and as a share of the total US AIDS budget (Kaiser Family Foundation, 2010: 2). In 2009 the US accounted for 58% of total donor assistance and 26.9% of all available resources (including public sector spending, private sector spending and philanthropic contributions) for AIDS. It leads decisively: the next highest contributor was the United Kingdom, which contributed 10.2% and 4.7% respectively (Kates et al, 2010: 2). The US's

PEPFAR (President's Emergency Plan for AIDS Relief) programme, created in 2003, pledged $15 billion over five years to combat AIDS, malaria and tuberculosis (Kates and Lief, 2006: 7). An additional $48 billion was authorized in 2008 for the period 2008-2013 (PEPFAR, 2011: online). The US, through PEPFAR, is also the heftiest contributor to the Global Fund to fight AIDS, Tuberculosis and Malaria (Kates et al, 2010: 7; Kaiser Family Foundation, 2010: 2).

Resources are, however, still inadequate. In many low and middle income countries, funding gaps show themselves daily in the empty spaces where drugs, doctors and testing centres should be. Even given massive injections of funding, and including all possible sources of funding, UNAIDS – together with the Kaiser Family Foundation - estimated that approximately $7.7 billion in *additional* funding was needed in 2009 for a comprehensive response (prevention, treatment, infrastructure and human resources) to the epidemic in low and middle income countries (Kates et al, 2010: 9). Approximately 33.3 million people were still living with the disease come the end of 2009, a 27% increase from the 1999 level of 26.2 million. Though this has partly to do with vastly expanded access to life-saving and life-prolonging antiretroviral therapy (ART), a large proportion of those urgently needing drugs are not getting them. In 2009 in Sub-Saharan Africa, only 37% of those eligible for treatment were able to access it, while this proportion was 42% in South and Central America and 19% in Eastern Europe and Central Asia (UNAIDS, 2010a: 96). Globally, approximately 9.8 million people did not have access to the treatment they needed in 2009. Many people dying of AIDS (1.8 million in 2009), thus, do so far from the threshold at which modern medicine can keep them alive (UNAIDS, 2010a: 19).

It is clear that the large international funding network that supports the AIDS response is not large enough to get help to all those that need it. Still, its scale has placed AIDS funding under the spotlight. Recently, a question has been put to the responders: 'are you not perhaps spending too much on this disease'? It seems a callous question to some, especially considering the many AIDS sufferers still awaiting treatment, but several factors have urged its asking. Firstly, the 2008 financial crisis has placed severe pressure on all governments, donors included, and spending priorities have been placed under close scrutiny (see UNAIDS, 2010c: 16, for example). As can be seen from the figure above, international assistance for AIDS leveled off – even dropping slightly – between 2008 and 2009. The US Federal Budget for 2011 cut 5% in contributions to the Global Fund from 2010. While it called for a 2% increase in overall global contributions to AIDS relief, relative to previous year-on-year increases this is a near flat-lining of funds:

Figure I.2: Percentage increases in US Federal funding for global HIV/AIDS relief, Federal Years 2006-2011



Source: Calculated from Kaiser Family Foundation, 2010: 3

Elsewhere, strong concern has been voiced by AIDS relief workers, Non Governmental Organisations (NGOs) and various media commentators over the scaling back of funding commitments that will see many aid-dependant relief projects severely compromised (see, for example, Guardian, 2011: online; PULSE, 2011: online; Health Gap, 2011: online; and Heal Africa, 2011: online).

Secondly, the donor attention paid to AIDS has raised concerns over whether a zero-sum game exists among diseases, wherein high spending on AIDS, given finite resources, leads to the neglect of other illnesses (see, for example, England, 2007 and Bongaarts and Over, 2010). While AIDS is a vast and dangerous epidemic, so the argument goes, the funding it receives should be linked to its disease burden – in other words, what causes the most harm should get the most money. There are various other vast and dangerous conditions that, though less present in the public mind, should not be neglected. In particular, acute respiratory conditions, malaria, pneumonia, diarrheal illnesses and various tropical diseases have been flagged as significant but underfunded conditions in low and middle income countries (Shiffman, 2006; Moran et al, 2009; Liese and Schubert, 2009). Such concern has motivated comparisons of that proportion of total health spending spent on AIDS (both globally and regionally) with that proportion of total disease burden accounted for by AIDS (see, for example, Amico et al, 2010 and Nattrass and Gonsalves, 2010). These 'proportionality' exercises aim for clarity on whether AIDS is unfairly favoured in terms of global health spending.

These exercises, however, remain very contentious. There is considerable debate about whether AIDS is, in fact, receiving too much or too little money relative to its disease burden. The issue came to the fore in a recent (2010) issue of the journal *Science.* Nattrass and Gonsalves (2010: 175) used 2007 UNAIDS data to argue that the proportion of total health spending spent on AIDS was greater than the disease's share of the disease burden (as given by Disability Adjusted Life Years [DALYs], a measure that shall be thoroughly discussed in Section 2) in a small minority of countries. Bongaarts and Over (2010: 177), however, argued that using data from the Organisation for Economic Cooperation and Development (OECD) would produce a more reliable and different conclusion. The issue has yet to be resolved, and represents only the most recent bone of contention in a decade-old skeleton. Prior to 2010, as shall be seen, measures of proportionality were widely employed by authors seeking to gauge the equitability of global health spending between diseases.

Given the gravity of the issues at hand, there is a need for clarity within the area of proportionality - it has, after all, already played an active part in the debate about whether AIDS is receiving 'too much' money. This paper approaches this need for clarity in the following way. It examines the proportionality of AIDS funding to its disease burden in the year 2008 (the most recent available data) by measuring that percentage of total health expenditure spent on HIV/AIDS against that percentage of total disease burden attributable to the disease for all countries for which data are available. Particular attention is paid to the issue raised in *Science*; namely, whether substituting OECD data for UNAIDS data has any significant effect on the number of countries spending above or below the level that is proportional to their AIDS disease burdens.

Section 1 summarises the main contributions to the literature and expands on the need for further research. Section 2 explains the methodology and data sources. Section 3 presents and discusses results. Results indicate that the majority of countries in the dataset 'overspend' on HIV/AIDS relative to the most commonly employed measure of disease burden, the DALY. This result, however, belies the fact that 'underspending' is far more egregious than overspending – while most countries 'overspend', the total amount in surplus of proportionality in overspending countries is dwarfed by the total amount still needed to reach proportionality in underspending countries. Total global HIV/AIDS resources are still grossly inadequate to bring all countries' spending on the disease in line with their respective disease burdens. Interestingly, South Africa is the country that needs to increase its absolute AIDS spending the most in order to spend proportionately. Section 4 concludes.

It is not the intention of this paper to answer the question of whether the world spends too much on AIDS. Rather, it seeks to contribute a measure of clarity to the debate on whether a 'disproportionate' amount is being spent on the disease. To spend 'disproportionately' on AIDS is not necessarily to be in error. In many cases it is appropriate to allocate spending in line with the marginal benefits of additional funding, and this may result in seemingly disproportionate allocations. However, as we shall see, measures of proportionality can provide a useful first step in deciding how to allocate what limited resources are available for health. This is especially so because data available for marginal cost effectiveness calculations at the global level are severely limited.

Section 1 - Literature review and the need for further research

Interest in proportionality has been driven by the need to sensibly allocate extremely scarce global healthcare resources. Scarcities in global health spending have and do force health initiatives into competition with one another (Reich, 1995; Segall, 2003; Waddington, 2004; MacKellar, 2005; as quoted in Shiffman, 2006). The need to prioritise, thus, cannot be ignored. AIDS kills, but so do many other diseases. AIDS needs more money, but perhaps diarrhea needs it more. It would of course be most helpful if each additional dollar of healthcare could be allocated in such a way as to maximise its impact on disease burden. As Bongaarts and Over state in their contribution to the aforementioned *Science* debate:

> 'Regardless of data discrepancies, we believe that health spending should not be allocated in any strict proportion to disease burden, but rather in proportion to the marginal return in terms of reducing disease burden. We advocate allocating incremental resources to the interventions that save the most life-years per dollar spent' (2010: 176).

Unfortunately, such maximisation of marginal benefit is – currently, at least – very difficult to do, if not impossible. As we shall see, it is difficult to obtain accurate data on even aggregate allocations of healthcare resources. Calculating which interventions 'save the most life-years per dollar spent' requires a level of precision and coverage that is currently unavailable in the global data bank.

In the absence of certainty regarding where each dollar will have the most impact, scholars have been forced to consider a broader measure for which data

are available – namely, the proportionality between that share of healthcare funding allocated to a specific disease and its share of the disease burden. Section 2 expands on specific measures of disease burden, but it is important to note here that all measures aim to quantify the harm to human life that a given condition causes. Linking funding to 'harm' through proportionality, even if loosely, merely suggests that the most dangerous conditions should receive the most attention. As early as 1999, the Institute of Medicine in the United States, in order to allocate scarce funding resources, 'proposed that the amount of disease-specific research funding provided by the National Institutes of Health be systematically and consistently compared with the burden of disease for society' (Gross et al, 1999: 1881). More recently and more relevantly, UNAIDS has accepted a measure of proportionality. Its recently created Domestic Investment Priority Index indicates what levels of country spending 'might be expected given their disease burden and government resources' (UNAIDS, 2010a: 147). It is important to reiterate that proportionality does not tell us precisely how healthcare resources should be allocated. This is not least because measures of disease burden (as we shall see) depend on specific assumptions and cannot capture the true complexity of disease. Proportionality does, however, give us some idea of whether the most harmful conditions are being placed high on the funding agenda. In so doing, it provides a useful foundation for debate.

The question of whether AIDS spending is disproportionate to its disease burden is a relatively recent one. Still, important contributions have been made. MacKeller (2005) investigates aggregate official development assistance by all OECD donors to all countries for the years 1993 and 2003, and finds that AIDS received far greater donor attention than any other condition. In particular, she notes that it received more funding per DALY than all other infectious diseases, maternal and perinatal conditions and nutritional deficiencies. Shiffman (2006) examines funding for 20 communicable diseases that heavily affect developing countries from 42 major donors. He finds that AIDS is prioritized relative to other diseases, receiving 46% of donor funding in the period 1996-2003 but representing only 31% of developing country disease burden. England (2007) claims that AIDS constitutes 5% of the disease burden in low and middle income countries – 'less than...respiratory infections, perinatal conditions, or ischaemic heart disease' (2007: 344) - but, in 2004, received 21% of international health aid. He does not, however, explain how he arrived at these figures.

Shiffman (2008) explicitly tackles the question of whether donor commitments to AIDS have displaced spending on other diseases. He finds that, during the period 1992 to 2005, both the level of aid directed towards AIDS and its

increasing share in total health aid budgets implied a high prioritization of the disease relative to other conditions. He notes that 'overall, the evidence indicates that displacement is likely occurring, but that aggregate increases in global health aid may have mitigated some of the crowding-out effects' (2008: 1). Ravishankar et al (2009) conduct a detailed analysis of trends in international health aid between 1990 and 2007, and note that development assistance for AIDS has seen significantly greater increases than that for other conditions, and also that it receives the most aid per DALY. Moran et al (2009) examine key data from the first of five annual surveys - commissioned by the Bill and Melinda Gates Foundation – of global Research and Development investments into developing country diseases, their analysis aimed at ascertaining just which diseases qualify as 'neglected' in terms of funding. They find that in 2007 Tuberculosis, Malaria and AIDS received a significantly greater share of funding – with AIDS receiving the most out of these – than many other conditions with high disease burdens. They state that:

> 'The predominance of research into new products for HIV/AIDS, malaria, and TB is understandable—and the generosity of funding in these areas is a credit to donors—however, other high-burden, high-mortality diseases remain badly under-funded: pneumonia and the diarrhoeal illnesses stand out in this regard...For instance, HIV, TB, and malaria accounted for 125 million DALYs in low- and middle-income countries in 2004 and received nearly 80% of total funding; while pneumonia and the diarrheal illnesses accounted for 165 million DALYs in the same year but received less than 6% of total funding' (Moran et al, 2009: 0145).

The above studies seem to indicate donor bias towards AIDS at the expense of other diseases, but suffer from important shortcomings. Firstly, where it is asserted that AIDS receives more per DALY than other diseases (proportionality implies equal funding per DALY), little information is given on where disproportionate spending is occurring. Aggregate statistics are interesting, but the analysis of trends misses country-specific results that may well be important to policymakers. If disproportionate spending is occurring, *where* is it occurring? How much spending must be redistributed from AIDS to other conditions in Ghana, say, for proportionality to be satisfied? Further, are there particular countries that are driving the trend? Is spending below proportionality (henceforth, 'underspending') the norm for most countries, with cases of spending above proportionality (henceforth, 'overspending') representing only powerful outliers? Secondly, the studies reviewed above, through no fault of their own, contain data only up until 2007. If one recalls that international aid for AIDS jumped from $4.9 billion to $7.7 billion between 2007 and 2008 – a

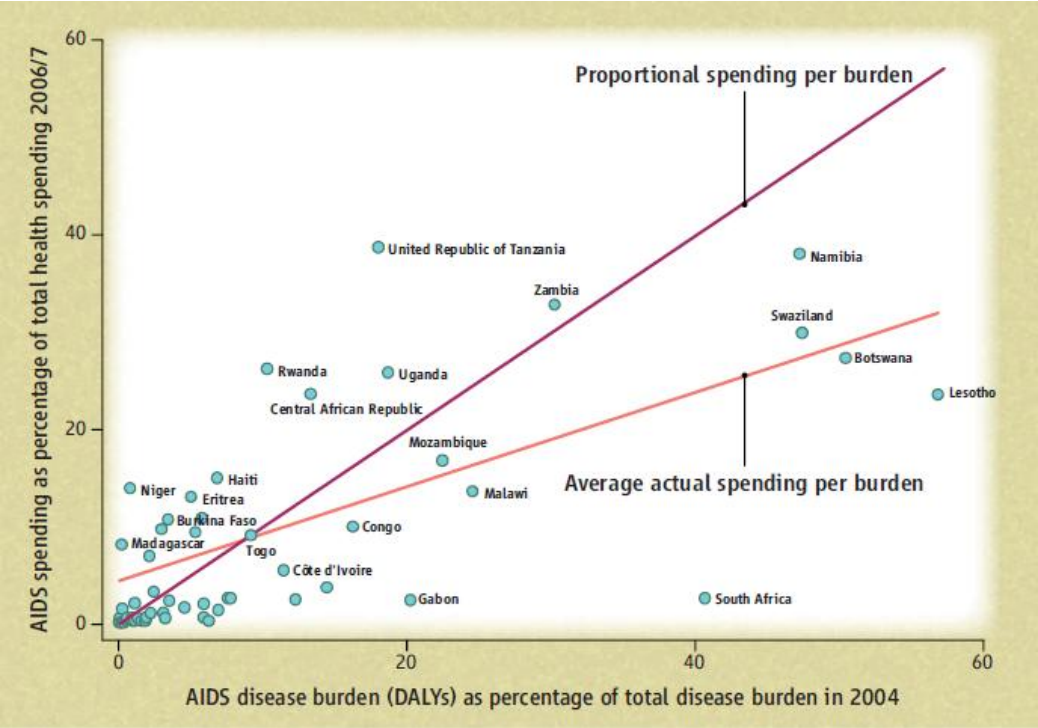
near 60% increase – it is clear that a more recent analysis is required. Conclusions about under- or over-spending in 2007, even if given at the country level, are largely obsolete.

Thirdly, and even if these first two issues were solved, the studies above – with the exception of Moran et al's - focus merely on donor assistance. There is no reason why donor assistance would – or should - follow DALYs in any given country. This is not because donor priorities may run counter to developing country need – Shiffman (2006: 412), for example, notes that issues such as national security and various other political factors may play a role in a 'provider interest' understanding of donor aid. Rather, it is because a proper understanding of proportionality within any given country, given developing country needs, implies inclusion of domestic government spending *as well as* international aid. If certain diseases are heavily prioritized by developing country governments at the expense of others, donor spending that follows disease burden will skew overall spending in favour of such diseases. Few meaningful conclusions, thus, can be made on the basis of donor spending alone.

