

## PRESIDENTIAL ADDRESS

# Combating the ‘other diseases’ of MDG 6: changing the paradigm to achieve equity and poverty reduction?☆

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**Summary** This paper suggests that the ‘other diseases’ of Millennium Development Goal 6 (MDG 6) are ignored by policy-makers and politicians who overfocus on unachievable objectives and targets around the ‘big three’ diseases of HIV, tuberculosis (TB) and malaria, which if the planet was viewed by aliens would be seen as the only diseases that existed on the planet. The diseases of the majority of the poor represent ‘low hanging fruit’ for control and elimination and opportunities are ignored despite the availability of cheap or donated drugs and ample evidence that such interventions are effective and reduce incidence, as well as mortality and morbidity. The time frame available to achieve the MDGs of some 7–8 years requires a re-evaluation of what can be done with the tools available now and which can address the problems faced by the majority of poor people afflicted by disabling conditions which together represent a global burden greater than malaria or TB. The author considers also the volume of research relevant to the MDGs and their achievement is distorted by the focus on high tech end research which cannot be delivered by 2015 and that in terms of the 90:10 gap in research relevant to the problems of the poorest the real gap is 99:1. The concepts of distortion of donor funding for diseases of MDG 6 for implementation of largely curative interventions which do not reduce incidence as well as research which addresses problems that cannot reach poor people in the time frame to 2015 is emphasised. New paradigms are required if any impact on MDG 6 is to be achieved recognising the needs of the majority via an equitable distribution of funding.  
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## 1. Introduction

Despite the focus and emphasis on HIV and malaria in United Nations (UN) documents (UN, 2007) there has been

a momentum to address neglected tropical diseases (NTD) in a more integrated and holistic way. This has led to a greater recognition of the importance of these infections as causes of poverty and impediments to the well-being of at least one billion people; these diseases are true ‘allies of impoverishment’. The definitions of what constitutes a neglected disease, and the rationale for a rapid-impact approach to their control or elimination, have been provided in a series of papers (Hotez et al., 2006, 2007; Molyneux, 2004; Molyneux et al., 2005). This approach

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was also endorsed by the Commission for Africa Report (<http://www.commissionforafrica.org>) which emphasised the need to initiate implementation against the diseases. Deworming was recognised as an important quick win intervention en route to the Millennium Development Goals (MDG) (Lancet Editorial, 2004; Sachs and McArthur, 2005), which would also enhance educational achievement, improve nutrition and enhance growth, and has been incorporated by UNICEF in more integrated approaches to interventions, for example bed net distribution in various African countries with measles vaccination and deworming (UNICEF, 2008). The Director General of WHO has incorporated the neglected diseases amongst the priorities for the organisation in a series of speeches ([http://www.who.int/dg/speeches/2007/20070827\\_brazzaville/en/index.html](http://www.who.int/dg/speeches/2007/20070827_brazzaville/en/index.html)). The year 2008 is halfway to the MDGs target date of 2015 (UN, 2007). Dodd and Cassels (2006) emphasised that in many, if not all, areas progress has been depressingly ineffective; indeed they conclude that limited, if any, progress has been made. The Department for International Development (DFID) reiterate this lack of success towards the specific targets of MDG 6 on HIV and malaria (<http://www.dfid.gov.uk/research/researchmdg6.asp>). However, the Millennium Development Goals Report of the UN (2007) shows that whilst there is some progress the MDG 6 targets are significantly behind the stated goals. Improved health of the poor is central to the attainment of four MDGs. A sick, poor, disenfranchised population is not productive—disease results in poverty; poverty causes disease—the oft repeated cliché.

## 2. The changed environment

During the last decade the global health environment has changed considerably (Ruger, 2007); some of these changes are exemplified in Table 1. The international commitment to the MDGs provides a basis upon which a policy framework for interventions and advocacy for increased emphasis on improved health is based. The emphasis on disease control has been predominantly on HIV/AIDS and malaria despite combating 'other diseases' [including tuberculosis (TB)] being included in MDG 6 (Sachs and McArthur, 2005). However, the 'other diseases' are often conspicuously ignored (Hotez et al., 2006, 2007). The UK Commission for Africa in 2005 recommended funding for the NTDs as a group, given the donated products available, the limited costs of the interventions, the efficacy of the drugs and their broader impact (<http://www.commissionforafrica.org>). However, the recommendations have yet to be put into effect and donors continue to focus on the 'big three' despite the limited progress in reducing incidence, prevalence or the self-established targets. The 'low hanging fruit' interventions which are cost effective, efficacious, reduce prevalence, are pro-poor and easy to implement for the other diseases are ignored. Easterly (2006) remarks *"If western governments and NGOs really want to make poor people's lives better it will take some political courage to admit doing everything is fantasy. The rich countries' public has to live with making poor people's lives better in a few concrete ways that aid agencies could actually achieve"*.

