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Why neglected tropical diseases matter in reducing poverty

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Key messages

- Neglected tropical diseases (NTDs) have a direct impact on the achievement of the Millennium Development Goals (MDGs). Without addressing these diseases, the broader aim of poverty alleviation is unlikely to be achieved.
- Straightforward and highly cost-effective strategies are available to control and eventually eradicate or eliminate NTDs.
- Success in controlling, eliminating or eradicating NTDs depends on partnerships between multiple constituencies that enable countries to adapt international guidelines to local contexts, integrate NTD programmes into health systems and engage communities in implementation.

Introduction

While neglected tropical diseases (NTDs) have been recognised for centuries – indeed as 'biblical plagues' – NTDs have, as the name implies, remained below the radar of most international and national policy-makers.

This relative neglect can be seen in examining the Millennium Development Goal (MDG) framework: while NTDs are supposedly included in MDG 6 under 'other diseases', they are largely forgotten in favour of the HIV and AIDS, malaria and tuberculosis (TB) parts of MDG 6, as evidenced by the fact that there are no indicators specific to them (Molyneux, 2008).

One possible explanation for international disinterest is that NTDs almost exclusively affect the developing world (though this is also true for malaria) and are not likely to spread far beyond; indeed, many NTDs have disappeared completely in the developed world due to improved hygiene and sanitation standards. Similarly, they tend to affect the poorest people, who have little political voice or lobbying capacity (World Health Organization (WHO), 2010). They are also largely chronic conditions, which, with few exceptions, are not prone to epidemics.

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Health extension workers from Gondar Zuria Woreda, Maksegnit town, Ethiopia. Photo © UNICEF Ethiopia.

However, over the past decade, there has been a resurgence of interest in NTDs arising from an increasing awareness that NTDs, which are silently affecting the poorest billion people (WHO, 2010), represent an impediment to achieving wider human development outcomes (for example, improved maternal and child health, and food and nutritional security). Additionally, NTDs both affect and are affected by many of the other areas covered by the MDGs.

Because of linkages with the other MDGs, and as NTDs are beginning to be discussed as part of the post-2015 framework, ODI decided to include research in this area as part of the Development Progress project.[1] Through better understanding country-level progress made in NTDs, alongside research on an area that has received greater attention, such as maternal and child health, we aim to inform policy in countries facing similar challenges.

Preliminary background research undertaken to identify countries showing relatively high levels of success in addressing NTDs uncovered some characteristics that appear to be critical for a country to achieve progress. These are not necessarily only applicable to NTDs, but apply also to broader health issues in resource-constrained settings, as evidenced in earlier Development Progress case studies[2] and preliminary findings from the NTD case studies in Sierra Leone and Cambodia.

In this paper, we explore how NTDs constitute a critical area for improving health-care outcomes more broadly.

- We outline what NTDs are and how they are treated.
- We explore why they are important for progress in health and broader well-being, using the MDG framework as a structure for analysis.
- We reveal some of the factors that we see as critical to controlling and eventually eliminating NTDs, and discuss some challenges going forward.

What are NTDs?

NTDs are a group of 17 diseases that have been recently branded under the NTDs label in spite of being widely diverse in terms of their distribution, epidemiology, transmission, vector involvement, zoonotic aspects, pathology and requirements for prevention and control. The WHO has listed them together because they share a set of common characteristics (see Box 1). Many of the NTDs have unpronounceable names, which has in part led to them being branded 'NTDs' as a 'useful form of shorthand' to help raise their profile in the international agenda and mobilise resources (WHO, 2010).

NTDs are endemic in 149 countries. Low-income and low-middle-income countries represent more than 70% of the affected countries, and all low-income countries are affected by at least five NTDs (WHO, 2010; Jannin and Savioli, 2011). Up to 90% of the global NTD burden is explained by five of these diseases (see Table 1).

Box 1: Common features of NTDs

- A proxy for poverty and disadvantage.
- Affect populations with low visibility and little political voice.
- Do not travel widely.
- Often overlap geographically.
- Cause stigma and discrimination, especially for girls and women.
- Have an important impact on morbidity and mortality.
- Are relatively neglected by research.
- Can be controlled, prevented and possibly eliminated using simple, effective and feasible solutions.

Source: WHO (2010)

Table 1: Five main NTDs with prevalence and population at risk

Diseases	Prevalence (millions)	Population at risk
Soil-transmitted helminth infections:		
ascariasis	807	4.2 billion
trichuriasis	604	3.2 billion
hookworm	576	3.2 billion
Lymphatic filariasis	120	1.3 billion
Onchocerciasis	37	90 million
Schistosomiasis	207	779 million
Trachoma	84	590 million

Source: Hotez et al. (2007)

Note: The other 12 diseases, representing 10% of the disease burden, are: dracunculiasis, cysticercosis, echinococcosis, food-borne trematodes infection, dengue, rabies, leishmaniasis, human African trypanosomiasis, Chagas disease, leprosy, Buruli ulcer and endemic treponematoses.

How can we treat NTDs?

The WHO recommends a combination of five strategies for the prevention and control of NTDs, which are applied according to the epidemiology of the specific NTD. The strategies are preventive chemotherapy (PCT); intensified case-management; vector control; safe water, sanitation and hygiene; and veterinary public health.