The first and third concerns have been partially addressed by two very recent studies. Nattrass and Gonsalves (2010) use 2006 and 2007 UNAIDS and World Health Organization (WHO) National Health Accounts (NHA) data to compare country-level spending on AIDS – including domestic expenditure and international aid – as a proportion of overall health spending to the proportion of overall DALYs attributable to AIDS. Their results, shown in Figure 1.1, indicate a trend towards under-spending, and provide some country-level detail on which countries lie where.

Amico et al (2010), meanwhile, also use UNAIDS and WHO data to conduct the same, though more systematically explained, exercise for 2007. They include 65 countries and, in addition to the proportionality exercise, analyse AIDS spending per capita, total AIDS spending and the statistical correlation between AIDS spending and HIV prevalence. Of primary relevance is their finding that Sub-Saharan Africa (SSA) is the only region where the share of AIDS spending exceeds the share of DALYs attributable to the disease. They state that 'on the whole, most countries are spending rational amounts based on the impacts of HIV' and note that only a few select countries in SSA account for the region's overspending result (2010: 7).

Figure 1.3: AIDS spend (% overall health spend) vs. AIDS DALYs (% overall DALYs), 2006/07



Source: Nattrass and Gonsalves, 2010: 175

There are still questions left unanswered by these contributions, however, and not just those that pertain to the potential differences between 2007 and 2008. Nattrass and Gonsalves use 2006 spending data for some countries and 2007 data for others, which makes things a little confusing. A static picture such as theirs (Figure 1.1), which plots one entry per country on the same graph regardless of data vintage, gives the impression of a snapshot of the situation at a given point in time. But this is not the case. Further, the WHO data on total health expenditure that they use includes private expenditure. The UNAIDS data on AIDS spending they use, however, does not include private expenditure (UNAIDS and WHO, 2009a). This is likely to bias their vertical axis indicator (proportion of overall health expenditure spent on AIDS) downward or, in other words, underestimate the true proportion of total health funds spent on AIDS. This downward bias is likely to be more severe in middle income and rich countries because of higher levels of out of pocket expenditure. Amico et al, meanwhile, do not include data on South Africa – the country with the largest population of HIV positive people – in their study. Since they report results by region, this severely skews their findings for Sub-Saharan Africa. Further, they do not provide results on spending relative to DALYs that are disaggregated by

country (though they do this for AIDS spending per capita, prevalence and other indicators).

Finally, and most significantly, Bongaarts and Over (2010: 177) – in direct reply to the Nattrass and Gonsalves exercise - raise an intriguing concern over the source of AIDS spending data. They contend that UNAIDS data underestimates AIDS spending by excluding a large portion of international AIDS assistance. They note large discrepancies between UNAIDS and OECD data for countries such as Botswana, Namibia, Senegal, South Africa and Nigeria. OECD data, they claim, provide more reliable estimates in this regard:

> 'A key reason for this discrepancy is that a large part of foreign donor expenditures passes directly through contractors to AIDS patients without ever being reported to the government. If the donor-reported OECD data rather than the recipient-reported U.N. data are used, AIDS's share of total health spending is larger than AIDS's share of the disease burden in more countries than Nattrass *et al*.'s figure [Figure 1.1] suggests' (2010: 177).

It is true that the two data sources approach data collection from different angles. The OECD's Creditor Reporting System (CRS) contains data disaggregated according to two 'channels of delivery': NGOs and Civil Society and Public Sector (OECD, 2010a). An inspection of the recently declassified reporting directives for the OECD's Development Assistance Committee (DAC) confirms that each channel of delivery is 'normally linked to the extending agency [donor providing funds] by a contract or other agreement, and is directly accountable to it' (OECD, 2010b: 8). In other words, some funds are channelled directly to NGOs and other organisations without passing through government.

The National AIDS Spending Assessment exercises, from whence UNAIDS sources its spending data, do attempt to capture such funds (UNAIDS and WHO, 2009a). However, their data collection teams are organised by country governments. Health resource tracking is a vast and complex challenge. Indeed, agencies such as the WHO, UN and OECD have yet to properly align their systems of accounting for health expenditure (see Powell-Jackson and Mills, 2007). Given this complexity, it is inevitable that some funding will be missed as teams attempt to solicit information from the many agencies operating within their countries (the specifics of these various funding flows are explored more thoroughly in Section 2). CRS data may well provide a better picture of international assistance for AIDS – at least for the OECD member countries.

Considering the above, and taking into account the funding controversies unfolding even as this is written down, there are several pressing needs that need to be addressed. Firstly, regardless of methodological or data questions, the latest data need to be interrogated. It seems probable that anyone wishing to use existing evidence to argue, one way or the other, would like to avoid the retort: 'we don't believe you because it's just not like that anymore'. Secondly, it needs to be seen whether UNAIDS and OECD data do differ significantly, and whether such difference significantly affects overall findings. It is worth knowing if results that set a country on one side of a very contentious line are sensitive to the source of the data used. Finally, it would be extremely helpful to present a detailed breakdown of which countries spend disproportionately and by how much.

Section 2 – Indicators and data sources

Calculating proportionality, on the face of it, is not at all complicated. It merely involves the comparison of two ratios: (1) that proportion of the health budget spent on AIDS and (2) that proportion of total disease burden that is attributable to AIDS. Thus, the proportionality condition is satisfied if:

$$\frac{Spending\ on\ AIDS}{Total\ Health\ Spending} = \frac{AIDS\ disease\ burden}{Total\ disease\ burden}$$

Properly defining and measuring each indicator, however, is a complex ordeal involving multiple data sources and variables. Accordingly, the indicators used in this section's proportionality exercise will be explained in some detail. As the issues discussed are contentious, the greatest care has been taken to ensure minimal experimentation with the data. Further, care has been taken to ensure that the selected measures have been both widely and officially used. The approach is deliberately non-technical and can be followed by anyone with the necessary time and inclination to do so.

Disease burden – AIDS DALYs and Total DALYs

The Disability Adjusted Life Year (DALY) attempts to provide a single measure quantifying the mortality and morbidity associated with disease and various forms of injury. It improves upon simpler measures of disease burden, such as deaths attributable to a given condition, by including both losses due to

premature death *and* the disability inflicted during life – both key to any properly considered conception of true affliction. A simple summation of the indicator is given thus:

> 'The disability-adjusted life year (DALY) extends the concept of potential years of life lost due to premature death to include equivalent years of "healthy" life lost by virtue of being in states of poor health or disability. One DALY can be thought of as one lost year of "healthy" life, and the burden of disease can be thought of as a measurement of the gap between current health status and an ideal situation where everyone lives into old age, free of disease and disability' (WHO, 2008a: 3).

The unweighted indicator comprises two measures: years of life lost due to premature death (YLL) and years of life lost due to disability (YLD). YLL for a particular condition considers the number of deaths at a given age and for a particular sex, multiplied by a global standard life expectancy (in number of years still to be lived) at that age and sex (WHO, 2011a: online). YLL is measured relative to the same 'ideal' standard life expectancy for all countries – 80 years at birth for men and 82.5 for women, as in the original 1990 DALY calculations (AbouZahr and Vaughan, 2000: 78). YLD, meanwhile, is calculated with reference to the 'disease weight' or relative severity of disease as measured on a scale between 0 and 1 (0 being perfectly healthy and 1 being dead). It can be calculated as the number of incidences of the disease multiplied by the disease weight and the average duration of disease from contraction to either remission or death (WHO, 2011a: online). Disease weight is the same for all countries, but varies according to age with regard to some conditions (see below) (WHO, 2008b).

'Social preferences' are applied to the simple calculus described above in two steps. First, future DALYs are discounted relative to present ones, which is meant to factor in the societal preference for disease alleviation today over disease alleviation tomorrow. Second, non-uniform age weights are applied so that years of life lost carry less weight in the elderly and the very young. This reflects an assumption of 'welfare interdependence', where those in infancy and old age are supported by others while those in adulthood support others (Robberstad, 2005: 186). In particular, and including both discounting and age weighting, an infant's death incurs a cost of 33 DALYs while the death of a person aged 5-20 incurs a cost of approximately 36 DALYs (WHO, 2008a: 3). Our basic definition above, then, can be qualified thus:

> 'DALYs are the sum of the present value of future years of lifetime lost through premature mortality, and the present value of years of future life-time adjusted for the average severity (frequency and intensity) of any mental or physical disability caused by disease or injury' (Fox-Rushby and Hanson, 2001: 326).

DALYs (for 1990) were first introduced in the 1993 World Development Report, while updates were conducted for the years 2002 (in 2005) and 2004 (in 2008). A further update is currently underway (WHO, 2011a: online). The update conducted in 2008 for the year 2004 shall henceforth be referred to as 'the 2004 update'. The proportionality exercise in this paper uses the latest data available from the WHO, which are sourced mainly from the 2004 update but also include additional updates – also for the year 2004 - following consultation with WHO member states in late 2008 (WHO, 2009). The 2004 update uses non-uniform age weights as described above and a discount rate of 3% per annum (WHO, 2008a). Disease weights for HIV cases (0.135) vary according to age and are sourced from the original 1990 calculations. Those for AIDS cases not on ART (0.505) are uniform across age groups and, again, are identical to those in 1990. Disease weights for AIDS cases on ART (0.167) were revised in the 2004 update, though they too are uniform across age groups (WHO, 2008b: 2). 'Total DALYs' in a given country include all DALYs for all diseases, conditions and injuries. 'AIDS DALYs' include those DALYs attributable to AIDS, which are identified by the Global Burden of Disease code W009 in the WHO dataset (WHO, 2009).

It is important to note that there are other measures of disease burden, among them Quality Adjusted Life Years (QALYs), Life Years gained and Health Adjusted Life Expectancy. Their histories and methodological idiosyncrasies are summarized elsewhere (see, for example, Gold et al, 2002; Robberstad, 2005 and Sassi, 2006). Further, some have raised objections, many of them ethical, about the way that DALYs are calculated and used (see Anand and Hanson, 1997, particularly with regard to the ethics of age weighting; as well as Arnesen and Nord, 1999; AbouZahr and Vaughan, 2000; and Gold et al, 2002). The DALY, like any metric, is an imperfect tool that does not capture the entire realm of disease. It is, however, widely used by the international community in general and by the WHO in particular. Further, by including consideration of morbidity, it provides a more complete picture of the harm caused by disease than measures (such as Life Years Gained) that consider only mortality. In addition, its assumptions and value choices are more explicit and transparent than those used in the calculation of QALYs, which also include consideration of morbidity (Murray, 1994: 430). Finally, as we have seen, DALYs remain the

standard measure of disease burden used by those seeking to measure AIDS proportionality.

Total health spending

The measure of total health spending employed here attempts to include all spending on health by the public sector and the international community. As in Amico et al (2010), private sector spending on health - as given by out of pocket expenditure and private health insurance – is excluded. This is done because neither UNAIDS nor OECD data on AIDS spending includes private expenditure. Including it in the denominator and not the numerator would skew the calculations. Data for total health spending is sourced from the WHO's National Health Accounts (NHA) database. The NHA represents a vast international effort – which includes cooperation between and assistance from the WHO, World Bank, the United States Agency for International Development and the OECD – to track the entire system of health expenditure within each country and 'trace how much is being spent, where it is being spent, what it is being spent on and for whom' (WHO, 2003: XIII). The NHA methodology represents the current international standard for health resource tracking (Powell-Jackson and Mills, 2007: 353). The most recent data available are used, which include final estimates for the year 2008. There is, as yet, no unified database containing total health expenditure in absolute terms by country for the year 2008. A new database was thus constructed by the author from individual country reports, which provide detailed information on funds spent by the public and private sectors. The country reports (WHO, 2011b) present figures in Local Currency Units (LCUs), but provide an indicator of average LCU per US Dollar for each year. The author divided nominal LCU amounts by the LCU per US dollar figure to produce health expenditure figures for each country in 2008 US Dollars.

Expenditures in each country report are separated according to 'financing agent'. Public expenditure agents include general government, the ministry of health and social security funds. Private health expenditure agents include out of pocket expenditure, private health insurance and non-profit institutions serving households. A careful reading of the NHA Guide to Producing National Health Accounts (WHO, 2003) indicates that funds are classified according to direct health spending by the financing agent *regardless of financing source*. In other words, general government health expenditure in the NHA includes not only domestic funds, but also funds received from international donors and spent by the government. Similarly, expenditure by non-profit institutions includes

funding received from private sources (philanthropic foundations or businesses, for example), government agencies and international sources. The NHA guide provides an example of a survey soliciting spending information from an NGO which illustrates this (WHO, 2003: 136).

This creates a problem. A portion of both donor and government funding, which should be included in the chosen measure of total health spending, flows to non-profits. However, so too does some private funding. Since funding is presented according to financing agent and not financing source, there is no way to separate that part of non-profit expenditure financed by the private sector and that part financed by the public and international sectors. Though the country reports do include information on total funding from international sources, there is no indication of the relative shares going to each of the funding agents. There is thus no choice but to include non-profit institutions serving households for the purposes of this study. While this forces the inclusion of some invisible amount of private health expenditure – which biases the share of AIDS spending in total health spending downwards, as explained in Section 1 with reference to Nattrass and Gonsalves (2010) – excluding the non-profit sector produces total health expenditure figures for many countries that are smaller than total AIDS spending figures (discussed next). This is clearly impossible. It would seem that private expenditure represents a small portion of non-profit funding relative to combined government and international financing. Excluding the non-profit sector would pose a different but bigger problem than including it. As an aside, it is interesting to note that this same issue was faced by Amico et al (2010), though they did not discuss it or consider the implications of including the non-profit sector for their analysis.

Spending on AIDS

AIDS spending data is provided from three alternative data sources in this study: UNAIDS, OECD and AidData. Each of these requires some explanation.

UNAIDS data

The National AIDS Spending Assessment (NASA), created by UNAIDS, represents 'the most ambitious attempt to collect [AIDS] spending information at the national level and to monitor expenditures at the global level' (Amico et al, 2010: 2). The NASA framework attempts to account for all AIDS funding flows from all sources and to all projects in a given country. This includes both

health and non-health related AIDS activities, such as social and prevention campaigns. One could say that it is to AIDS expenditure what the NHA is to health expenditure. Important overlaps exist between the NHA and NASA frameworks. Indeed, UNAIDS (together with the United States Agency for International Development and the WHO) has developed a comprehensive guide on linking the NHA implementation efforts with those of NASA:

> 'While their [NASA's and NHA's] objectives are not identical, they have overlapping components and so NASA and NHA implementation can occur in a coordinated manner to avoid duplicative and redundant resource-tracking efforts. By doing so, the frameworks can meet the needs of both HIV/AIDS and general health care stakeholders, national and international' (UNAIDS and WHO, 2009a: XI).

These overlaps, which include adherence to similar norms of accounting and health resource tracking, make for a smooth pairing of NASA data with the NHA data on total health expenditure describe above. As mentioned, NASA data do not include private expenditures on AIDS. As with the NHA data, NASA data (henceforth UNAIDS data) are for the year 2008 in 2008 US Dollars. All data, except for that on South Africa, were sourced from the AIDSinfo database for the purposes of this study (UNAIDS, 2010b). Data for South Africa were retrieved from its NASA country report (Republic of South Africa, 2010**)**. It is unclear why this data was not included in the AIDSinfo database. Data for each country includes spending from both public and international sources.

OECD data

The OECD Creditor Reporting System contains official data from the 23 member countries of the Development Assistance Committee on commitments and disbursements of official development assistance (ODA). These members are as follows (OECD, 2011a):

Australia	Germany	Netherlands	United Kingdom
Austria	Greece	New Zealand	United States
Belgium	Ireland	Norway	(EU institutions)
Canada	Italy	Portugal	
Denmark	Japan	Spain	
Finland	Korea	Sweden	
France	Luxembourg	Switzerland	

Official development assistance is defined thus:

> 'those flows to countries and territories on the DAC List of ODA Recipients and to multilateral development institutions which are:
> i. *provided by official agencies*, including state and local governments, or by their executive agencies; and
> ii. each transaction of which: a) is administered with the promotion of the *economic development and welfare of developing countries* as its main objective; and b) is *concessional in character* and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent)' (OECD, 2011b: online).