**Table 1** Changes in the global health environment

- Conflict and its sequelae in Africa has disrupted health systems. Per capita expenditure on health remains well below the expectation to provide a service compatible with better health and is often less than US\$10 per capita/annum
- The rapid spread and expansion of the HIV/AIDS pandemic, together with an increasing concentration on the 'big three' (HIV/AIDS, TB and malaria) in priority setting and donor support. This results in distortion effects on other programmes (Shiffman, 2006, 2008) with an impact on the health system itself
- There is an increased emphasis on budget support and sector-wide approaches, with a trend to decentralise health systems. There is still debate about the impact of these policies on critical measures of health for the poor (Hutton and Tanner, 2004). However, disease-specific programmes are discouraged with exception of HIV, TB and malaria and possibly polio
- There has also been a series of financing initiatives to infuse additional resources into the health system—insurance, user fees, debt relief, World Bank loans, and debt relief and poverty reduction strategies
- Public–private partnerships (PPP) to address specific health issues have emerged (Buse and Harmer, 2007; Widdus, 2005); a call for the harmonisation and realignment of these partnerships has been made in the Paris Declaration on Aid Effectiveness. Some 100 PPPs exist and harmonisation is needed to reduce the number of 'financial instruments' through which donor money is directed
- 'Competition' between programmes has greatly increased, leading to a scarcity of health services reaching the periphery. Action to ensure sustainable improvements in health services and to promote synergy is necessary to prevent fragmentation of efforts and human resources. The recent evaluation of World Bank Health strategy reiterates the need to strengthen health systems. However, McCoy (2007) emphasises the need to clarify the role of other agencies in leading the health and development policy and implementation is required
- Since 1997 there has been an expansion of drug donation programmes, the emergence of generic manufacturers in middle income countries and the policy changes in drug pricing policy—preferential pricing. However, in parallel there has been the emergence of counterfeit products which seriously undermine the value of any public health efforts

## 3. Neglecting the majority—a deliberate policy?

The MDGs, in particular MDG 6, refer to the benefit of controlling HIV/AIDS and malaria—plus 'other diseases'. The 'other diseases' include the NTDs (see Hotez et al., 2006, 2007 for lists and definitions). However, published target nos. 7 and 8 only refer to HIV and malaria and are deliberately vague about the many 'other diseases' which afflict the vast majority of poor—the population of sub-Saharan

Africa is 770 million; 30 million are estimated to be infected with HIV implying that 740 million are not, yet they are conveniently ignored. The recent UN report on the MDGs only mentions HIV and malaria (UN, 2007). The strategy of annual preventive chemotherapy (WHO, 2006) for NTDs can have a significant impact on the well-being and productivity of affected populations, offering the chance to uplift themselves from the burden of debilitating disease and chronic poverty. Annual deworming also contributes to the development of human capital through improved learning ability of treated children, improved school attendance and improved growth (Stephenson et al., 1993; Stoltzfus et al., 1996). A recent systematic review of randomised controlled trials of oral mass drug therapy has emphasised the efficacy of this approach (Reddy et al., 2007).

The ‘low hanging fruit’ approach has been achieved in many different settings (see Molyneux, 2004; Table 2). Such interventions also benefit the health system by improving national surveillance and monitoring systems; enhancing institutional capacity development; strengthening laboratory services; enhancing operational research capacity; and improving drug distribution systems, drug storage, quality control and supply chains. Other positive outcomes include the development of community networks of volunteers who are able to collect, manage and distribute drugs, undertake monitoring of adverse events, submit reports, provide census data, and implement community-directed approaches. All these are catalytic, enabling expansion of delivery channels for other interventions (Homeida et al., 2002; Molyneux and Nantulya, 2005). Recent studies have shown that when bed nets are delivered at the same time as albendazole and ivermectin in filariasis and onchocerciasis programmes in Nigeria the uptake of bed nets by pregnant women increased nine-fold (Blackburn et al., 2006), and in virtually all settings where additional health interventions (measles immunisation, deworming, vitamin A capsules) have been linked to bed net distribution a significant impact on net uptake has been seen ([http://www.unicef.org/media/media\\_40963.html](http://www.unicef.org/media/media_40963.html)).

These experiences provide evidence for potential added value to the control of the three leading causes of mortality—HIV/AIDS, TB and malaria. The populations affected by these diseases stand to benefit if interventions were to take advantage of the opportunity for synergy with NTD control to achieve the MDGs. For instance, NTD intervention strategies could be affordable and effective additions to malaria control initiatives, such as the scale-up of the distribution of insecticide-treated bed nets (ITN) and home-based management of malaria (Blackburn et al., 2006). These pro-poor, integrated intervention packages rank as a ‘best buy’ for the rural populations in Africa.

Recent disease burden estimates suggests that the global burden of NTDs is at least the same as either malaria or TB (Hotez et al., 2006, 2007). Many individuals are ‘poly-parasitised’. Malaria, HIV and TB interact with the plethora of other infectious agents afflicting poor people. Hence, a more holistic approach will reduce duplication; maximise community participation and empowerment; provide an added value/multiplier effect on the health of communities; and contribute to strengthening the health system (Lammie et al., 2006).