A commitment represents a 'firm written obligation by a government or official agency, backed by the appropriation or availability of the necessary funds, to provide resources of a specified amount under specified financial terms and conditions and for specified purposes for the benefit of the recipient country'. A disbursement, meanwhile, is 'the placement of resources at the disposal of a recipient country or agency, or in the case of internal development-related expenditures, the outlay of funds by the official sector' (OECD, 2010b: 8).

The CRS includes both bilateral assistance flowing from DAC members to recipient countries as well as assistance channelled through multilateral institutions such as the World Bank and the Global Fund. Donors self-report to the DAC and are guided by a set of detailed reporting directives that define how funding is to be classified and presented (Powell-Jackson and Mills, 2007: 357). The NHA framework builds upon the standards for health accounting set forth by the OECD (WHO, 2003: XIV) and, as a result, CRS data pair well with the chosen measures of total health expenditure. CRS data group projects funded under 'purpose codes', which reflect the main purpose for which funds are used. Two purpose codes pertain to spending on AIDS: 'STD [Sexually Transmitted Disease] control including HIV/AIDS' (13040) and 'Social mitigation of HIV/AIDS' (16040). Together, these two purpose codes attempt to capture all funds from the world's main donors, both health and non-health, directed towards the fight against AIDS. Data are grouped by recipient country, recipient region and donor country and agency. Data do not include funding from private donors such as the Bill and Melinda Gates foundation, and only consider public expenditure on ODA channelled through DAC member country governments.

For the purposes of this study, 2008 **disbursement** data for 'STD control including HIV/AIDS' and 'Social mitigation of HIV/AIDS' from all donors for the year 2008, measured in 2008 US Dollars (OECD, 2010a), were combined. This delivered a single international AIDS funding figure for each recipient

country which can be thought of as a kind of CRS version of the UNAIDS data indicator 'domestic spending on HIV from international sources'. UNAIDS also provides data for AIDS spending from domestic sources alone – 'domestic HIV spending from public sources'. **UNAIDS** data on AIDS expenditure from public (or domestic) sources were combined with **CRS** data for expenditure from international sources. This produced the OECD estimate of AIDS spending used in this study. This combination should not be controversial. There is no double counting, as the UNAIDS data differentiates clearly between public and international financing. Further, the CRS contains no data on expenditure from domestic sources. Lastly, as has already been explained, it is important to consider AIDS expenditure in each country from both domestic and international sources if a meaningful contribution to the literature is to be made.

Just how much do UNAIDS and OECD data differ?

As a prelude to the main investigation, it is useful to interrogate the question of whether OECD and UNAIDS data differ significantly from country to country. Data from both sources on AIDS spending from *international* sources were available for 87 countries (Appendix 1). Comparing the data yields interesting results:

Figure 2.1: 2008 AIDS spending from international sources, millions 2008 US$, UNAIDS vs. OECD data

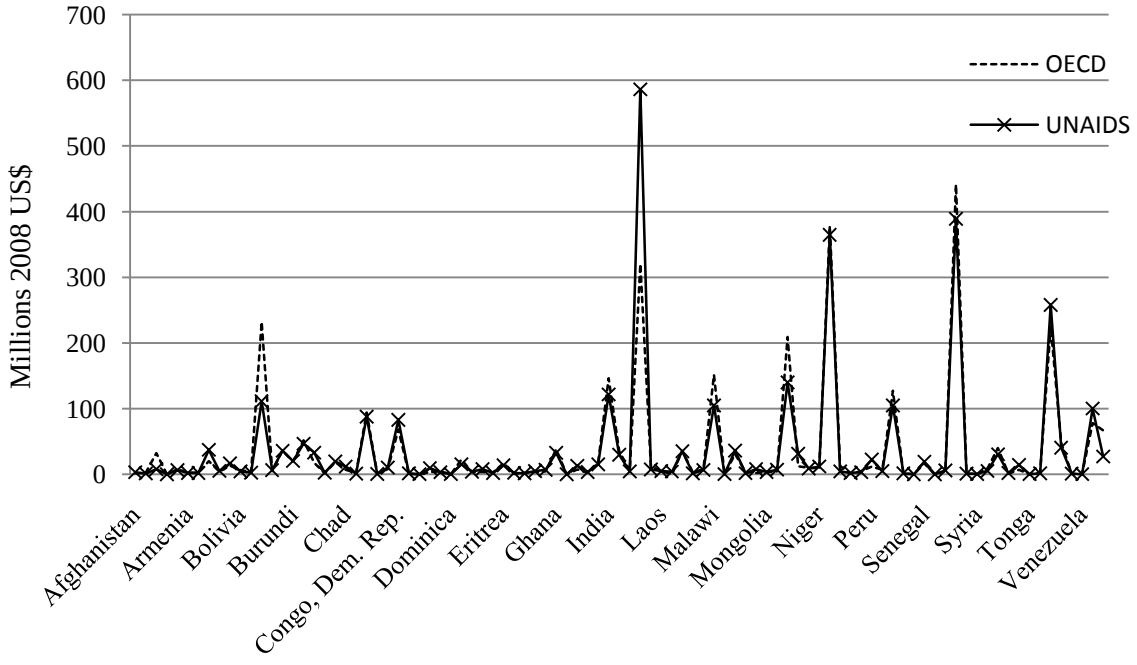


Figure 2.2: 2008 Absolute deviation of OECD from UNAIDS data, AIDS spending from international sources, millions 2008 USD

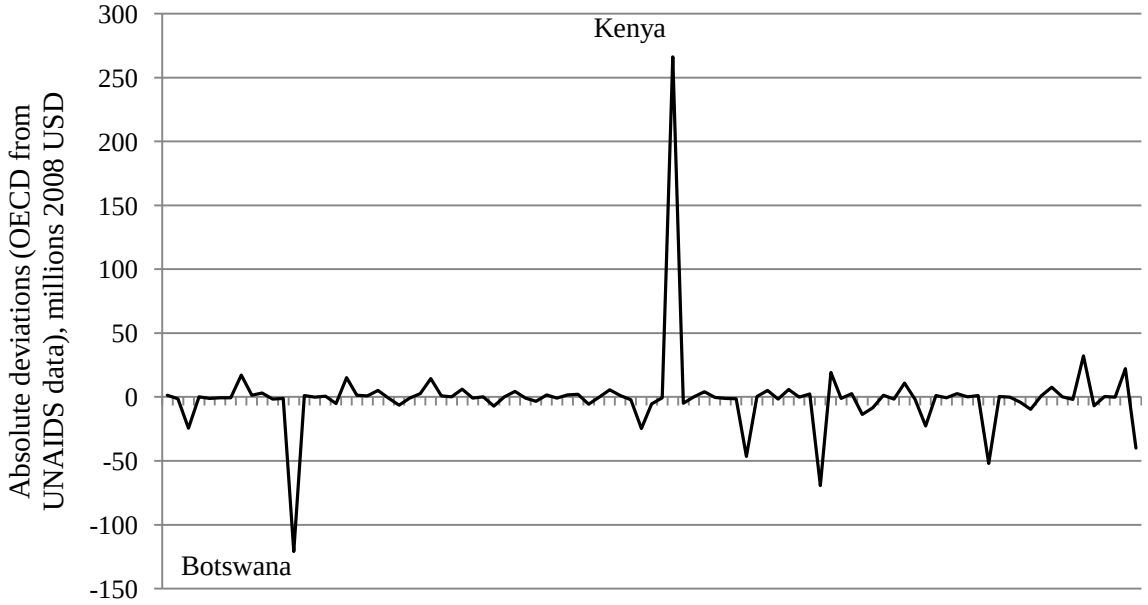
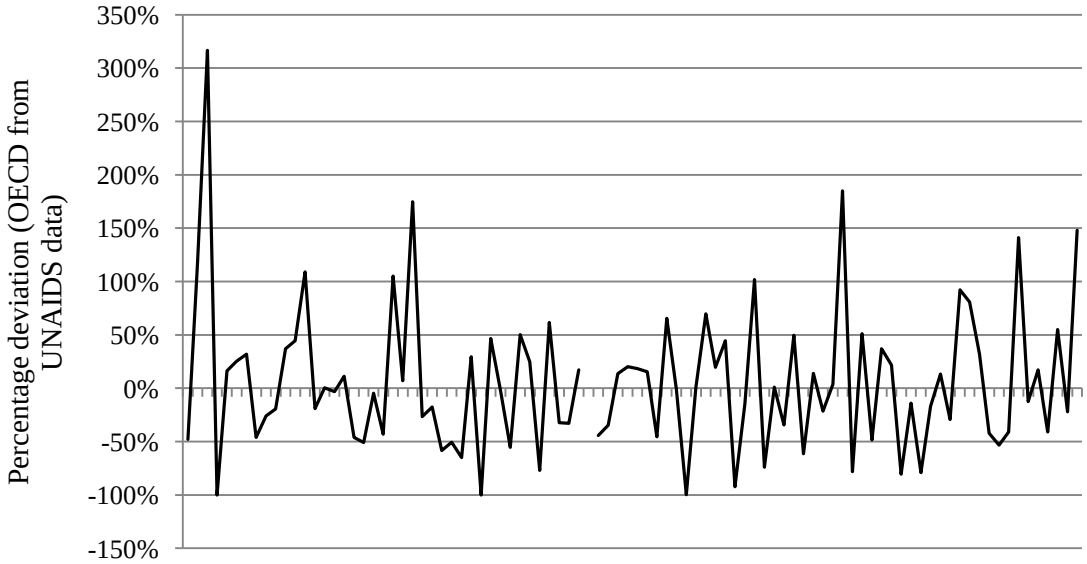


Figure 2.3: 2008 Percentage deviation of OECD from UNAIDS data, AIDS spending from international sources



*Line break is owing to a 0 international spending value for Grenada in UNAIDS data

One can see from Figure 2.1 and 2.2 that the OECD and UNAIDS data generally follow each other quite well. Indeed, their figures for total AIDS spending from international sources are very similar: $3.281 billion in OECD and $3.251 in UNAIDS. Figure 2.3, however, demonstrates that this similarity belies some extreme intra-country discrepancies. It shows that OECD data routinely deviate by over 100% from UNAIDS data, with figures for Angola showing a

discrepancy of 316%. The data disagree most on Sao Tome and Principe, with a remarkable deviation of 1290% for this country ($700 000 in OECD and $50 000 in UNAIDS). For the sake of readability, the wayward island was removed from the deviations graph. Importantly, deviations show no regular pattern, implying that there is no routine under- or over-estimation of one data source vis a vis the other. Recall for a moment the aforementioned debate in *Science* involving Nattrass and Gonsalves (2010) and Bongaarts and Over (2010). It is clear from the above that Bongaarts and Over (2010: 177) use only selective evidence when they imply that UNAIDS data are likely to underestimate the number of countries overspending on AIDS relative to its disease burden. The data sources do disagree at times, but we have yet to see what the implications of this disagreement are for proportionality.

AIDDATA

Though it is not central to the data issue brought up by Bongaarts and Over (2010), it is prudent to include yet another source of AIDS spending to clear up some questions left unanswered by CRS data. Firstly, it would be useful to get an idea of how many projects classed under different purpose codes include AIDS components. This would provide a more complete picture of true AIDS spending. Secondly, it would be useful to include funding from non-DAC donors not included in the CRS as well as funding not classified as Official Development Assistance. To investigate these issues, alternative data were sourced for the purposes of this study from a development finance portal named AidData.

AidData, formed in 2009, is the result of a collaboration between, firstly, the Project-Level Aid Database (PLAID) team at the College of William and Mary and Brigham Young University and, secondly, the aid information technology provider Development Gateway. It aims to provide comprehensive, project-by-project, easily-accessible data encompassing the entire universe of development aid. Building on a range of official sources from a range of multilateral and bilateral aid agencies - including the CRS, donor agency annual reports and project documents – it seeks to provide rigorous and transparent data that can be used for the effective management of development flows. Its data collection efforts are ambitious:

> ‘The core of the AidData project, the PLAID database, currently encompasses multilateral and bilateral donor activities spanning the years 1945-2009. It contains information from traditional aid sources such as the OECD's Creditor Reporting System (CRS) as well as donors not captured by the CRS and activities that do not

> fit the OECD definition of Official Development Assistance (ODA). In cooperation with the OECD CRS, PLAID augments existing data by publishing more complete project descriptions and more detailed aid project purpose codes. In particular, PLAID is dedicated to collecting project-level data from all multilateral donors and non-DAC bilateral donors (NDBs) to provide a more complete picture of development finance flows and activities' (Findley et al, 2010a: 4).

AidData only replaces CRS data on those projects for which more complete information is available – for example, from individual project reports. Further, it does not include private sector aid (AidData, 2011: online). Its database, thus, should include all and only donor-reported aid of the form that is required for the chosen exercise.

A key strength of the database is that it provides searchable project-level data that allows for the extraction of projects related to a specific purpose, donor, year or recipient country. Detail about project aims and scope is primarily contained within project titles, short project descriptions (which briefly outline the aim of the project) and long project descriptions (which provide more detailed accounts of project components). The most current AidData research release (1.9.2), which was released on the 15th of April 2010 (Findley et al, 2010b), was used. The dataset used in this study was built thus:

1.) All projects for the year 2008 that contain either of the words 'HIV' and 'AIDS' in their short descriptions, long descriptions or titles were extracted. Since not all projects are described in English, projects whose descriptions include either 'VIH' or 'SIDA' – the French, Spanish, Portuguese and Italian equivalents of 'HIV' and 'AIDS' – were also extracted.
2.) This delivered a total of 3609 projects, most of them from the CRS. However, some CRS projects were missed - those that, for some reason, do not contain reference to the AIDS keywords in their descriptions. In a separate exercise, thus, all records from AidData relating to the CRS purpose codes 'STD control including HIV/AIDS' and 'Social mitigation of HIV/AIDS' were extracted, regardless of the information contained in their descriptions. Those CRS projects that were missed in the original search were then added to the database.
3.) The database was searched project by project and those projects that fit the keywords but have no relevance to AIDS were excluded. For example, many projects related to higher education contain the word 'universidad', while the French for 'aid for winter' is 'aide d'hiver'. Entries in languages other than English were translated with the help of Yahoo Babelfish (Yahoo, 2011: online).

4.) Remaining projects were colour-coded in three groups. Red projects were defined as those not directed towards AIDS or those that mention it only incidentally. Many Tuberculosis projects, for example, mention susceptibility of AIDS sufferers to the disease, while a large number of irrelevant projects contain generic descriptions of millennium development goals or donor agency priorities. Orange projects were defined as those projects that contain reference to AIDS, but only as one among several goals - projects aimed at HIV/TB comorbidity, for example, and those supporting microfinance schemes with AIDS education components. Those programmes aimed primarily at AIDS were coded in white. Commonly encountered examples of projects coded in each colour are presented in Appendix 2 to give a sense of the analytical approach adopted in this study.

The above exercise delivered a detailed database of some 4000 projects from which to build information on AIDS spending. Red projects were excluded on the basis that they had no clear relation to AIDS. While many orange projects contain AIDS components, it is unclear what proportion of their spending is directed towards AIDS activities. Further, including spending on a project split between AIDS and another disease would require inclusion of a portion of that other disease's DALYs in calculations. Again, the proportions are unknown. Orange projects were thus excluded. By far the majority of projects are for CRS records under 'STD Control including AIDS' and 'Social Mitigation of HIV/AIDS'. Interestingly, only four or five 'social mitigation' projects, and no 'STD control' projects, could be coded orange and none at all could be coded red – though a few hundred projects do contain unhelpful descriptions of the broad aims of PEPFAR that reveal very little. Since there were no trends of unwarranted inclusion, the choice was made to defer to the official classification and to not exclude the few orange 'social mitigation' projects. Though it would have been very informative, a lack of descriptive specificity meant that it was not possible to ascertain how many projects classed under these two codes involve broader healthcare elements (something of direct relevance to the entire AIDS funding debate). Interestingly, many projects that explicitly mention AIDS as their primary focus (coded in white) are placed under CRS codes such as Culture and Recreation, Health Education, Infectious Disease Control, Social/Welfare Services and Reproductive Health Care. A total of 162 such projects were included, totalling $26.2 million.

Constructing the 'AidData' estimate of total AIDS funding still required several more steps. Since no projects related to the two AIDS-related CRS purpose codes were excluded, AIDS spending figures sourced directly from the CRS - as described under the previous heading – were used. AidData should include these CRS entries, but the official source is preferable. Projects for which AidData replaced CRS figures in favour of more complete records were then considered.

Significant discrepancies (above $100) appeared for only a handful of countries: Afghanistan ($1.3 million more than CRS record), Guinea-Bassau ($1.4 million more), Kenya ($4.7 million more) and Macedonia ($13 000 more). These amounts were added to the relevant CRS country totals. Next, the 162 additional projects identified by our keyword searches were summed by recipient and added to the relevant country totals. The above delivered yet another estimate of total AIDS spending figures from *international* sources. As under the previous heading, this was added to UNAIDS data on AIDS spending from domestic sources to arrive at the final totals used in this study.

Summary

The above may appear quite convoluted. An example may help clarify matters. Take the hypothetical country Spendia. According to UNAIDS data, Spendia spends $100 of its domestic health budget, largely financed by taxing its citizens (Spendians), on AIDS. It spends a further $50 from international donors on AIDS. The CRS, however, estimates that Spendia has received $65 in AIDS funding – not $50 – from international donors. AidData, meanwhile, notes that $10 worth of projects directed at AIDS are not captured by the CRS (being classed in the purpose code 'Reproductive Health'). Further, AidData has found better data for two CRS projects. Together, these projects actually cost $5 *more* than the CRS estimates. The Spendia expenditure on AIDS is represented thus:

UNAIDS =	$150 (UNAIDS domestic sources + UNAIDS international sources)
CRS =	$165 (UNAIDS domestic sources + CRS international sources)
AidData =	$180 (UNAIDS domestic sources + CRS international sources + extra donor projects not included by CRS + difference between CRS and AidData for some projects)

The data used represent the state of the health resource tracking art. With the exception of the AidData figures, all data stem from official sources and have not been subjected to any imputations, predictions or extrapolations. While neither the colour-coding exercise nor the data provided by AidData bear the signature of the OECD, they provide an idea of the magnitude of funds not captured by this official source that nonetheless may be relevant to AIDS spending. A summary of data sources and indicators is included in Table 2.4 (shaded blocks indicate constituents of each measure of AIDS spending):

Table 2.4: Indicators and data sources

	DALYs (disease burden)	Total health exp. (Public + Non-profit)	AIDS spending (Public + International)			
Alternative estimates	-	-		**UNAIDS**	**OECD**	**AidData**
Measured in	# 2004 DALYs	2008 USD	2008 USD			
Data source*	World Health Organization Global Burden of Disease Project 2004 update (2009)	World Health Organization National Health Accounts Country Reports	UNAIDS 'domestic HIV spending from international sources'			
			UNAIDS 'domestic HIV spending from public sources'			
			CRS ODA ('STD Control including HIV/AIDS'+'Social Mitigation of HIV/AIDS')			
			CRS projects replaced by AidData			
			AidData projects not coded as AIDS-related			
Relevant precedent	MacKeller (2005), Shiffman (2006), Ravishankar et al (2009), Nattrass and Gonsalves (2010), Amico et al (2010)	Amico et al (2010), Nattrass and Gonsalves (2010)		Amico et al (2010), Nattrass and Gonsalves (2010)	MacKeller (2005), Shiffman (2006,2007), Ravishankar et al (2009), Bongaarts and Over (2010)	None

*Shading indicates that estimate includes adjacent data source

Data coverage

Complete DALY, total health expenditure and UNAIDS AIDS expenditure data for 2008 were available for 118 countries. Of these 118, adjustments (as outlined above) could be made with OECD international data for 87. Of these 87, AidData adjustments could be made for 39. Data on the number of people living with HIV in 2008 were available for a total of 93 countries (UNAIDS, 2010b). Results are presented for different data sources (see below and Appendix 3). It was not possible to impute HIV population data for other missing countries, as data were also missing on their prevalence rates and for previous and later years. High and low estimates for 2009 were available for the Democratic Republic of Congo, Brazil and China. As no alternatives were available for these countries, the medians of these estimates were used (UNAIDS, 2010a). Data on the number of people living with HIV in all regions in 2008 were sourced from the UNAIDS 2009 Epidemic Update, and were used in order to calculate the percentage covered by the dataset (UNAIDS and WHO, 2009b). As the missing data biases coverage of the world's HIV positive population downwards, the dataset includes *at least* the following levels of coverage:

- 76.3% globally
- 77.6% in Sub-Saharan Africa
- 71.7% in Southern Africa (including Zambia and Angola)

To this author's knowledge, this is the most comprehensive investigation of the proportionality of AIDS spending to disease burden undertaken to date – Amico et al (2010), for example, only include 65 countries.

While UNAIDS data is organised by country, a significant amount of funding in the OECD data is classified simply by region or as 'bilateral aid' (see Appendix 1 for these figures). This has two implications. Firstly, total regional expenditure exceeds the sum of country expenditure in the OECD and AidData data. This is simply a result of adding the OECD expenditure for 'Africa, South of Sahara', say, to that region's total and not to any specific countries. Further, owing to the fact that some data are classified simply as 'bilateral aid', world expenditure exceeds the sum of regional expenditure (again with OECD and AidData data). Secondly, it has been ensured that the definition of each region follows that in the OECD data. This is a simple but important way of ensuring consistency – there is no one answer, after all, to which countries should be included in regions such as South and Central Asia.

A full list of countries included, labelled by region, appears in Appendix 1.

Section 3 - Results

All expenditure figures represent total spending from both public and international sources. Where 'overspending', 'underspending' or the need to 'reallocate' is mentioned, this only refers to deviations from the proportionality condition as has been defined. Such terms as are used are employed for a clearer understanding of the data and do not represent conclusions about what individual countries should or should not do. It is of the utmost importance the following is clarified: it will not be suggested, here or elsewhere, that *existing* AIDS funds be taken from any AIDS programmes. If anything, remarks about spending above or below proportionality will provide a useful way to think about the allocations of future funds.

World results, regional results and trends

Table 2.5: Global AIDS expenditure vs. AIDS DALYs (millions 2008 US$)

	UN	OECD	AIDDATA
Total	10534.34	10791.64	10824.71
AIDS spend (% of World health spend)	1.16	1.35	1.36
AIDS DALYs (% of World DALYs)	3.46		

First, let us measure the world. One can see that, according to all sources, the share of global expenditure spent on AIDS is significantly lower than its disease burden. There is not much to add on this point.

Table 2.6: 2008 Regional AIDS expenditure as a percentage of total health expenditure vs. AIDS DALYs as a percentage of all DALYs

		UNAIDS	OECD	AID DATA	HIV % ALL DALYS
WORLD		1.16	1.19	1.19	3.46
AFRICA		**11.94**	**12.35**	**12.42**	**10.49**
	SUB-SAHARAN AFRICA	18.39	18.90	19.01	11.32
	NORTH AFRICA	0.18	0.18	0.18	0.23
AMERICA		**1.11**	**1.13**	**1.13**	**1.57**
	NORTH AND CENTRAL AMERICA	1.16	1.22	1.23	1.87
	SOUTH AMERICA	1.08	1.08	1.08	1.45
ASIA		**0.71**	**0.74**	**0.74**	**1.02**
	FAR EAST ASIA	0.67	0.68	0.68	0.99
	MIDDLE EAST	0.42	0.39	0.39	0.41
	SOUTH AND CENTRAL ASIA	0.97	1.05	1.05	1.07
EUROPE		**0.59**	**0.59**	**0.59**	**1.14**
OCEANIA		**2.30**	**4.26**	**4.26**	**0.17**

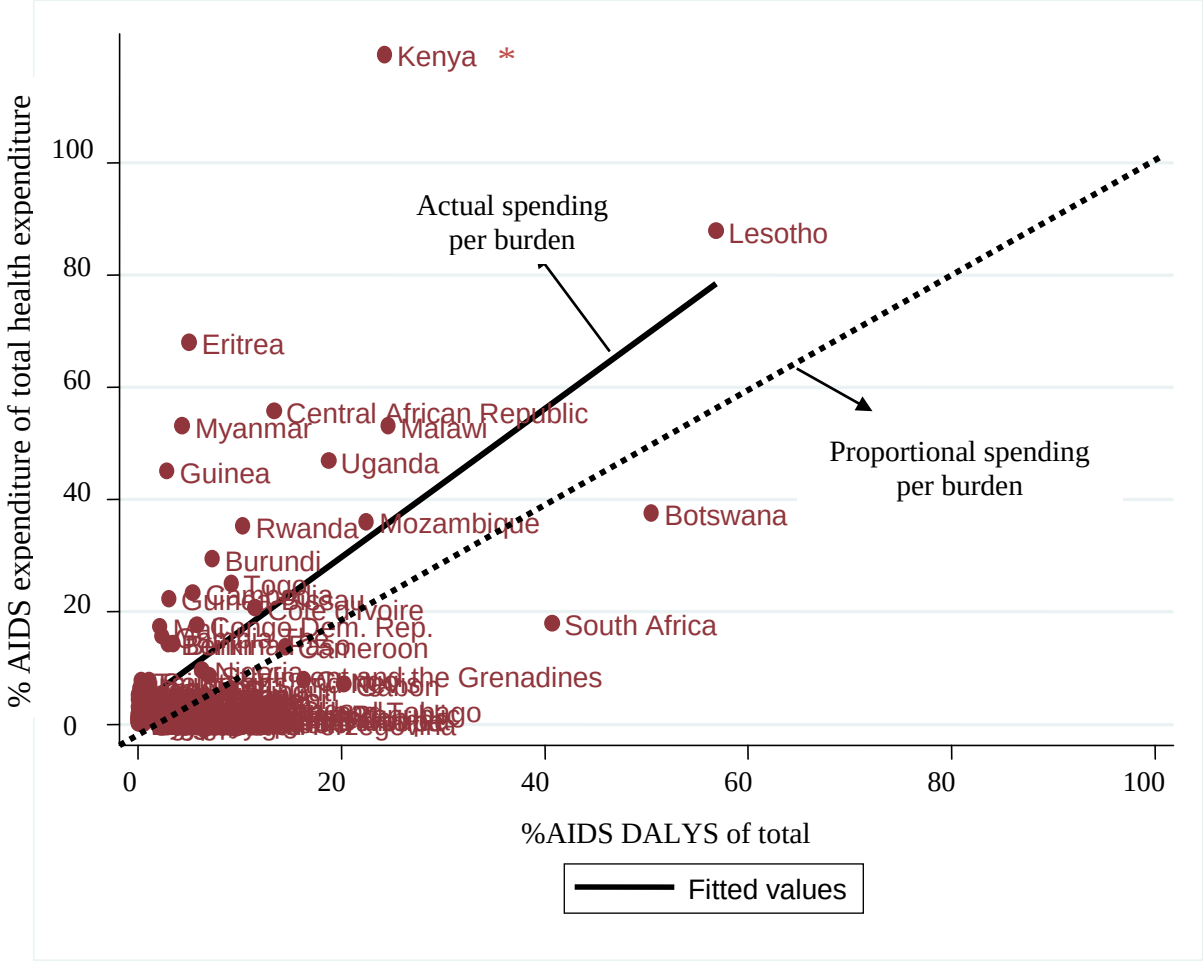
*Underlining indicates overspending

The above regional figures include all 118 countries across all three data sources. The 'OECD' and 'AidData' columns represent adjustments (that is, replacing UNAIDS data with either OECD or AidData estimates) made only to those countries for which OECD or AidData data were available. This gives an idea of how the overall picture changes when alternative data are used for the limited number of countries for which these are available. Underlining indicates overspending.

Regionally, the results firmly show that Sub-Saharan Africa and Oceania are overspending. UNAIDS data hold that the Middle East is overspending, but only by 0.01 percentage points. Sub-Saharan Africa spends rather wildly out of proportion to disease burden and would need to reallocate approximately 40% of its spending to other diseases in order to spend proportionately. Though there is large disagreement between UNAIDS and the other two data sources in the region, Oceania seems the biggest overspender by all accounts. In the best case scenario (UNAIDS), it would have to reallocate 93% of AIDS spending to achieve proportionality. All other regions underspend. Noteworthy in this regard are the cases of North and Central America - which would have to increase spending by more than 50% - and Europe – which would have to nearly double its AIDS spending to achieve proportionality.

The following regression reflects the trends evident in UNAIDS data and are a kind of 2008 update of the figure provided by Nattrass and Gonsalves. Both use WHO data for total health expenditure (though Nattrass and Gonsalves, as mentioned, include all private health expenditure), both use UNAIDS data for AIDS spending and both use DALY data from the same 2004 update. The vertical axis measures that percentage of total health expenditure spent on AIDS for each country, while the horizontal axis measures that percentage of total DALYs accounted for by AIDS for each country. OECD and Aiddata data indicate similar trends and are shown, along with trends for Sub-Saharan Africa, in Appendix 3.

Figure 2.7: AIDS spend (% overall health spend) vs. AIDS DALYs (% overall DALYs), 2008 (UNAIDS data)



*This anomalous result is discussed below

Main findings: country-specific results

Table 2.8 summarises the most important findings of the proportionality exercise: those at the country level. Data from all three AIDS spending data sources are reported. Though there are many to choose from, three key indicators have been selected that this author deems most helpful for interpretation of results. Firstly, whether a country has over- or under-spent is indicated with either a tick (√) or a cross (X) respectively. Secondly, that percentage of AIDS spending that would have to be increased or decreased in order for the proportionality condition to be satisfied is presented for each country. Decreases are shown with a negative sign. Thirdly, the dollar amount each country would have to increase or decrease spending by in order to satisfy proportionality is indicated. Finally, those countries that are sensitive to choice between UNAIDS and OECD data by more than $5 million are underlined. Blank spaces in the OECD column represent countries for which no OECD data were available. Blank spaces in the AidData column represent those countries for which no alterations or additions were made to OECD data. Complete findings are presented in Appendix 1.