**Table 2** Examples of successful control or elimination of neglected tropical diseases

|   |  |
|---|--|
| <p><b>Lymphatic filariasis</b> has been successfully controlled in China; transmission has been arrested and is no longer a public health problem in Thailand, Sri Lanka (<i>Brugia</i>), Suriname, Solomon Islands, Trinidad and Tobago, Egypt and Costa Rica. There are national elimination programmes ongoing in 46 out of 83 endemic countries. The elimination strategy is based on annual mass drug distribution of albendazole and Mectizan (donated by GlaxoSmithKline and Merck &amp; Co. Inc respectively) in Africa, and albendazole and DEC in Asia. In 2005 WHO reported that 381 million treatments had been delivered in 2005; this dropped to 250 million as the India programme suffered a delay in implementation</p> <p><b>River blindness (onchocerciasis)</b> has been eliminated as a public health problem and as a disease of socio-economic importance in 10 West Africa countries, protecting a population of some 60 million people. Control of blindness and skin disease through community-directed distributors using ivermectin (Mectizan; donated by Merck &amp; Co. Inc) reached more than 62 million people in 2005 through the African Programme for Onchocerciasis Control (APOC) in 19 countries. In the Americas the programme is close to achieving the cessation of transmission in several foci in six countries using twice-yearly treatments</p> <p>Domestic transmission of <b>Chagas disease</b> (caused by <i>Trypanosoma cruzi</i> and transmitted by triatomine bugs) has been controlled in five South American countries, providing economic rates of return of around 30% on the investment in vector control. Transmission by blood transfusion has been greatly reduced</p> <p><b>Leprosy</b> has been reduced as a public health problem and is now a problem in only seven of the previously over 100 endemic countries. Since 1985 some 14.5 million people have been cured through multidrug therapy. The numbers of new cases per year have fallen dramatically. The drugs for the cure of leprosy are donated by Novartis</p> <p><b>Guinea worm</b> is moving towards eradication. The number of cases has been dramatically reduced from over 1 million in 1988 to some 25 000 in 2006 in the remaining nine endemic countries. Since the eradication programme began 180 countries have been declared free of the disease. Several previously endemic countries have been certified as free of transmission (Afghanistan, India, Pakistan, Iran, Yemen, Senegal). The disease is now confined to Africa with the majority of the new cases reported from Sudan and Ghana</p> <p><b>Schistosomiasis</b> prevalence in Egypt has been reduced from around 20% to less than 1–2% using praziquantel (now US\$0.25/treatment) over the last two decades. Ongoing schistosomiasis and soil-transmitted helminth programmes are now in place in Burkina Faso, Mali, Niger, Tanzania and Uganda where 20 million people have been treated with praziquantel and albendazole, with plans on track for implementation in Burundi, Rwanda and Ghana. China has also made substantial progress in reducing the burden of schistosomiasis</p> |  |
|---|--|



There are highly effective and tested interventions for schistosomiasis, lymphatic filariasis, intestinal helminths, onchocerciasis and trachoma. Costings demonstrate that everyone in Africa who needs treating can be reached for an additional investment of just US\$0.50 per person per year treated—in many settings this is likely to be much less (Goldman et al., 2007). In Asia, however, the costs of deworming have been shown to be between US\$0.03 and 0.12 per person per year (Montresor et al., 2007; Sinuon et al., 2005).

This would be a highly effective public health buy, indeed probably the best available, because the economic rates of return on control are estimated at 15–30% (Molyneux, 2004). The validity of the concept of these drug interventions being best buys has been strengthened in recent papers showing the cost per disability-adjusted life-year (DALY) averted is lowest for interventions such as deworming, filariasis and onchocerciasis control even without compounding the benefit of integrated delivery which will reduce costs further by up to 47% (Brady et al., 2006; Goldman et al., 2007; Laxminarayan et al., 2006). The costs of delivery of the interventions based on mass drug distribution are summarised in Table 3.

The case for greater investment and focus on the NTDs has been made in many recent publications (Canning, 2006; Laxminarayan et al., 2006) whilst Hunt (2006) has provided a human rights dimension to the argument for addressing this group of disabling diseases. Beyrer et al. (2007) also use neglected diseases in their case studies of human rights issues in Myanmar and Colombia.

#### 4. Eradication—the tale of two eradication programmes

Whilst 'eradication' has often been an inappropriately used word, as it is only applicable globally, elimination or 'local eradication' has been achieved in several settings (Molyneux et al., 2004). The global reduction to zero incidence is the target of World Health Assembly (WHA) resolutions only for polio and dracunculiasis (Guinea worm). A review of the status of the global polio eradication programme has been provided by Aylward (2006); critical issues for the polio eradication programme relate to vaccinating all populations with oral polio vaccine (OPV) in areas where populations are less accessible and where there is political resistance to vaccination of children. Since the political resistance to OPV in northern Nigeria in 2003 the spread from this focus of virus as far as India and Indonesia has been at huge cost to the programme. While Fine and Griffiths (2007) debate the concept of 'polio eradication' Arita et al. (2006) challenge the feasibility of the polio eradication programme. Recently the Lancet (Lancet Editorial, 2007) reported that vaccine-induced poliomyelitis has emerged in Nigeria as a result of the earlier cessation in immunisation and low coverage. Despite this, the achievements of the programme in reducing polio are remarkable but at huge expense. In parallel, the dracunculiasis (Guinea worm) eradication programme has also been successful (Ruiz-Tiben and Hopkins, 2006). In the late 1980s approximately one million new cases of dracunculiasis were reported annually; in 2006 only some 25 000 were reported. Some 180 countries have been declared free