Table 2.8 – Country specific proportionality results

	Overspenders (√) &underspenders (X)			Percentage increases/decreases for proportionality			Cuts/increases (millions 2008 USD) for proportionality)		
	UN	**OECD**	**AID**	**UN**	**OECD**	**AID**	**UN**	**OECD**	**AID**
AFRICA									
SUB SAHARAN AFRICA									
Angola	X	√	√	76.3	-0.2	-0.2	24.2	-0.1	-0.1
Benin	√	√		-79.3	-75.4		-16.5	-13.2	
Botswana	X	√		34.2	-1.0		116.4	-4.6	
Burkina Faso	√	√		-76.0	-76.1		-36.5	-36.6	
Burundi	√	√	√	-75.3	-74.7	-74.9	-19.6	-19.0	-19.2
Cameroon	X	X	X	5.2	69.8	61.4	*2.1*	17.3	16.0
Cape Verde	√	√		-95.4	-90.7		-2.5	-1.2	
Central African Republic	√	√		-76.1	-74.9		-15.4	-14.5	
Chad	X	X		18.7	85.9		2.6	7.6	
Congo	X	X		105.1	168.3		12.2	15.0	
Democratic Rep. Congo	√	√	√	-67.4	-60.8	-61.3	-58.0	-43.5	-44.4
Côte d'Ivoire	√			-44.8			-27.8		
Djibouti	X			48.8			1.6		
Equatorial Guinea	X	X		617.3	438.0		17.5	16.5	
Eritrea	√	√		-92.6	-94.0		-13.4	-16.7	
Gabon	X	X		184.4	164.0		21.9	20.9	
The Gambia	√	√	√	-84.8	-77.9	-78.3	-4.2	-2.7	-2.7
Ghana	X	X		92.3	67.6		35.0	29.4	
Guinea	√	√		-93.7	-88.8		-12.4	-6.6	
Guinea-Bissau	√	√	√	-86.5	-80.1	-87.3	-3.2	-2.0	-3.4
Kenya	√	√	√	-79.7	-65.9	-66.5	-525.8	-259.6	-265.7
Lesotho	√	√	√	-35.3	-35.6	-36.0	-28.7	-29.1	-29.6
Madagascar	√	√	√	-93.9	-94.5	-94.5	-11.2	-12.5	-12.5
Malawi	√	√	√	-53.8	-67.8	-68.0	-57.4	-103.9	-104.7
Mali	√	√	√	-87.6	-85.8	-85.9	-35.4	-30.2	-30.5
Mozambique	√	√	√	-37.7	-57.9	-58.0	-54.7	-123.9	-124.8
Niger	√	√	√	-88.2	-85.2	-86.5	-11.0	-8.4	-9.4
Nigeria	√	√	√	-35.3	-37.5	-37.5	-139.3	-153.0	-153.1
Rwanda	√	√	√	-70.8	-75.8	-75.8	-78.5	-101.2	-101.2
Sao Tome and Principe	√	√		-91.2	-98.9		-0.1	-0.7	
Senegal	√	√	√	-81.1	-78.9	-79.0	-20.7	-18.0	-18.2
Seychelles	√	√		-35.2	-25.7		-0.2	-0.1	
South Africa	X	X	X	127.4	120.6	119.1	2 157.5	2 105.4	2 093.7
Togo	√	√	√	-63.5	-27.6	-27.9	-9.8	-2.1	-2.2
Uganda	√	√	√	-60.1	-55.3	-55.4	-178.3	-146.2	-146.7
NORTH AFRICA									
Algeria	X	X		700.6	491.2		26.6	25.3	

	Overspenders (√) & underspenders (X)			Percentage increases/decreases for proportionality			Cuts/increases (millions 2008 USD) for proportionality		
	UN	**OECD**	**AID**	**UN**	**OECD**	**AID**	**UN**	**OECD**	**AID**
Egypt	√	√		-64.1	-63.5		-4.8	-4.7	
Morocco	√	√		-34.8	-19.4		-4.4	-2.0	
AMERICA									
NORTH AND CENTRAL AMERICA									
Antigua and Barbuda	X	X		235.4	324.9		0.8	0.8	
Bahamas	X			341.3			15.2		
Costa Rica	√	√		-19.5	-16.1		-3.9	-3.1	
Cuba	√	√	√	-59.2	-53.0	-53.4	-27.6	-21.5	-21.8
Dominica	X	X		148.1	1 334.3		0.3	0.4	
Dominican Republic	X	X	X	190.6	123.0	110.7	44.6	37.5	35.8
El Salvador	√	√	√	-28.1	-18.9	-19.0	-11.0	-6.6	-6.6
Grenada	X	√		5.6	-20.5		0.0	-0.1	
Guatemala	√			-57.8			-29.7		
Honduras	√	√		-0.6			-0.1		
Mexico	X	X		6.0	5.3		15.9	14.2	
Nicaragua	√	√	√	-81.6	-83.0	-83.1	-12.2	-13.4	-13.5
Panama	X	X	X	325.9	375.8	374.3	44.4	45.8	45.8
Saint Kitts and Nevis	√			-85.8			-1.3		
St Vincent & the Grenadines	√	X		-19.7	180.8		-0.3	0.8	
Trinidad and Tobago	X	X		179.7	147.0		27.0	25.0	
SOUTH AMERICA									
Argentina	√	√	√	-24.1	-24.5	-24.5	-60.1	-61.1	-61.2
Bolivia	√	√	√	-55.7	-66.1	-69.0	-3.0	-4.7	-5.3
Brazil	X	X		35.0	35.3		218.2	219.4	
Chile	√	√		-58.0	-58.4		-51.0	-52.0	
Colombia	X	X		127.5	125.6		132.0	131.2	
Ecuador	√		√	-18.2			-4.7		
Paraguay	√	√	√	-18.9	-31.1	-31.3	-1.8	-3.4	-3.4
Peru	X	X	X	123.0	203.3	203.2	50.5	61.4	61.4
Venezuela	X	X		59.7	59.5		42.8	42.7	
ASIA									
FAR EAST ASIA									
Cambodia	√	√		-77.1	-79.2		-40.0	-45.2	
China	√	√	√	-4.4	-6.2	-6.4	-14.1	-20.4	-21.1
Indonesia	√	√		-90.3	-91.3		-44.8	-50.3	
Laos	√	√		-97.7	-97.7		-4.9	-4.9	
Malaysia	X	X	X	223.4	227.0	226.3	54.3	54.5	54.5
Mongolia	√	√		-98.4	-98.5		-5.0	-5.01	
Philippines	√	√	√	-92.6	-94.2	-94.2	-6.1	-7.9	-8.0

	Overspenders (√) & underspenders (X)			Percentage increases/decreases for proportionality			Cuts/increases (millions 2008 USD) for proportionality		
	UN	**OECD**	**AID**	**UN**	**OECD**	**AID**	**UN**	**OECD**	**AID**
Singapore	√			-28.7			-4.4		
Thailand	X	X		384.8	363.3		804.7	795.0	
Timor Leste	√			-97.1			-1.8		
Vietnam	√	√		-27.3	-8.6		-29.7	-7.5	
MIDDLE EAST									
Iran	X	X	X	4.5	2.5	2.3	1.6	0.9	0.9
Kuwait	X			63.3			3.0		
Lebanon	X	X		12.7	156.0		0.9	5.0	
Syria	√	√		-97.0	-97.3		-1.9	-2.1	
SOUTH AND CENTRAL ASIA									
Afghanistan	√	√	√	-99.9	-99.8	-99.9	-3.2	-1.8	-3.1
Armenia	√	√		-70.2	-75.2		-1.8	-2.3	
Azerbaijan	√	√		-80.3	-82.3		-4.0	-4.6	
Bangladesh	√		√	-99.5			-37.1		
Georgia	√	√		-94.9	-92.9		-7.6	-5.4	
India	X	X	X	97.6	69.0	68.9	142.0	117.5	117.3
Kyrgyzstan	√	√	√	-97.5	-98.4	-98.4	-8.6	-13.4	-13.6
Myanmar	√	√		-91.9	-80.5		-30.1	-10.9	
Pakistan	√	√	√	-78.2	-86.2	-86.2	-11.1	-19.4	-19.4
Sri Lanka	√	√		-61.6	-51.6		-1.0	-0.6	
Tajikistan	√	√	√	-95.9	-97.5	-97.6	-5.9	-10.1	-10.1
EUROPE									
Belarus	X	X		34.9	45.2		6.5	7.8	
Belgium	√			-39.5			-44.2		
Bosnia and Herzegovina	√	√		-76.7	-83.3		-2.1	-3.2	
Bulgaria	√			-90.0			-8.3		
Croatia	√	√		-95.3	-95.3		-9.5	-9.4	
Czech Republic	√			-93.3			-60.0		
Estonia	√			-37.3			-6.8		
Greece	√			-72.4			-69.6		
Hungary	√			-31.0			-1.1		
Macedonia	√	√	√	-95.6	-96.6	-96.6	-3.5	-4.6	-4.6
Moldova	√	√		-89.9	-81.5		-11.6	-5.7	
Montenegro	√			-35.9			-0.2		
Poland	X			20.5			12.8		
Romania	X			32.9			28.7		
Russian Federation	√			-33.8			-262.6		
Spain	√			-77.0			-706.1		
Sweden	X			865.0			191.6		

	Overspenders (√) & underspenders (X)			Percentage increases/decreases for proportionality			Cuts/increases (millions 2008 USD) for proportionality		
	UN	**OECD**	**AID**	**UN**	**OECD**	**AID**	**UN**	**OECD**	**AID**
Switzerland	X			6 913.6			1 030.0		
Ukraine	√	√	√	-82.0	-83.2	-83.2	-82.0	-89.0	-89.3
United Kingdom	√			-79.1			-732.5		
OCEANIA									
Fiji	√	√		-88.1	-66.1		-2.21	-0.58	
Marshall Islands	√			-96.7			-0.56		
Micronesia	√			-94.1			-0.33		
Nauru	√			-40.3			-0.03		
Palau	√			-78.4			-0.04		
Solomon Islands	√			-97.3			-0.58		
Tonga	√			-97.0			-0.20		
Tuvalu	√			-97.6			-0.05		
Vanuatu	√	√		-99.7	-99.5		-1.09	-0.7	

According to UNAIDS data, 71% of countries (84 out of 118) overspend on AIDS relative to its share of their disease burden. The use of OECD instead of UNAIDS data only switches the overspend/underspend conclusion for four countries: Angola (UNAIDS under by $24.2 million, OECD over by $0.1 million), Botswana (UNAIDS under by $116.4 million, OECD over by $4.6 million), Grenada (UNAIDS under by $0.03 million, OECD over by $0.1 million) and St. Vincent and the Grenadines (UNAIDS over by $0.3 million, OECD under by $0.8 million). As one can see, however, this minor shuffling only changes the number of overspending countries by 2 – from 84 in UNAIDS data to 86 in OECD data. Further, no switches occur when using AidData as opposed to OECD data. The finding, thus, that over 70% of countries overspend is robust across all three data sources. The claim made by Bongaarts and Over (2010: 177) – that UNAIDS data underestimates the *number* of overspending countries – is correct in 2008, but an additional two countries is a very small win.

Switching data sources does matter, however, for conclusions about how much reallocation needs to take place. A total of 104 countries are sensitive to changes between UNAIDS and OECD data by more than $1 million, while 30 (underlined) are sensitive by more than $5 million. Of these, 12 countries are sensitive to changes by more than $10 million:

Table 2.9: Countries sensitive to change in data source from UNAIDS to OECD by more than $10 million

OECD US$ Million Smaller(S)/Bigger(B) Cut(C)/Increase(I) than UNAIDS					
Kenya	266.20	SC	India	24.59	SI
Mozambique	69.26	BC	Rwanda	22.72	BC
South Africa	52.09	SI	Vietnam	22.20	SC
Malawi	46.55	BC	Myanmar	19.20	SC
Uganda	32.13	SC	Cameroon	15.22	BI
Angola	24.33	Switches category entirely			
Botswana	121.03	Switches category entirely			

*SC or 'smaller cut', for example, means that OECD data imply less money that needs to be reallocated in order for proportionality to be achieved

It must be noted that the UNAIDS data for Kenya produce an anomalous result – namely, that 119% of the country's total health expenditure is spent on AIDS. This is clearly impossible, and in this case the OECD data (which posit an AIDS spending share of 71%) are perhaps to be preferred. AidData data only deviate from OECD data by more than $1 million in 7 countries: South Africa, Dominican Republic, Guinea-Bissau, Afghanistan, Niger, Cameroon and Kenya. Of these, only South African figures deviate by more than $10 million, calling for an $11.71 million smaller increase in spending to reach proportionality than those of the OECD.

All countries have been ranked in terms of their degree of over-spending and under-spending. It would be onerous to list specific ranks as they change between data sources, so full rankings are presented in Appendix 4 and only the following interesting results noted (rankings and figures refer to UNAIDS data unless otherwise stated). Afghanistan, Vanuatu and Bangladesh are the top three biggest overspenders (relative to their health budgets and disease burdens) and would need to reallocate upwards of 99% of AIDS spending in order to reach proportionality. Cape Verde, Madagascar and Guinea are the three highest relative overspenders in Africa, with reallocation figures upwards of 90%. The three countries that would need to reallocate the most money are the United Kingdom ($733m), Spain ($706m) and Kenya ($526m). The three corresponding top three African countries are Kenya, Uganda ($179m) and Nigeria ($139m). Switzerland is unquestionably the biggest relative underspender, and would have to boost AIDS spending by 6914% to reach proportionality. It is followed by Sweden (865%) and Algeria (701%). Algeria, Equatorial Guinea (617%) and Gabon (184%) are the top three relative underspenders in Africa. South Africa is unanimously, and by an astounding margin, the country that requires the largest

amount of extra AIDS spending to reach proportionality – all data sources imply spending increases of around $2.1 billion or 120%. The next two countries requiring the most drastic increases are Switzerland ($1.03 billion) and Thailand ($804m). The corresponding top three African underspenders are South Africa, Botswana ($116m, though OECD deems this country an overspender) and Ghana ($35m).

Such rankings as have been referred to are interesting, but the most meaningful results are undoubtedly those that involve the countries with the highest AIDS burdens. According to UNAIDS data, approximately 13.8 million HIV positive people in the 118 countries included lived in overspending countries in 2008. This figure decreases by approximately 10 000 when one uses OECD data where available. This represents approximately 54% of all HIV positive people contained within the dataset. HIV population data are missing for 20 overspending countries but only 4 underspending countries (5 in OECD data). 54%, thus, is likely to be a significant underestimate. The following are the results for the top 20 countries that contain the most HIV positive individuals:

Table 2.10: Proportionality results – 20 countries most heavily affected by HIV

		Overspenders (√) and underspenders (X)			Percentage increases/decreases for proportionality			Cuts/increases (millions 2008 USD) for proportionality			HIV+ population ('000s)
		UN	OECD	AID	UN	OECD	AID	UN	OECD	AID	
1	South Africa	X	X	X	127.4	120.6	119.1	2 157.48	2 105.39	2 093.68	5 600
2	Nigeria	√	√	√	-35.3	-37.5	-37.5	-139.33	-153.04	-153.06	3 200
3	India	X	X	X	97.6	69.0	68.9	142.05	117.46	117.32	2 400
4	Kenya	√	√	√	-79.7	-65.9	-66.5	-525.77	-259.56	-265.67	1 400
5	Mozambique	√	√	√	-37.7	-57.9	-58.0	-54.68	-123.94	-124.82	1 300
6	Uganda	√	√	√	-60.1	-55.3	-55.4	-178.32	-146.19	-146.73	1 100
7	Russian Federation	√			-33.8			-262.62			940
8	Malawi	√	√	√	-53.8	-67.8	-68.0	-57.37	-103.92	-104.68	910
9	China	√	√	√	-4.4	-6.2	-6.4	-14.09	-20.36	-21.09	740
10	Brazil	X	X		35.0	35.3		218.18	219.37		635
11	Cameroon	X	X	X	5.2	69.8	61.4	2.07	17.29	15.99	590
12	Thailand	X	X		384.8	363.3		804.72	795.03		550
13	Côte d'Ivoire	√			-44.8			-27.77			470
14	Ukraine	√	√	√	-82.0	-83.2	-83.2	-82.03	-88.98	-89.32	350
15	Democratic Rep. of Congo	√	√	√	-67.4	-60.8	-61.3	-57.96	-43.46	-44.43	315
16	Botswana	X	√		34.2	-1.0		116.39	-4.64		310
17	Lesotho	√	√	√	-35.3	-35.6	-36.0	-28.72	-29.11	-29.57	280
18	Indonesia	√	√		-90.3	-91.3		-44.75	-50.26		270
19	Vietnam	√	√		-27.3	-8.6		-29.69	-7.49		270
20	Ghana	X	X		92.3	67.6		35.01	29.43		260

65% (13) of these countries spend more on AIDS than its disease burden warrants (12 or 60% in OECD data). Indonesia, Ukraine and Kenya need to reallocate the largest percentages of AIDS spending; while Kenya, Russia and Uganda need to reallocate the most money to achieve proportionality. Thailand is the largest relative underspender, requiring remarkable AIDS spending increases of 385% (UNAIDS) or 363% (OECD). South Africa and India are next in line, both requiring an approximately two-fold increase in AIDS spending. South Africa, Thailand and Brazil require the greatest monetary increases in AIDS spending in order to reach proportionality.

When one considers the spending reallocations/increases required per HIV positive individual, the picture does not change significantly. According to UNAIDS data Thailand ($1.463m UNAIDS, $1.446m OECD), South Africa ($0.385m UNAIDS, $0.376m OECD), and Botswana ($0.375m UNAIDS, $0.015m **in overspending per person** in OECD) need the most per person; while Kenya ($0.376m UNAIDS, $0.185m OECD), Russia ($0.279m UNAIDS, no OECD data) and Ukraine ($0.234m UNAIDS, $0.254m OECD) need to reallocate the most per HIV positive person. The choice of data, as mentioned, affects the overspend/underspend conclusion for Botswana.

One might be tempted from the above to conclude that the world is spending disproportionately 'too much' on AIDS – after all, the majority of countries are. This would, however, represent a kind of first-past-the-post framing of the problem: whichever side gets the most countries wins. This author prefers another electoral system; one of proportional representation. When the total amount of overspending is weighed against the total amount of underspending, an extremely interesting result arises. According to UNAIDS data, the total amount for all overspending countries in excess of proportional spending is $3.84 billion. The total amount falling short of proportional spending in underspending countries, however, is $5.29 billion. The corresponding figures when OECD adjustments are made where possible are $3.65 billion and $5.01 billion respectively. Put another way, there is approximately $1.44 billion (or $1.43 billion) in global net underspending. Though most countries overspend, in total overspending is considerably less severe than underspending.

Summary

There is a global trend towards disproportionate overspending on AIDS relative to its disease burden. The direction of the trend is not sensitive to choice of data source. Most HIV positive individuals live in countries that overspend. This conclusion, too, is not sensitive to choice of data source. Choosing between OECD and UNAIDS data does matter for country-specific conclusions,

specifically for the 12 countries previously noted. Further, while overspending is the norm, those countries that underspend typically do so quite vastly. Indeed, tallying surpluses and deficits shows that there is approximately $1.4 billion *more* underspending than there is overspending. South Africa illustrates this most vividly. Even if *all* those countries that overspend were to reallocate their surpluses to South Africa, the country would still fall short of proportionality by approximately $700 million.

Choice of data source

Much has been made of the differences (or lack thereof) between OECD and UNAIDS data, but little guidance has been provided on which source to prefer. The issue is not an easy one. OECD data provide a more thorough, official account of resources flowing from DAC donors. Moreover, statistical work carried out by the DAC is useful for long-term analysis of trends in donor spending. This data does, however, come with a nine to twelve month lag and is 'not suited to real-time political resource decision-making, a purpose for which it is not intended' (UNAIDS, 2005: 3). UNAIDS data, meanwhile, is specifically aimed at providing current, 'nimble' data (with a three to six month lag) that can be applied readily in rapidly changing policy and financial environments. Many questions can't wait almost a year to be answered, and in these cases UNAIDS will be the obvious (and only) choice. Moreover, the country-level data it provides is a greater aid to decision-making than the OECD data, which is peppered with unspecified bilateral and regional allocations. It must be remembered, however, that the country teams responsible for UNAIDS data collections may miss some donor funding flowing outside of government.

Even given such gaps in UNAIDS data, in trying to account for all AIDS resource flows within a given country it should capture much funding from DAC as well as non-DAC members. This may recommend it over OECD data. While the 2010 Development Cooperation Report (OECD, 2010c) does explicitly mention ongoing cooperation in data collection efforts between the DAC and non-DAC donors, to date information on the extent of South-South cooperation is slim. Some non-DAC members do report to the OECD - their net disbursements totaled $9.48 billion in 2008 (OECD, 2010c: 259) – but it is not clear how much of this went to AIDS. Some $87.6 million was contributed to the Global Fund by reporting non-DAC donors in 2008 (OECD, 2010d: online) but, again, this is only partial information. It is not absolutely clear which official data source provides the most comprehensive picture of AIDS spending – this is, after all, why both have been reported. Since UNAIDS data are meant to include all AIDS spending that OECD data include, but not vice versa, it may be logical to assume that OECD data are more reliable in countries where their estimate

exceeds that of UNAIDS. Further, since UNAIDS data are meant to capture more spending than OECD data (because of non-DAC contributions), it may be logical to assume that UNAIDS data are more reliable in countries where their estimate exceeds that of the OECD. A guideline, albeit a loose one, could be to 'pick the highest number'.

Getting an idea of where the official sources stand is important, but the AidData estimates are also helpful for a better understanding of the totality of AIDS funding. Since little information is available on non-DAC donors *anywhere*, they – like the UNAIDS and OECD data – do not include funds flowing from potentially important South-South collaborations. Still, it is useful to see that some projects not classified under 'STD Control including HIV/AIDS' or 'Social mitigation of HIV/AIDS' do seem to involve mainly AIDS components. Whether it is appropriate to include these or not is up to the individual user. Importantly, the steps taken in building the AidData database preempt accusations against OECD data of the type Bongaarts and Over leveled at UNAIDS data – namely, that they may miss a significant amount of AIDS spending. Since the AidData adjustments did not make much of a difference, one can reject the claim that a significant amount of donor funds is being missed by the two AIDS-related CRS purpose codes.

Discussion and weaknesses

The analysis conducted excludes some potentially important countries due to unavailability of either total health spending or AIDS spending data – Zimbabwe, Zambia, Namibia and Swaziland, for example. Further, as has been mentioned, the measure of disease burden used, the DALY, incompletely captures the complexity of the AIDS virus. It does not deal well with comorbidity and thus underestimates true affliction caused by the disease. Infection with HIV increases one's chances of contracting TB, for example (Corbett et al, 2003; Goodman, 1995). Technically, if AIDS could be said to be the direct cause of 3% of TB cases, 3% of TB's DALYs should be included. No such data exists, however. There is also the problem of the socioeconomic impacts of AIDS (Haacker, 2004; Canning, 2006) which are not captured. Again, there is very little that can be done about this. Finally, the many AIDS cases *prevented* by the initiatives enabled by existing AIDS funding have not been captured. If effective prevention strategies are keeping the AIDS burden of disease low, optimal spending may appear as overspending.

All these concerns are relevant, but do not belong to AIDS alone. DALYs are incomplete, but they are at least consistently so. There is little reason to imagine that they underestimate the burden of AIDS in ways that they do not in other,

equally vicious conditions. ART provides an exception to this rule, however. Because those AIDS sufferers on ART suffer less disability (0.167) than those not on ART (0.505), AIDS DALYs in a given country will decline as more people are placed on ART. Thus, if a country spends proportionately in one year and uses funding to expand treatment, it will 'overspend' the next year because treatment has led to a decline in DALYs. This leads to the absurd problem that if funding were made contingent on proportionality, it would lead to a perverse disincentive to expand ART. Ideally, the measure of proportionality used should be adjusted in such a way as to account for the presence of ART. In the case at hand, however, it is perhaps fortunate that the latest DALY data available are for the year 2004 – a time when global ART coverage was minimal (approximately 12% [UNAIDS and WHO, 2005: 11]). This problem is thus unlikely to affect results as much as it would in more recent years. It should, however, be kept in mind when the current WHO update is complete and more recent DALYs are published.

The felicity associated with using 2004 DALYs, unfortunately, stops at ART. Because 2008 and not 2004 expenditure is used, the above exercise tacitly ignores the effects of any developments in the relative disease burden of AIDS from 2004 to 2008. This could affect the results for each country in one of two ways. Firstly, if the AIDS disease burden has worsened relative to other conditions since 2004, they will underestimate the amount of AIDS spending required for proportionality. In these cases, overspending will be less and underspending more dramatic. Alternatively, if the burden of other diseases has worsened relative to the AIDS burden, results will overestimate the amount of AIDS spending required for proportionality. In these cases, overspending will be more and underspending less dramatic. The question hinges on which development is more likely within each country.

In the extreme case of South Africa, it seems likely that the size of the epidemic, coupled with the vast funding deficit, may have led to a worsening of the AIDS burden relative to other conditions. In other countries, however, it is more difficult to tell. As noted in the beginning, past studies on proportionality found that AIDS has consistently received more funding per DALY than any other disease. It may be reasonable, then, to assume that this surge in funding has actually led to an improvement (ie. decrease) of the AIDS disease burden relative to other, more underfunded diseases. Unfortunately, without updated DALY data there is no way to tell either way. Since DALYs rely on more than mere incidence levels, even calculating the changes in the spread of each disease won't provide an answer. The question is whether burdens have reshuffled so much between 2004 and 2008 so as to switch the overspend/underspend conclusions for those countries that differ significantly from proportionality –

these are, after all, the main focus. Since deviations are often extreme, this author does not believe this is likely.

As mentioned initially, it is important to recognize that the issue of proportionality is one talking point among many in the AIDS spending debate. This analysis has not stepped into the important field of cost-effectiveness, which at least in principle allows for maximizing the effects on disease burden at the margin. The costs of reducing one DALY are not uniform across diseases. Then again, it is precisely because there is limited data for this kind of study and none at all at the international level that this paper has focused on proportionality. It is this author's hope that clarity on proportionality will provide groundwork for future cost-effectiveness analysis. Another issue not touched upon is that raised by those such as Girard et al (2010) and Barry and Townsend (2010). They contend that the real issue in the AIDS funding debate is not proportionality but insufficient global health spending - rather than cutting down on AIDS resources, they argue, efforts should be directed to increasing spending across the board. This, however, does not address the question of where additional resources should be directed and which diseases need them most. Again, clarity on proportionality can provide a good starting point for this.

The analysis has also not ventured into the question of vertical (focused on a specific condition) versus horizontal (focused on building broader health systems) health programmes (see Ooms et al, 2008, in particular; as well as MacKeller, 2005; Nattrass and Gonsalves, 2010; Reddi and Leeper, 2010; Asiimwe et al, 2010 and Bongaarts and Over, 2010). To the extent that AIDS spending was being used to build broader healthcare systems in 2008, the analysis in this paper overestimates the share of funding exclusively directed towards AIDS. Many of the AIDS projects read through in the AidData database did contain reference to broader healthcare initiatives but, as mentioned, it was quite impossible to determine whether AIDS plays well with others in the health playground. This is the one area, perhaps, that will provide the most fruitful avenue for further research.

An issue that deserves some attention is that regarding the political realities of reallocating expenditure. The shifting of any planned future expenditure from AIDS to other diseases or broader healthcare programmes should not be blind to issues of monitoring and accountability. It is all well and good to say that more funds should be diverted to battling bilharzia, say, but who monitors the incidence of the disease? How does one analyse whether prevention efforts are working? Who is responsible for ensuring that infected rivers are clearly signposted? Who gets fired when they are not? In the absence of clearly defined, measurable targets and clear channels of responsibility, money shifted to other healthcare programmes may disappear into opaque management

systems that fix few problems and even fewer people. The 2004 World Development Report speaks at length of the importance of accountability to service delivery, and introduces an analytic framework for thinking about the concept involving five key elements: delegation, finance, performance, information about performance and enforceability. The link between them is explained with a simple example:

> 'In buying a sandwich you ask for it (*delegation)* and pay for it (*finance*). The sandwich is made for you (*performance*). You eat the sandwich (which generates relevant *information* about its quality). And you then choose to buy or not buy a sandwich another day (*enforceability*), affecting the profits of the seller' (World Bank, 2004: 47).

Proper information and enforcement capabilities are required if proper performance is to come from finances delegated.

The machinery of AIDS activism mentioned at the very beginning not only pieces money together, but also sounds loud sirens when money is being misallocated and misspent. It has done so on many occasions, an apt example being the Treatment Action Campaign's constitutional court battle with the South African government over the latter's limited rollout of Nevirapine (Heywood, 2003). This cannot be ignored and represents an important caveat in any discussions about reallocation. Nattrass and Gonsalves (2010) summarise the point well:

> 'In the absence of easily measurable outputs and clear, politically feasible and sustainable mechanisms to hold government to account, funds can all too easily be misappropriated [De Renzio, 2006] or shifted away from priority health interventions—as was the case in Zambia when the TB program collapsed after being "integrated" into the general health care system [Bosman, 2000]. AIDS spending, by contrast, can be linked to specific targets and has a constituency (treatment activists) with a strong incentive to hold governments accountable...Undercutting HIV funding, ostensibly in order to build a better health care system, could dismantle the most organized and effective health care consumer constituency in existence in developing countries' (2010: 175).

This applies to other diseases and healthcare initiatives as well as to the components of AIDS spending itself. The 2010 Global HIV Prevention Progress Report Card (GHPWG, 2010) notes that few prevention programmes have clear, well-defined targets or monitoring mechanisms. Indeed, it states that 'analysis

of data indicates that the world is doing a poor job of implementing sound, evidence-based, well planned programmes' (2010: 1). Such evidence needs to be taken into account when calling for a greater focus on prevention versus treatment (see Over, 2008, for example), ostensibly in order to fast-track eradication of the epidemic.

Finally, it must be noted that proportionality may not be useful in cases where health spending is extremely low in every sphere. In such cases, it may be that a certain minimum of healthcare infrastructure needs to be put in place for the initiation of a coherent response to the AIDS epidemic. Moreover, spending from a low base will have to gather momentum in one or a few areas until talk about reallocation will be meaningful. It is impractical to suggest that a very poor country should concentrate on all things at once, from the first. Despite these qualifications, it is very useful to see that certain countries – particularly South Africa, Brazil, Thailand, Kenya, Nigeria and Uganda – are not spending even remotely in line with their AIDS disease burdens. In these countries, there is certainly space to examine spending allocations and, in extreme cases of disproportionate overspending, *open* the question of whether some conditions could use additional funds more than AIDS.

2.4 - Conclusion

There is a lot of talk at the moment about whether AIDS funding should be cut back or increased, urged along its current path or dramatically reengineered. Many people's lives literally depend on the funding AIDS receives; now more than ever, therefore, it is important that we obtain as much clarity as possible on the issues involved. This paper has contributed to the clarification of a very topical issue in this debate. The results generated do not solve the problem of precisely if, where and how much future spending should be reallocated within countries. They do, however, lend a measure of clarity to a metric that has been, and doubtless will continue to be, used to argue on both sides of the AIDS funding debate. In particular, we have seen that OECD and UNAIDS data do indeed produce different spending figures at the country level, and that choice of data source has very real implications for any exercise aimed at gauging how much money is really being allocated to each country's fight against AIDS. Bongaarts and Over (2010: 76) were right to flag the issue, but their analysis was too cursory to support their implication that UNAIDS data are likely to underestimate AIDS spending. The exercise conducted in this section has shown that the relationship between the two data sources is considerably more complex than these authors suggest. Further investigation is required to determine why certain countries exhibit severe discrepancies. Nattrass and Gonsalves (2010: 175), meanwhile, put forward arguments based on figures that, because of the

massive increases in AIDS spending between 2007 and 2008, are currently outdated. The flat-lining of funding between 2008 and 2011 means that the results presented in this study are far more relevant to present conditions.

As we have seen, the precise implications of a country's standing in terms of proportionality are complex and largely unclear. However, there is now, for the first time, a clear picture of where the world lies in terms of proportionality. Debates will be ongoing about whether this picture deserves to hang prominently on the walls of the AIDS funding debate, but at least it has been put into focus. Considerable value lies within the raw tables generated in Section 3, quite apart from the limited analysis conducted in this paper. The availability of more recent DALY and health expenditure data will doubtless call for new investigation, but this is likely to take some time. Final 2008 estimates for the latter were only released in March 2011, after all, and the DALY update currently underway involves complex calculation and data collection. In the time being, the results presented above can provide guidance as to where diseases besides AIDS are likely to be badly underfunded. More detailed investigation is urgently required to see which of these is in most need in each country.