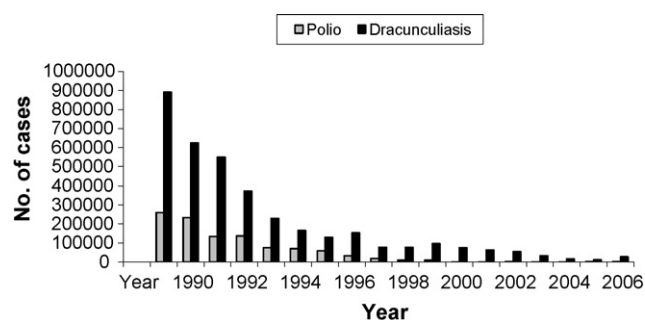


Figure 1 Annual number of dracunculiasis and polio cases reported 1989–2006.

of transmission. The declaration by the International Commission for Certification for Dracunculiasis Eradication that Afghanistan is free of transmission means the disease is now confined to Africa (Al-Awadi et al., 2007; Barry, 2007; WHO, 2007).

The current WHA resolution defines the eradication date as 2009. Nine countries remain endemic in Africa—Ghana and Sudan being the most endemic countries with seven others in the pre-certification phase (WHO, 2007). As with all eradication programmes the final mile of finding and containing the last remaining cases becomes the most expensive part of the programme. To achieve global certification of the absence of transmission will require greater commitment by the international community. However, the biological vulnerability of Guinea worm and the inability to spread, marks this parasite out as the most appropriate of all eradication targets (Ruiz-Tiben and Hopkins, 2006).

Figure 1 compares the polio and Guinea worm eradication programmes progress since the late 1980s to the present. The comparison is instructive in the context of the biological feasibility and the availability of tools given the estimated costs of polio eradication (US\$4 billion) compared with an estimated US\$175 million (external contribution) for Guinea worm and the scientific queries on the feasibility of polio eradication raised by Arita et al. (2006).

#### 5. NTDs—global context and competition for resources

During the past decade there have been four Director Generals of WHO, the Millennium Summit and the publication of the MDGs, the creation of the Global Fund to fight AIDS, TB and Malaria (GFATM), the establishment of the Bill and Melinda Gates Foundation, and the G8 annual summits; all of which have addressed the global health issues focusing on AIDS, TB and malaria. In addition, special Presidential initiatives—the Presidents Emergency Plan for AIDS Relief (PEPFAR) and the President's Malaria Initiative (PMI)—and the World Bank programmes such as the Malaria Booster programme have emerged. Also special WHO initiatives have been established, e.g. Roll Back Malaria and Global Malaria Programme, the Tobacco Free Initiative and '3 × 5'. These initiatives have created webs of complexity, and challenge country and institutional management capacity. The situation at the opposite ends of the spectrum of health policy—the global arena and the district or the community

**Table 3** Costs of delivery of interventions based on mass drug distribution

| Disease              | Geographical setting | Distribution system     | Cost/person/year (US\$) | Reference                                    |
|----------------------|----------------------|-------------------------|-------------------------|--|
| Lymphatic filariasis | Burkina Faso         | Community distributed   | 0.06–0.11               | Goldman et al. (2007)                        |
|                      | Dominican Republic   |                         | 0.68–1.87               |  |
|                      | Egypt                |                         | 1.00–1.37               |  |
|                      | Ghana                |                         | 0.17                    |  |
|                      | Haiti                |                         | 1.10–2.23               |  |
|                      | Philippines          |                         | 0.19                    |  |
|                      | Tanzania             |                         | 0.26–0.54               |  |
| Onchocerciasis       | APOC countries       | CDTI                    | 0.58                    | MacFarlane (personal communication)          |
| Intestinal helminths | Ghana                | School-based programmes | 0.71                    | The Partnership for Child Development (1999) |
|                      | Tanzania             |                         | 0.24                    |  |
|                      | Vietnam              |                         | 0.03                    |  |
|                      | Cambodia             |                         | 0.03–0.12               |  |
|                      | Uganda               |                         | 0.04–0.08 (delivery)    |  |
| Schistosomiasis      |                      |                         | 0.50                    | Fenwick et al. (2005)<br>Brady et al. (2006) |

APOC: African Programme for Onchocerciasis Control; CDTI: community-directed treatment with ivermectin.

where implementation is expected to occur—reflects the problem. At the global level the actors coalesce as ‘partnerships’ to the extent that a study of the industry of Global Health Partnerships has become a justifiable academic pursuit as the mandatory requirement for partnership status reflects at least an attempt to fit the required ethic (Buse and Harmer, 2007). Whilst the international response has been to call for harmonisation of such partnerships resulting in the establishment of the International Health Partnership with the objective of rationalising the complexity of the current environment.