Appendix 1 - Background data: AIDS spending (% total health spending) vs. AIDS DALYs (% all DALYs)

Note on regional and world totals for OECD and AIDDATA: (1) include those countries for which only UNAIDS data is available, (2) include regional figures not specified by country, eg. 'Sub-Saharan Africa, regional'

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	OECD	AIDDATA	UNAIDS	OECD	AIDDATA	%HIV all DALYs	GEN GOV	Non-profit	TOTAL	All DALYs (000s)	HIV DALYs (000s)
WORLD	**10 534.34**	**10 791.64**	**10 824.71**	**1.16**	**1.19**	**1.19**	**3.46**					
AFRICA	**4 414.19**	**4 567.76**	**4 594.60**	11.94	12.35	12.42	10.49					
SUB SAHARAN AFRICA	*4 390.28*	*4 512.64*	*4 539.18*	*18.39*	*18.90*	*19.01*	*11.32*					
Angola	31.77	56.10	56.12	1.40	2.48	2.48	2.47	2 264.58	0.00	2 264.58	12 469.91	308.31
Benin	20.77	17.52		14.42	12.16		2.99	144.05	0.01	144.06	3 530.51	105.44
Botswana	339.87	460.89		37.62	51.01		50.50	796.10	107.37	903.47	893.87	451.41
Burkina Faso	48.01	48.18		14.29	14.34		3.43	334.53	1.50	336.03	7 402.20	254.13
Burundi	26.06	25.41	25.60	29.48	28.75	28.96	7.28	60.40	28.00	88.41	4587.63	334.08
Cameroon	39.97	24.75	26.05	13.74	8.51	8.95	14.45	281.42	9.54	290.97	7 969.03	1 151.38
Cape Verde	2.57	1.28		4.63	2.31		0.22	55.51	0.00	55.51	85.16	0.18
Central African Rep.	20.28	19.37		55.70	53.20		13.33	33.79	2.63	36.41	2273.33	303.06
Chad	13.90	8.87		4.97	3.18		5.90	271.24	8.10	279.34	5889.20	347.66
Congo	11.63	8.89		7.95	6.07		16.30	146.35	0.00	146.35	1296.76	211.35
Congo Dem. Rep.	85.96	71.46	72.44	17.68	14.70	14.90	5.76	463.92	22.26	486.18	37 312.69	2 149.07
Côte d'Ivoire	62.01			20.76			11.47	237.43	61.20	298.63	11 110.58	1 274.05
Djibouti	3.22			6.19			9.21	52.04	0.00	52.04	280.00	25.78
Equatorial Guinea	2.83	3.77		1.02	1.36		7.32	277.09	0.00	277.09	267.08	19.55

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	**OECD**	**AIDDATA**	**UNAIDS**	**OECD**	**AIDDATA**	**%HIV all DALYs**	**GEN GOV**	**Non-profit**	**TOTAL**	**All DALYs (000s)**	**HIV DALYs (000s)**
Eritrea	14.46	17.80		68.11	83.87		5.02	21.23	0.00	21.23	1 195.35	59.98
Gabon	11.85	12.77		7.10	7.65		20.20	166.91	0.00	166.91	400.22	80.83
Gambia The	4.99	3.43	3.49	15.62	10.74	10.94	2.37	21.63	10.28	31.92	566.03	13.43
Ghana	37.93	43.51		3.95	4.53		7.59	918.61	42.27	960.88	7 530.46	571.63
Guinea	13.18	7.45		45.00	25.42		2.84	28.45	0.85	29.30	3 929.56	111.56
Guinea-Bissau	3.65	2.47	3.87	22.32	15.12	23.71	3.01	7.16	9.18	16.34	925.43	27.89
Kenya	659.87	393.66	399.77	119.25	71.14	72.25	24.24	466.42	86.91	553.33	14 720.22	3 567.46
Lesotho	81.31	81.70	82.16	87.84	88.26	88.75	56.81	78.39	14.18	92.57	809.20	459.73
Madagascar	11.95	13.24	13.26	3.93	4.36	4.36	0.24	291.57	12.32	303.88	6 466.05	15.49
Malawi	106.72	153.27	154.03	53.16	76.35	76.73	24.58	157.82	42.92	200.74	7 574.92	1 862.20
Mali	40.39	35.18	35.54	17.41	15.16	15.32	2.16	231.98	0.00	231.98	7 065.87	152.53
Mozambique	144.95	214.21	215.08	36.04	53.25	53.47	22.44	345.38	56.85	402.23	9 655.50	2 166.82
Niger	12.46	9.90	10.91	6.84	5.44	5.99	0.81	181.44	0.71	182.15	9 995.23	80.57
Nigeria	394.66	408.38	408.40	9.67	10.01	10.01	6.26	4072.75	8.73	4 081.48	7 7690.31	4 860.25
Rwanda	110.81	133.53	133.56	35.34	42.58	42.59	10.32	211.10	102.47	313.57	5 404.42	557.49
Sao Tome and Principe	0.09	0.75		0.99	7.93		0.09	5.69	3.70	9.39	50.67	0.04
Senegal	25.57	22.86	23.02	5.93	5.30	5.34	1.12	419.13	12.11	431.24	4 481.87	50.18
Seychelles	0.57	0.50		1.61	1.41		1.04	28.86	6.72	35.58	13.83	0.14
South Africa	1 694.00	1 746.09	1 757.79	17.91	18.46	18.58	40.72	9 035.87	423.67	9 459.54	20 988.18	8 545.40
Togo	15.37	7.75	7.79	25.08	12.66	12.71	9.16	45.43	15.85	61.28	2 539.88	232.74
Uganda	296.65	264.52	265.07	46.94	41.85	41.94	18.72	241.03	390.97	632.00	14 145.83	2 648.56
NORTH AFRICA	*23.91*	*22.95*	*22.95*	*0.18*	*0.18*	*0.18*	*0.23*					
Algeria	3.80	5.15		0.05	0.06		0.38	8 037.24	2.42	8 039.66	5 215.39	19.75
Egypt	7.54	7.43		0.22	0.22		0.08	3 345.88	7.17	3 353.05	13 317.61	10.76
Morocco	12.57	10.17		0.73	0.59		0.48	1 714.58	0.00	1 714.58	5 030.63	24.05
AMERICA	1 739.88	1 779.05	1 782.21	**1.11**	**1.13**	**1.13**	**1.57**					
NORTH/CENTRAL AMERICA	*522.97*	*549.57*	*551.91*	*1.16*	*1.22*	*1.23*	*1.87*					

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	**OECD**	**AIDDATA**	**UNAIDS**	**OECD**	**AIDDATA**	**%HIV all DALYs**	**GEN GOV**	**Non-profit**	**TOTAL**	**All DALYs (000s)**	**HIV DALYs (000s)**
Antigua and Barbuda	0.33	0.26		0.85	0.67		2.84	38.89	0.00	38.89	13.15	0.37
Bahamas	4.44			1.84			8.12	238.30	3.00	241.30	59.48	4.83
Costa Rica	19.88	19.09		1.05	1.01		0.85	1 868.43	18.63	1 887.07	532.44	4.52
Cuba	46.62	40.48	40.86	0.65	0.56	0.57	0.26	7 189.00	0.00	7 189.00	1 567.48	4.15
Dominica	0.18	0.03		1.26	0.22		3.13	14.06	0.00	14.06	10.91	0.34
Dominican Republic	23.42	30.52	32.29	2.03	2.65	2.80	5.91	963.69	188.25	1 151.94	1 986.41	117.35
El Salvador	39.23	34.82	34.84	4.94	4.39	4.39	3.56	793.40	0.00	793.40	1 240.71	44.14
Grenada	0.48	0.64		2.12	2.82		2.24	22.19	0.59	22.78	19.77	0.44
Guatemala	51.35			5.32			2.25	899.80	64.81	964.61	2 730.49	61.30
Honduras	24.32	26.37		4.57	4.96		4.55	517.17	14.52	531.69	1 341.05	60.96
Mexico	266.04	267.68		0.89	0.89		0.94	29 956.60	0.00	29 956.60	15 192.74	142.97
Nicaragua	14.91	16.11	16.21	4.44	4.79	4.82	0.82	325.22	10.91	336.14	941.34	7.68
Panama	13.63	12.20	12.24	1.17	1.05	1.05	4.99	1161.20	1.00	1 162.20	466.60	23.30
Saint Kitts and Nevis	1.49			7.72			1.10	19.27	0.00	19.27	8.63	0.09
St Vincent & Grenadines	1.63	0.46		8.63	2.47		6.93	18.83	0.00	18.83	22.21	1.54
Trinidad and Tobago	15.03	17.02		2.54	2.88		7.10	591.47	0.48	591.95	260.15	18.48
SOUTH AMERICA	*1 216.92*	*1 211.71*	*1 212.53*	*1.08*	*1.08*	*1.08*	*1.45*					
Argentina	248.77	249.83	249.93	1.38	1.38	1.38	1.05	17 354.40	699.71	18 054.11	5 985.45	62.56
Bolivia	5.39	7.04	7.71	1.14	1.49	1.63	0.51	459.03	12.57	471.60	2 301.26	11.65
Brazil	623.13	621.94		1.00	1.00		1.35	60 907.31	1 336.05	62 243.36	35 896.05	485.19
Chile	88.01	88.94		1.49	1.51		0.63	5 630.99	276.54	5 907.53	2 095.36	13.11
Colombia	103.56	104.43		0.85	0.86		1.94	11 979.60	136.74	12 116.34	8 483.40	164.95
Ecuador	25.97			1.92			1.57	1 230.00	120.00	1 350.00	2 288.10	35.99
Paraguay	9.30	10.95	10.98	2.26	2.67	2.67	1.84	403.80	7.02	410.82	974.73	17.90
Peru	41.06	30.19	30.20	1.17	0.86	0.86	2.60	3 431.14	90.62	3 521.76	4 764.20	123.85

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	**OECD**	**AIDDATA**	**UNAIDS**	**OECD**	**AIDDATA**	**%HIV all DALYs**	**GEN GOV**	**Non-profit**	**TOTAL**	**All DALYs (000s)**	**HIV DALYs (000s)**
Venezuela	71.72	71.81		0.87	0.88		1.40	7545.41	658.06	8203.47	4217.56	58.87
ASIA	1 116.55	1 170.94	1 173.66	0.71	0.74	0.74	1.02					
FAR EAST ASIA	*801.27*	*810.43*	*811.29*	*0.67*	*0.68*	*0.68*	*0.99*					
Cambodia	51.85	57.08		23.40	25.77		5.36	148.60	72.93	221.53	5002.99	268.27
China	323.83	330.11	330.83	0.35	0.36	0.36	0.33	92 529.45	0.00	92 529.45	200 524.24	671.26
Indonesia	49.56	55.07		0.79	0.88		0.08	6 286.58	1.83	6 288.42	53 248.83	40.75
Lao PDR	5.02	4.97		6.42	6.35		0.15	37.02	41.17	78.20	1 627.74	2.40
Malaysia	24.29	24.02	24.07	0.57	0.57	0.57	1.85	4 211.77	23.90	4 235.67	3 682.09	68.28
Mongolia	5.04	5.08		3.11	3.13		0.05	157.78	4.64	162.42	520.10	0.25
Philippines	6.58	8.39	8.46	0.30	0.38	0.38	0.02	2 130.19	71.49	2 201.68	16 179.66	3.59
Singapore	15.34			0.69			0.50	2 202.85	5.31	2 208.15	450.60	2.23
Thailand	209.12	218.81		2.54	2.65		12.30	8 200.78	45.09	8 245.88	12 841.71	1 578.90
Timor Leste	1.83			2.50			0.07	57.56	15.49	73.04	284.66	0.21
Vietnam	108.81	86.61		4.26	3.39		3.09	2 540.51	16.47	2 556.97	12 849.88	397.61
MIDDLE EAST	*49.99*	*47.05*	*47.12*	*0.42*	*0.39*	*0.39*	*0.41*					
Iran	36.01	36.69	36.76	0.45	0.46	0.46	0.47	7 908.83	22.09	7 930.92	12 029.07	57.06
Kuwait	4.70			0.21			0.35	2 203.64	0.00	2 203.64	257.22	0.89
Lebanon	7.30	3.21		0.59	0.26		0.67	1 224.52	6.89	1 231.41	720.05	4.81
Syria	1.99	2.21		0.34	0.38		0.01	583.30	0.00	583.30	2 511.97	0.25
SOUTH/CENT. ASIA	*265.29*	*284.99*	*286.79*	*0.97*	*1.05*	*1.05*	*1.07*					
Afghanistan	3.24	1.75	3.07	1.12	0.61	1.06	0.00	277.71	10.75	288.45	18437.13	0.22
Armenia	2.60	3.12		1.29	1.55		0.38	195.64	6.19	201.83	570.29	2.19
Azerbaijan	5.00	5.58		1.01	1.13		0.20	402.86	91.74	494.60	1573.59	3.14
Bangladesh	37.26			4.30			0.02	830.60	35.37	865.96	39993.13	7.82
Georgia	8.04	5.81		2.34	1.69		0.12	343.44	0.38	343.82	709.84	0.85

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	OECD	AIDDATA	UNAIDS	OECD	AIDDATA	%HIV all DALYs	GEN GOV	Non-profit	TOTAL	All DALYs (000s)	HIV DALYs (000s)
India	145.59	170.18	170.32	0.64	0.75	0.75	1.26	17 307.02	5 477.13	22 784.14	305 111.89	3 851.90
Kyrgyzstan	8.80	13.61	13.83	5.45	8.44	8.58	0.14	141.87	19.39	161.26	1 188.50	1.62
Myanmar	32.80	13.60		53.15	22.03		4.30	43.41	18.30	61.71	13 710.57	589.50
Pakistan	14.19	22.48	22.49	1.15	1.82	1.82	0.25	1 237.02	0.00	1 237.02	40 560.76	101.57
Sri Lanka	1.57	1.24		0.21	0.17		0.08	724.68	16.37	741.04	4 668.77	3.79
Tajikistan	6.18	10.35	10.36	7.76	12.99	13.01	0.32	70.80	8.86	79.66	1 616.83	5.15
EUROPE	3 258.19	3 263.62	3 263.96	0.59	0.59	0.59	1.14					
Belarus	18.62	17.29		0.72	0.67		0.97	2451.14	131.27	2 582.41	2 173.98	21.13
Belgium	111.78			0.30			0.18	37 636.27	233.65	37 869.92	1 341.35	2.39
Bosnia and Herzegovina	2.76	3.86		0.25	0.35		0.06	1110.33	0.00	1110.33	627.95	0.36
Bulgaria	9.21			0.43			0.04	2 117.24	16.08	2133.31	1 426.12	0.61
Croatia	9.96	9.87		0.22	0.21		0.01	4 628.76	0.00	4628.76	697.73	0.07
Czech Republic	64.28			0.51			0.03	12 309.47	184.58	12 494.06	1 460.50	0.50
Estonia	18.37			1.64			1.03	1 120.11	0.26	1120.37	254.83	2.62
Greece	96.06			0.45			0.12	21 321.90	0.00	21 321.90	1 310.28	1.63
Hungary	3.67			0.05			0.03	7 736.97	189.82	7 926.79	1 814.37	0.58
Macedonia	3.66	4.77	4.78	0.80	1.04	1.04	0.03	457.16	1.69	458.85	340.62	0.12
Moldova	12.87	7.02		3.91	2.13		0.39	326.35	2.77	329.11	820.04	3.24
Montenegro	0.60			0.22			0.14	254.26	11.30	265.57	1 767.01	2.54
Poland	62.59			0.25			0.10	24 966.66	394.56	25 361.22	5 703.09	5.48
Romania	87.24			0.99			0.30	8 769.25	8.21	8 777.46	3 842.18	11.42
Russian Federation	777.02			1.47			1.32	51 622.00	1 149.34	52 771.34	40 347.87	532.86
Spain	916.74			0.91			0.97	99 998.57	870.94	100 869.51	4858.16	47.36
Sweden	22.15			0.06			0.21	35 120.03	95.30	35 215.33	1032.76	2.16
Switzerland	14.90			0.05			0.61	31 819.44	525.93	32 345.37	794.27	4.82

	AIDS spending, public and international sources (millions 2008 USD)			HIV SPEND% VS DALY%				Health expenditure (millions 2008 USD)			DALYs	
	UNAIDS	OECD	AIDDATA	UNAIDS	OECD	AIDDATA	%HIV all DALYs	GEN GOV	Non-profit	TOTAL	All DALYs (000s)	HIV DALYs (000s)
Ukraine	100.00	106.96	107.30	1.45	1.55	1.56	3.23	6 884.87	1.71	6 886.58	11 200.42	361.82
United Kingdom	925.71			0.46			0.26	191 933.33	9 294.44	201 227.78	7718.34	20.15
OCEANIA	5.53	10.27	10.27	2.30	4.26	4.26	0.17					
Fiji	2.51	0.88		2.53	0.89		0.30	97.48	1.52	98.99	146.09	0.44
Marshall Islands	0.58			2.79			0.09	20.70	0.00	20.70	13.65	0.01
Micronesia	0.35			1.16			0.07	30.52	0.08	30.60	16.47	0.01
Nauru	0.08			1.22			0.73	5.21	1.43	6.64	2.60	0.02
Palau	0.06			0.36			0.08	15.30	0.69	15.99	3.46	0.00
Solomon Islands	0.60			1.83			0.05	32.13	0.51	32.64	88.75	0.04
Tonga	0.21			1.86			0.05	10.91	0.38	11.28	14.66	0.01
Tuvalu	0.05			1.89			0.05	2.87	0.00	2.87	2.61	0.001
Vanuatu	1.09	0.67		5.16	3.19		0.02	20.39	0.76	21.15	37.33	0.01