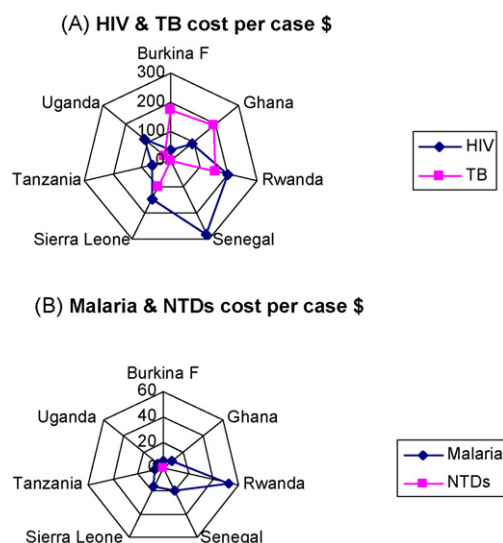
Few donor countries have reached the 0.7% GDP commitment to development with notable exceptions being some Nordic countries. The UK has committed to reach that target by 2015. However, within the health sector how increased funds are spent is dominated by contributions to UN agencies, the EU, budget support direct to countries and the existing yet constrained financial mega structures such as the Global Fund, GAVI and Polio Eradication. This has the administrative advantages of reduced transaction costs thereby relying on alternative governance structures and peer-review processes to execute and validate implementation. Increasingly, global health is recognised as an important element of foreign policy (Donaldson and Banatvala, 2007; Ministers of Foreign Affairs of Brazil, France, Indonesia, Norway, Senegal, South Africa, and Thailand, 2007) yet its complexities and the impact of the increased support needs to be measured in health outcomes.

Since 1997 the belief that Sector Wide Approaches for Health Financing are the correct approach (Cassels, 1997) has dominated bilateral financing in resource-poor settings; this has been accompanied by health sector reform processes which have decentralised function to a district

level. Hutton and Tanner (2004) have provoked the question ‘has SWAPs financing improved health?’ Is there evidence of any impact on the health of poor people, improved health systems, access, improved human resources, or any number of process indicators which could attribute value for money of a policy? However, the fact that a policy was initiated and promulgated without embedded evaluation mechanisms to measure health outcomes seems to contrast with statements which commit donors to base policy on evidence. In addition donors reject supporting individual or projectised disease control programmes yet promulgate the Global Fund which encourages precisely that approach.

## 6. Embedded policy and policy conflict

The SWAP funding mechanism and process reduces the emphasis on support for project activities and disease control. However, as the SWAP approach gained momentum the Global Fund was established, instituting project application processes to support HIV/AIDS, TB and malaria. Global Fund projects are submitted from countries via country coordinating mechanisms and can provide up to 5 years funding if accepted by Technical Review Panels and approved by the Board of the Fund. However, the intensity of the application and review process for such funds of itself distorts and distracts the very health system projects are supposed to support. Shiffman (2006, 2008) and DFID (2007) provide a striking example of Rwanda; similarly in other sub-Saharan African countries where HIV rates are low the proportion of funding specifically directed to HIV can distort already dysfunctional health services where per capita expenditure ranges around US\$10 but can be as low as US\$1 (Liberia)



**Figure 2** Plots of costs per case over 3-year funding period of (A) HIV and tuberculosis (TB) and (B) malaria and neglected tropical diseases (NTD) in selected countries. Data derived from several sources: Global Fund for AIDS, TB and Malaria, the World Bank and the Presidents Emergency Plan for AIDS Relief.

but per person resources for HIV are two orders of magnitude greater than for the rest of the health system—hardly an equitable distribution (Figure 2). Disease control has historically been an important component of donor- and country-funded interventions; such programmes have been successful making sustained impacts on incidence and prevalence of the neglected diseases (Table 2). Programmes which monitor prevalence and incidence on a regular basis have robust figures available to measure impact. However, at the genesis of mega initiatives, the biology, diversity and potential of the organisms which are the targets are rarely considered in the face of political pressure.

## 7. Public health principles versus activities pressure

The objectives of a public health intervention against any infectious agent should be to reduce incidence. Dramatic progress in disease reduction has been historically achieved in campaign approaches, be it through vaccines, drugs, vector control, sanitation or improved water supply. In addition non-health sector based interventions have had consistent effective impacts on child mortality, for example by the education of females or environmental improvements. Over the past decade, however, the overfocus on HIV/AIDS, TB and malaria and the establishment of the Global Fund, the PEP-FAR or the PMI have targeted interventions and set targets which have not been achieved; such as the Abuja target for bed net coverage (60% of vulnerables covered by 2005) or '3 × 5' HIV treatment target (around 1.2 million people on antiretroviral therapy (ART) in Africa in 2006) (UN, 2007). What is ignored is that even if such targets were achieved there would be limited impact on transmission and therefore incidence. The Lancet (5–11 August 2006) edition which coincided with the Toronto AIDS Meeting contained articles from leaders of the HIV community (Table 4) recognising that

**Table 4** Quotes on advances in HIV

"Despite all the advances in science, medicine, and prevention, the epidemic continues to outpace our best efforts to contain it" (Gayle, 2006)

"...too much money was going to AIDS. The truth is that not enough money is going to AIDS, and there's a huge gap between the money that is needed to support AIDS programmes in low and middle-income countries, and what is available. This year alone, funding for the global AIDS response will be \$8 billion short of the \$18 billion required... AIDS needs to be at the core of any development strategy, it should be treated as a distinct and extraordinary entity that can be tackled only through exceptional responses" (Peter Piot quoted in Wakabi, 2007)

"This global epidemic remains out of control, with reported figures for 2005 of 40 million people infected with HIV. During 2005 there were 4.9 million new infections, showing that transmission is not being prevented, and there were 3.1 million deaths. ...." (French et al., 2006)

current strategies had limited or no impact on transmission. The epidemic and hence number of new cases were outstripping the attempts to reach those who currently need ART. Hence universal coverage seems a goal currently beyond reach in settings where available HIV resources outstrip resources for every other condition by orders of magnitude (see Shiffman, 2006, 2008; Figure 2). DFID (2007) states "Despite massive increases in resources to tackle HIV and AIDS, TB and malaria, their impact is still growing". This is hardly surprising in the context of the available tools and the overemphasis on treatment at the expense of transmission control strategies. There is broad acceptance from the HIV community that this is the case (Table 4). In certain settings, however, there has been some progress on reducing the mortality due to malaria and an upscaling of bed net coverage with a commitment to provide nets free as opposed to using social marketing to promote their use (Teklehaimanot et al., 2007; UN, 2007). However, in the context of the whole of the holoendemic areas of Africa progress is inadequate given the overall population at risk.

## 8. Changing the paradigms to address the majority needs

The Millennium Declaration and the MDGs are not on track for achievement in sub-Saharan Africa (DFID, 2007; Dodd and Cassels, 2006). Figures provided from the recent UNAIDS Stop TB and Roll Back Malaria Reports demonstrate a failure not only to reach targets for treatment or coverage but report no effect on incidence. The concept of incidence and a focus on it as a measure of public health success is fundamental, yet seems a remote concept politically as politicians seem to equate impact with numbers of treatments as opposed to efficacy. Easterly (2006) recommends focusing on the 'low hanging fruit'. NTD control at trivial cost represents such an investment allied to well defined benefits (Table 5).

**Table 5** Summary of the case for expanded neglected tropical diseases (NTD) control, elimination and eradication

- The global burden of the basket of NTDs as diseases of poverty is equivalent to that of HIV/AIDS or TB or malaria
- Probably more than half the world's populations are at risk by this group of diseases; certainly ‘the poorest billion’ are infected
- These diseases are controllable, eliminable/eradicable at marginal cost/person treated by effective, often donated drugs
- All interventions are based on effective public/private partnerships
- There now exists some evidence indicating that NTD control (‘deworming’) could reduce the morbidity and mortality of falciparum malaria and reduce transmission of HIV/AIDS
- In Africa circa 0.5 billion people could avoid permanent disablement, enjoy improved nutritional status, have reduced morbidity (including malaria) and children would benefit from enhanced school attendance. Infections can be controlled/eliminated by annual/biannual drug interventions at a total cost of less than US\$0.50 per person per year treated, \$250 million total per year
- There is an opportunity now to integrate these programmes under the Global Fund programmes at minimal extra cost through community-directed systems which have proven sustainability. ACT and bed net distribution could also be assisted through established NTD distribution channels
- Control of parasitic infections through annual chemotherapy improves haemoglobin status thereby reducing the crippling burden of anaemia and low economic productivity of affected individuals and communities
- Higher priority on control of these diseases is necessary by national governments, bilateral donors, international organisations and NGOs as these diseases induce poverty and are driven by poverty
- In the time left before 2015 the control of the ‘other diseases’ in MDG 6 is possible for a relatively small sum. It is unethical and inequitable to ignore such simple interventions against infections that afflict so many people and where control can contribute to strengthening health systems

ACT: artemisinin-based combination therapy; NGO: non-governmental development organisation.

The parallel between the ‘big three’ diseases in terms of resources now available and the invasion of Iraq and the subsequent chaos are instructive as it reflects the inability of money to solve a problem when the public health diagnosis is not applied. Since 2000 new resources for health have been channelled to the GFATM on the one hand and for US foreign policy to the war in Iraq. Neither problem has a solution—indeed the Iraq body count study (Burnham et al., 2006) showed mortality patterns similar to the HIV pandemic: incidence is increasing despite the resources fed into the system.

## 9. Research distortions and delusions

The recognition of the 10/90 gap in research for the diseases and health issues which afflict the majority of the world's poorest is a well defined paradigm (<http://www.globalforumhealth.org>) but the real proportion of funding to targeted research which will directly affect the outcomes to achieve the MDGs by 2015 is probably 1/99. This reflects the time to 2015 on the one hand and the bias towards high-end research with the unlikelihood that science can deliver any products by 2015 which can affordably address the needs of the majority of the poor. This proposed conceptual 1/99 gap emphasises that even if the research funding were to change more equitably towards addressing operational and implementation research to improve delivery of what we have now, no new products for diseases which afflict the majority are likely to emerge by 2015. The real needs are to undertake research which will address improved delivery of what we have now and on improving health systems. Examples of research which could be cited is the recent publication of the draft genome of *Brugia malayi*, a parasite eliminated as a health problem in China and where transmission has been eliminated for two decades from Sri Lanka (Ghedini et al., 2007). It seems bizarre for the authors to claim that this is essential research for a new drug when an existing drug, diethylcarbamazine (DEC), is available and which costs some US\$4 for 1000 tablets—enough to treat some 350 people—and can be delivered to poor people at a delivery cost of US\$0.02–0.10 (Goldman et al., 2007). There are several initiatives directed towards the development of drugs for neglected diseases but the time frame of the development pipeline and affordability of the end product by health systems and the poor will be in doubt unless there are donations and subsidies (<http://www.dndi.org>; [http://www.oecd.org/topic/0,3373,en\\_2649\\_37437\\_1\\_1\\_1\\_1\\_37437,00.html](http://www.oecd.org/topic/0,3373,en_2649_37437_1_1_1_1_37437,00.html)), the latter reference being to the recent meeting convened by the Organisation for Economic Cooperation and Development, the ‘Noordwyk Medicines Agenda’.