Unspecified regional expenditure (millions of 2008 US$)

	OECD	AIDDATA		OECD	AIDDATA
Africa, regional	32.18	32.48	South Asia, regional	0.74	0.74
North of Sahara, regional	0.21	0.21	Far East Asia, regional	3.12	3.14
South of Sahara, regional	127.93	128.45	Middle East, regional	0.25	0.25
America, regional	17.77	17.77	West Indies, regional (North and Central America)	12.06	12.06
North & Central America, regional	14.55	14.55	Europe, regional	3.49	3.49
South America, regional	0.61	0.61	States Ex-Yugoslavia	0.03	0.03
Asia, regional	28.47	28.47	Oceania, regional	6.78	6.78
Central Asia, regional	3.66	3.66	Bilateral, unspecified	1 485.23	1 485.99
South & Central Asia, regional	2.96	2.96			

Appendix 2 - Examples of the way AidData was coded for the purposes of this study

Directed towards AIDS not captured by AIDS-related CRS purpose codes
AIDS as one amongst several project goals AIDS not a significant driver of project

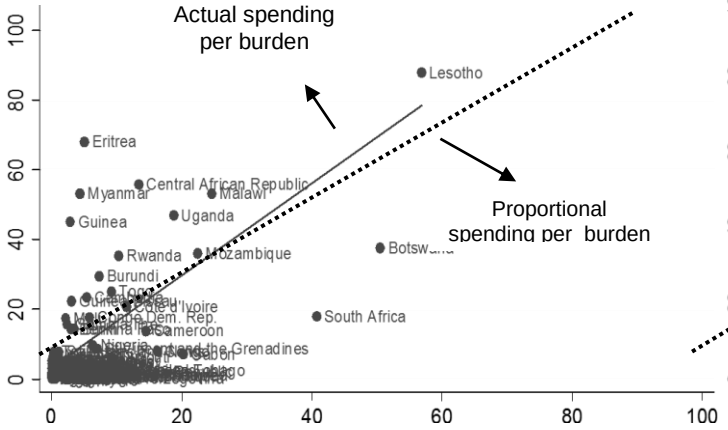
	Title	Long title	CRS purp. code	CRS id
	Fredskorpset	Through this project the partners aim to strengthen their relations, organise young people, and use sports as a tool for health/HIV/AIDS information, education and community development.	16061	2008002142
	SCIAF - Income Generation and Health Support for People Living with HIV/AIDS	SCIAF - Income Generation and Health Support for People Living with HIV/AIDS	16010	2008800361
	Advocacy HIV/AIDS	Advocacy on HIV and AIDS, travel to participate in seminars, prepare information materiel for campaigns and support initiatives.	15162	2008002419
	Disaster Prevention and Climate Change Mitigation 2008-2009	1) Empowerment to prevent/mitigate disasters such as floods droughts and hiv/aids 2) Fulfillment of right to food through sustainable sources of supplementary food nutrition and income for vulnerable households	72010	2008001086
	Relief and Rehabilitation in Zimbabwe 2008-2009	Specific Project Objectives: 1) Sustainable sources of basic food and income for vulnerable households 2) Community empowerment to mitigate spread of hiv/aids	72010	2008001085
	Local Cooperation Fund (LCF) in Kenya	Environmental Education and Action. The project will promote the use of puppetry as a viable means of enhancing learning_ promoting creativity and innovativeness_ developing social skills and team work to alleviate weakness in teaching and learning in schools. It will concentrate on environmental education and action_ civics and citizenships_ HIV/AIDS and violence against girls using puppetry as a tool.	41081	2008080519

	Title	Long title	CRS purpose code	CRS id
	Frame agreement with NGO (Frikyrklig samverkan FS rf)	Social center_ Education & recreation center_ Suriname. Cources in capacity building for women in the slum with education regarding healt_ HIV/AIDS_ family life and family violence. Personal counceling and coaching.	16050	2008080431
	U.S. Peace Corps In-Country Funding	U.S. Peace Corps In-Country Funding for On Board Strength of 73. On Board Strengthincludes Trainees, Volunteers, and Peace Corps Response (formerly Crisis Corps) Volunteers. Peace Corpsvolunteers work primarily in the areas of agriculture, business development, education, environment,health and HIV/AIDS and youth.	43010	2008026523
	Frame agreement with NGO (World Vision)	Kituntu Integrated Community Development Project. The objective of the programme is to improve the quality of life of 19_769 people of Kituntu sub-county. Access to quality primary and secondary education and adult literacy will be increased. Access to better health services and hygiene/sanitation will be improved and both health and socio-economic impact of HIV/AIDS at individual_ household and community levels mitigated. Household Food Security and resilience and community capacity to manage their own development will be improved.	43040	1996960099
	Sudan - Emergency HC in East - Plan 2008	Plan will provide emergency health assistance to communities still affected by the conflict in eastern Sudan, especially IDPs or refugees forced to flee their homes. It will specifically aim to save the lives of women and children through the provision of Emergency Obstetric Care - effectively providing trained medical staff, appropriate equipment and supplies, and a referral system. Awareness raising will be undertaken around reproductive health, family planning, HIV/AIDS, sexually transmitted infections, gender-based violence, and traditional practices which can be harmful, such as female genital mutilation and early marriage. P	72010	2008000747
	CAR - WFP PRRO 10189.2	The security situation in CAR continued to worsen in 2007 with continuous clashes between rebels and regular troops. The humanitarian needs in the country drastically increased leading to more than 1 million conflict-affected people in the Northern regions of the country. Ongoing insecurity has interrupted the agricultural cycle, seeds and other inputs to production, which are lacking, with a consequent dramatic decrease in agricultural production and an erosion in people#s coping capacity.Basic needs of conflict and disaster affected communities in developing countries are metExpected Outcomes: The specific objectives of the Protracted Relief and Recovery Operation (PRRO 10189.1) are to (i) protect the livelihoods of food-insecure target groups in post-conflict zones; (ii) improve the nutritional status and health of vulnerable populations, with a special focus on people living with HIV/AIDS	72040	2008000371

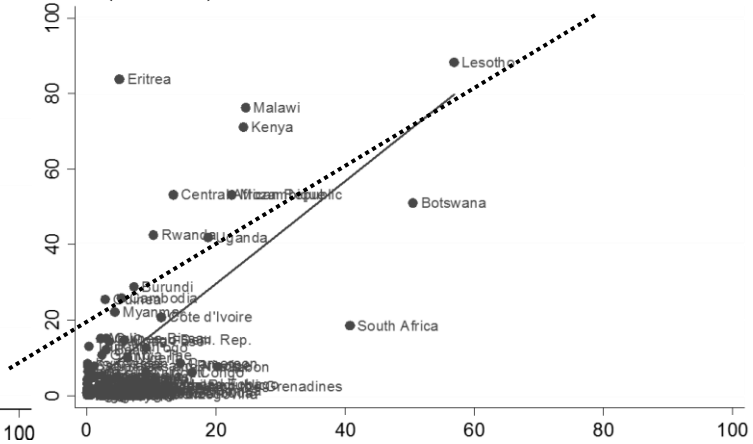
Appendix 3 - Proportionality regressions: World & Sub-Saharan Africa

Vertical axis: Percentage of total health expenditure spent on AIDS. Horizontal axis: Percentage of total DALYs accounted for by AIDS

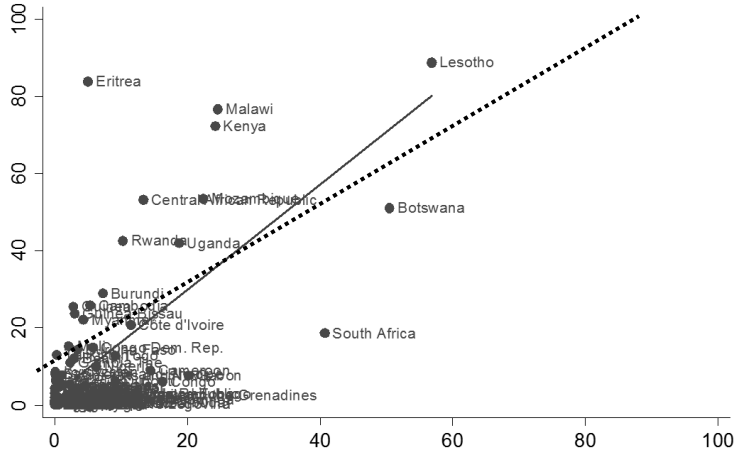
UNAIDS (World)



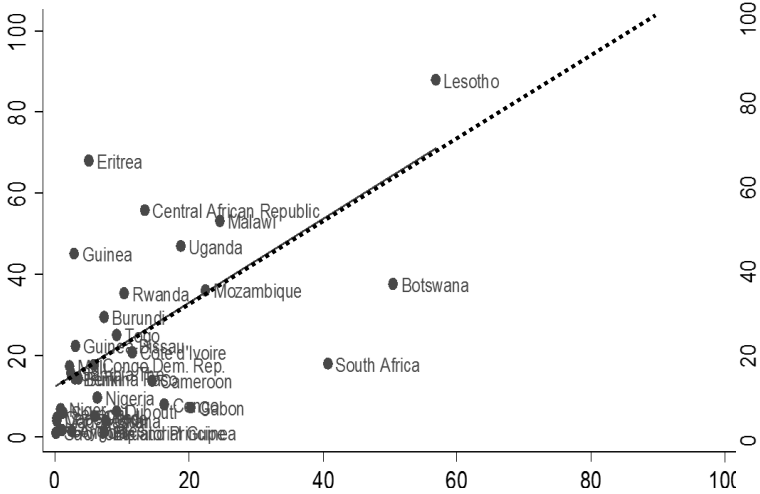
OECD (World)



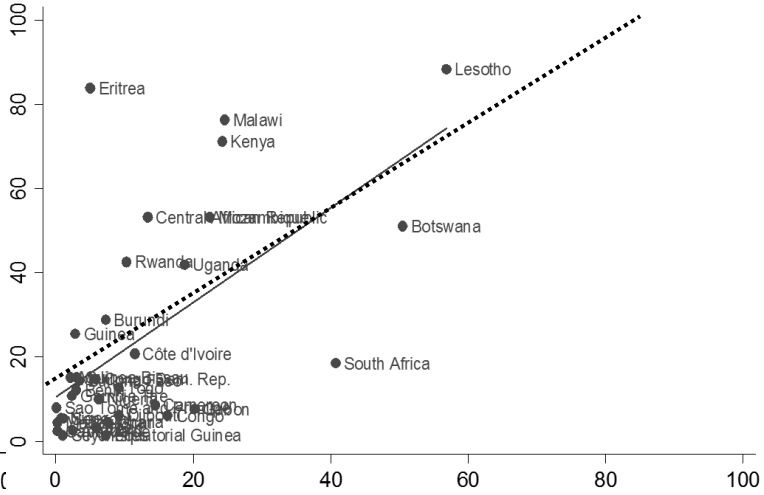
AIDDATA (World)



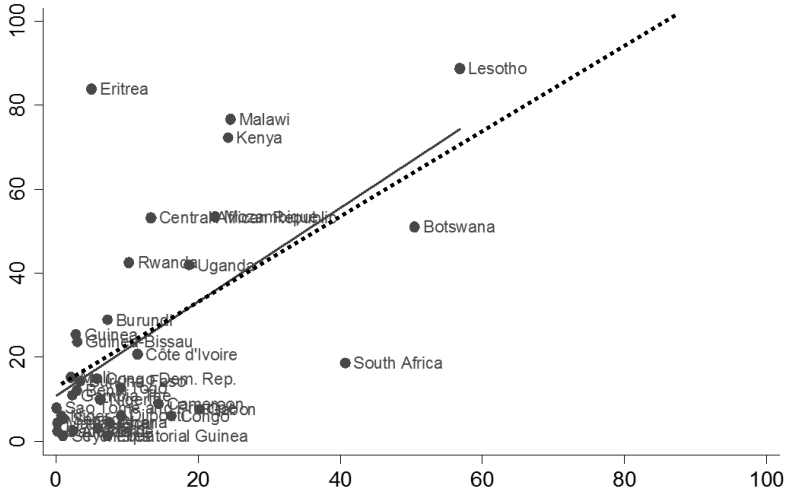
UNAIDS (Sub-Saharan Africa)



OECD (Sub-Saharan Africa)



AIDDATA (Sub-Saharan Africa)



Appendix 4 - Rankings (%∆ AIDS spending required for proportionality – largest to smallest)

(1) Overspenders

	UN	O	AID		UN	O	A		UN	O	AID
Afghanistan	1	1	1	Philippines	23	18	18	Spain	45	43	43
Vanuatu	2	3	3	Myanmar	24	36	37	Bosnia and Herzegovina	46	31	32
Bangladesh	3	2	2	Sao Tome and Principe	25	4	4	Central African Rep.	47	48	48
Mongolia	4	5	5	Indonesia	26	23	23	Burkina Faso	48	44	44
Laos	5	7	7	Bulgaria	27	25	25	Burundi	49	49	49
Tuvalu	6	8	8	Moldova	28	35	36	Greece	50	50	50
Kyrgyzstan	7	6	6	Niger	29	30	28	Rwanda	51	45	45
Solomon Islands	8	10	10	Fiji	30	52	54	Armenia	52	47	47
Timor Leste	9	12	12	Mali	31	29	30	Democratic Rep. Congo	53	56	56
Tonga	10	13	13	Guinea-Bissau	32	37	27	Egypt	54	55	55
Syria	11	11	11	Saint Kitts and Nevis	33	28	31	Togo	55	74	74
Marshall Islands	12	14	14	The Gambia	34	42	42	Sri Lanka	56	62	62
Tajikistan	13	9	9	Ukraine	35	32	33	Uganda	57	60	60
Macedonia	14	15	15	Nicaragua	36	33	34	Cuba	58	61	61
Cape Verde	15	24	24	Senegal	37	40	40	Chile	59	57	57
Croatia	16	16	16	Azerbaijan	38	34	35	Guatemala	60	59	59
Georgia	17	22	22	Kenya	39	54	53	Bolivia	61	53	51
Micronesia	18	19	19	Benin	40	46	46	Malawi	62	51	52
Madagascar	19	17	17	United Kingdom	41	39	39	Côte d'Ivoire	63	63	63
Guinea	20	26	26	Palau	42	41	41	Nauru	64	64	64
Czech Republic	21	21	21	Pakistan	43	27	29	Belgium	65	65	65
Eritrea	22	20	20	Cambodia	44	38	38	Mozambique	66	58	58

(2) Underspenders

	UN	O	AID		UN	O	AID		UN	O	AID
Estonia	67	67	67	Switzerland	1	1	1	Ghana	19	23	22
Montenegro	68	68	69	Sweden	2	3	3	Angola	20	86th over	86th over
Lesotho	69	69	68	Algeria	3	4	4	Kuwait	21	24	23
Nigeria	70	66	66	Equatorial Guinea	4	5	5	Venezuela	22	25	25
Seychelles	71	75	75	Thailand	5	7	7	Djibouti	23	26	26
Morocco	72	78	78	Bahamas	6	8	8	Brazil	24	28	28
Russian Federation	73	70	70	Panama	7	6	6	Belarus	25	27	27
Hungary	74	72	72	Antigua and Barbuda	8	9	9	Botswana	26	84th over	84th over
Singapore	75	73	73	Malaysia	9	10	10	Romania	27	29	29
El Salvador	76	79	79	Dominican Republic	10	18	19	Poland	28	30	30
Vietnam	77	82	82	Gabon	11	14	14	Chad	29	20	20
Argentina	78	76	76	Trinidad and Tobago	12	16	16	Lebanon	30	15	15
St Vincent & Grenadines	79	12th under	12th under	Dominica	13	2	2	Mexico	31	31	31
Costa Rica	80	81	81	Colombia	14	17	17	Grenada	32	77th over	77th over
Paraguay	81	71	71	South Africa	15	19	18	Cameroon	33	21	24
Ecuador	82	80	80	Peru	16	11	11	Iran	34	32	32
China	83	83	83	Congo	17	13	13				
Honduras	84	85	85	India	18	22	21				

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