## 10. Multidimensionality, rates of biological development and policy change

There are a multiplicity of actors at the national level creating complexity and demands from individual partnerships (around 100) which place demands throughout the health systems. This is also compounded by the number of UN agencies operating in the health field—WHO, UNICEF, The World Bank, UNDP, UNAIDS, the World Food Programme, UNFPA and the non-governmental development organisation (NGDO) community. All actors seek to establish an influence and presence in a country. The sovereignty of a country in determining priorities in the social sector is clear but the response to global initiatives and pressures diverts, distorts and distracts. This response inhibits any effective policy decision-making process, as countries move into response mode despite attempts to initiate basket funding and budget support. Rational decision-making in the face of such complexity, competing demands and limited resources requires skilled leadership, an evidence base both for policy and the



technical decisions upon which policy is based, and priority setting. The objectives, however, should be the cost effective deployment of the available resources, which should have the greatest impact on the majority and be targeted at the poorest sector.

The multidimensionality of the institutional and organisational actors are mimicked also by the health conditions of individuals and communities plus the ecology, social milieu and cultural environment; none of which is static—indeed this environment is infinitely more variable than the institutional one. Similarly, none of the social and biological factors should be looked at in isolation. Like the web of complexity of national actors and organisations attempting to run a health system, poor individuals in rural areas have many health challenges and assaults as well as the wider determinants of health, water, sanitation, ecology, climate and sociopolitical trends, which impact on overall health.

The emergence of health as a key factor in any foreign policy agenda, in G8 debates and in the UN system, where health features so highly in the MDGs, does not necessarily mean that the additional resources are well spent and effective. The remarkably low cost of preventive chemotherapy for helminth diseases based on donated drugs which are sustainably delivered (Goldman et al., 2007; Table 3) demonstrates that the costs are so low that the interventions could be introduced into the existing financing mechanisms such as the Global Fund and PEPFAR at massive benefit for the majority of the poor. Most studies conclude (Laxminarayan et al., 2006) that such interventions are amongst the lowest in terms of DALYs averted in public health (Table 3).

Collier (2007) has highlighted the impediments to development and to improving the plight of those in landlocked countries in a study of 'The Bottom Billion'. For this group their plight is not improving. In the 1990s the income of the bottom billion fell by 5%. It is this group which is plagued by chronic neglected disease if it is fortunate to have survived until the age of 5 years and not be infected by HIV—these individuals cannot be productive when faced with the disabling, chronic conditions which disfigure, cause blindness, drive anaemia and reduce the opportunities which schooling can provide as an exit strategy out of poverty. Collier quotes *"countries at the bottom co-exist with the 21st Century but the reality is the 14th Century - civil war, plague, ignorance"*. To this could be added being subject to poor or feudal governance, no health care or educational facilities, no participation in a political process, no access to communication or transport, no food security and confined to life in a society of barter or effective absence of cash. Collier asserts that political unrest is caused by poverty. All low-income countries face a 14% chance of falling into civil war in any 5-year period. However, one issue raised by Collier and in a different context by Sachs (2005) in 'The End of Poverty' is the problem facing landlocked countries. Sachs (2005) quotes Morawetz who points out that high-value low-unit volume export commodities are the only viable economic resources landlocked countries can export to sustain a viable economy assuming that the commodity price on the world markets justifies high transport costs. Morawetz says of Bolivia *"This is a landlocked country, up in the Andean mountains, facing incredibly high transport costs. The only products that Bolivia has ever been able to export*

*are commodities with a very high value per unit weight because only those commodities can successfully overcome the high transport costs"*. Morawetz considered that the only viable exports Bolivia had were silver, gold, rubber, tin and more recently hydrocarbons and coca which were all commodities with high value per unit weight or per unit volume.

There are 16 landlocked countries in Africa (including Democratic Republic of the Congo and Sudan whose coastline is trivial compared with their size and inadequate transport system). An estimated circa 40% of the population of sub-Saharan Africa lives in these 16 countries. Being landlocked precludes effective economic development and the importation of products which must overcome high transport costs. This analogy can be applied to the weight and volume of bed nets. The difficulties of transporting such a commodity to landlocked countries increases the unit cost considerably because of the transport constraints. This problem does not confront to the same extent drugs for preventive chemotherapy for NTDs. The weight of one bed net is 450g and its volume is around 1 l. The weight of 500 Mectizan tablets to treat approximately 200 people is 56g, 100 albendazole tablets is 125g and 100 praziquantel to treat 30 people the same. Hence for the weight of one net approximately 200 people could be treated by the preventive chemotherapy strategy and transport costs would be less of a constraint. Similarly, if Mectizan alone was distributed for onchocerciasis some 1200 people could be treated for the equivalent of delivering one bed net. These examples illustrate a constraint on health care delivery particularly for heavy or voluminous products.

In addition it has been shown by the Mectizan Donation Programme and the African Programme for Onchocerciasis Control that the coverage sustained by the communities delivering ivermectin against onchocerciasis is between 60% and 70%. It is also known that 70% of the Mectizan imported into countries is consumed. This 70% figure contrasts markedly with figures for other drugs (World Bank, 1994) where only some 12% of imported drugs actually are complied with or appropriately used.

## 11. Conclusions

This paper reflects on topics relevant to health policy and disease control. However, key messages which emerge are that presently at least one billion people are not accessing quality products which could make a real improvement to their well-being, productivity, nutrition and educational performance, and opportunities are being largely ignored by policy-makers by an overfocus on the 'big three'. The incidence of HIV, TB and malaria is not declining despite infusion of significant sums nor will there be a decline in incidence in the foreseeable future as research has yet to produce the new tools required to effectively address transmission. The costs of any intervention in landlocked countries and the weight of products and their efficacy should be recognised as a constraint, as the economy of such countries is dependent on products of high value which can overcome high transport costs. Interventions using donated drugs which are cost free (or others such as DEC or praziquantel which are very cheap), have created sustainable distribution and delivery systems



and retain support from committed NGOs. If bed nets are to be deployed in such settings in the numbers necessary, transport, access, and weight to deploy to the remotest communities will need support for decades and such needs must be identified in policy statements. In the interim the opportunities for bringing better health to such communities through low weight, low volume, donated and efficacious products which require delivery only once a year should be exploited as a platform for community engagement in other health interventions.

If MDG 6 is to be achieved it is necessary to revise the strategy and tactics. Exclusion of the majority of the 'bottom billion' is a human rights, equity and educational issue which current policy and structures are not addressing. The burden of the 'other diseases' is the same as malaria and TB but the 'other diseases' affect the vast majority who are disenfranchised. Policy-makers are ignoring interventions which represent 'low hanging fruit'. Several paradigm shifts and a new vision are required; 'other diseases' do not deserve to be dismissed when a focus of small development resources on the bottom billion, who could be helped immediately, would have so much greater, cheaper and more widespread impact than current policies have. These paradigm shifts are to recognise:

1. That there are many more poor people without HIV/AIDS, TB and to a lesser extent malaria who deserve more equitable recognition. In Africa alone there are 740 million people without HIV! We hence must address the needs of the majority by tackling what we can do now in the most cost-effective way (Easterly, 2006). Trying to do everything is fantasy.
2. We need to emphasise to policy-makers public health approaches—reducing incidence is more important than curative approaches. This is particularly relevant where health systems have demonstrably been unable to reach those requiring curative treatments; daily treatments for complex drug packages for a lifetime with the inherent problems of compliance, delivery, sustainability and stock out are unrealistic in resource-poor health systems.
3. We must recognise the distortions and disparities driven by disease-specific HIV programmes. Such distortions can only be solved if the human resource capacity and available interventions are looked at in a holistic way and not swayed by the distortions created by out-migration of health workers or by the focus on the 'big three' diseases at the expense of conditions and problems which affect the majority. Research distortions also exist reflecting the business of high-end research which cannot deliver products within the MDG time frame. The real gap in relevant research for poor people is not the 90/10 gap but 99/1.
4. It is a time to hold to account those politicians who endorse targets in international health ('3 × 5', Abuja targets for malaria, Stop TB) for failure not only to adequately finance implementation but to understand the public health consequences of their policies. Before setting any target in public health the feasibility of the targets, the logistics of delivery of products, the necessary research required and the capacity of the health system to deliver itself should be assessed. If delusory targets are created it is unsurprising delusions set in (Mackay, 1841).
5. There is a need to recognise the existence of an 'industry' in international health particularly for the 'big three'. Purporting to combat disease and achieve targets through the curative approach by treating a small proportion of the infected population is also delusory. All evidence suggests even from the HIV community (see UN, 2007; Table 5) that incidence is not declining. The three million target for ART by the end of 2005 was not reached even at the end of 2007 and the goal of universal access to ART by 2010 is a target which is even less likely to be achieved. In the overall context we are dealing with taxpayers money which seems to be spent on unachievable objectives while emphasising the wrong strategy if the genuine public health impact is to be made. This can be applied to antiretrovirals, case detection of TB and the distribution of bed nets accepting that recent studies show that with adequate coverage under-5 mortality can be nearly halved but actual numbers under ITNs or long-lasting insecticidal nets are grossly inadequate (UN, 2007; <http://www.un.org/millenniumgoals>).
6. We are ignoring the 'low hanging fruit', aspiring to research success in a time frame which cannot be achieved in the context of the MDGs and ignoring the needs of the vast majority of the populations of sub-Saharan Africa and South Asia where products are available, successes have been achieved and the absolute as well as relative costs and cost-effectiveness, country commitment and proven impact on public health parameters is undeniable. Policy-makers, politicians and the general public need to be aware that a complete change in approach is required if we are to establish equity on the one hand and achievability on the other.

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