The unprecedented decision of some pharmaceutical companies to donate 'as much drugs as needed for as long as needed' in order to help eliminate NTDs[3] has changed the NTDs landscape by making the drugs

NTDs proliferate in areas where large numbers of people do not have access to adequate health care, clean water, sanitation, housing, education and information.

Bo District, Sierra Leone, where significant strides have been made in tackling NTDs across the country. Photo © Romina Rodríguez Pose/Overseas Development Institute.

accessible for the poorest countries, with PCT becoming the most common approach to treating the five major diseases.

- **PCT** involves a single dose of medication once or twice a year, usually administered through large-scale distribution of medicines, known as mass drug administration (MDA). For MDA to be successful, not fewer than 65%–80% of the total population living in endemic areas have to take the drug. As such, it is often administered by community volunteers and teachers, allowing delivery to large numbers of people also in remote areas (WHO, 2010).[4]
- **Intensified case-management** involves caring for infected individuals and those at risk of infection. This intervention is the principal strategy for controlling those NTDs for which no preventive medicines are available, such as Buruli ulcer, Chagas disease, human African trypanosomiasis, leishmaniasis, leprosy and yaws.[5]
- The **control of vector-borne diseases** that are transmitted by insects, snails or crustaceans often requires the use of pesticides.
- Vector management is strengthened through provision of **safe water, sanitation and hygiene** and close collaboration within sectors responsible for health, agriculture, irrigation and the environment.
- Finally, **veterinary public-health measures** are also crucial in tackling NTDs since much of the morbidity and mortality resulting from NTDs arises from zoonotic diseases (for example, anthrax, bovine tuberculosis, brucellosis, cysticercosis, echinococcosis, rabies and zoonotic trypanosomiasis).

Why NTDs are important for progress in health and their linkages to other MDGs

NTDs are found and proliferate in areas where large numbers of people do not have access to adequate health care, clean water, sanitation, housing, education and information. Arguably, therefore, by treating the NTD, we can accelerate progress in a range of complementary development areas, such as poverty, nutrition, water and sanitation, women's empowerment and education.

NTDs have wide cross-cutting and cross-sectoral linkages and effects; they are linked to almost all MDGs, and efforts to ease their impact represent a largely unexploited opportunity to alleviate poverty and have a direct impact on the achievement of the MDGs. This section explores the linkages between NTDs and

other areas of development using the MDGs framework as a platform for the analysis.

MDG 1 – Eradicate extreme poverty and hunger[6]

Hunger and malnutrition. Anaemia and malnutrition are common side effects of several NTDs (Mistry, 2012). NTDs have a direct impact on nutrition because parasites (found in soil-transmitted helminths (STHs), for instance) consume key nutrients that a person needs to be healthy, considerably reducing the impact of food aid and other forms of nutritional transfers (UKCANTDs, 2012; African Union, 2013).[7] They also have an indirect impact on nutrition and food security more generally, since farmers affected by NTDs are less able to work and produce crops needed to feed themselves and their families, therefore resulting in lower productivity. Thus, controlling and eliminating NTDs is conducive to improving health outcomes and agricultural productivity.

Economic development and poverty. A strong and healthy workforce is critical for economic development. The disabilities, disfigurement and debilitating effects (including mental health impacts) of NTDs not only prevent adults from working, providing for their families and contributing to the economic development of their countries, but they also generate additional care burdens. At the household level, this results in generations becoming trapped in a cycle of increased medical costs, poverty and disease; at the macro level this implies significant economic losses for countries.

A study conducted in the southern USA estimated that being treated for hookworm throughout one's childhood led to an increase of approximately 40% in future wages (Bleakley, 2007). In the same vein, a study covering the long-term impact of deworming in Kenya showed that future earnings are up to 29% higher for children targeted by the campaign, while hours worked increased by 12% and work days lost to illness decreased by a third (Baird et al., 2011). Finally, a study of lymphatic filariasis (LF) in India showed that every year $842 million are lost due to treatment costs and reduced working time, equivalent to $2 per person resident in endemic areas (Ramaiah et al., 2000; Ottesen et al., 2008).

MDG 2 – Achieve universal primary education

NTDs limit educational outcomes as the severe malnutrition and anaemia they cause result in children being too sick to either attend or perform well in school. Moreover, children are often withdrawn from school to care for parents and others who may be disabled and/or suffering from NTDs.

In Kenya, school-based deworming has been shown to add a year to the average child's education.

A nurse marks a child's hand after administering deworming medicine, Shinile Woreda, Ethiopia. Photo © Staff Sgt. Kat McDowell/US Air Force.

Several studies have highlighted the positive impacts on children's health, nutritional status, cognitive function and educational achievement of deworming projects (Jukes et al., 2008; Miguel and Kremer, 2003; Baird et al., 2011). In Kenya, school-based deworming has been shown to reduce absenteeism by 25%, add a year to the average child's education and, in terms of value for money, was found to be far cheaper than alternative ways of increasing school participation (Jameel, 2007; Miguel and Kramer, 2003).

Similarly, Bleakley (2007:75) found that 'after hookworm eradication, school enrolment, regular school attendance, and literacy increased markedly [and that] a child infected with hookworm had a 20% lower probability of school enrolment'. As a consequence, 'schools are key to worm-control efforts because they provide the setting to treat children and provide health and hygiene education' (Mascie-Taylor et al., 2003, quoted in Wannak et al., 2010).

MDG 3 – Promote gender equality and empower women

Evidence shows that, given gendered division of household tasks, women and girls are more affected by NTDs than boys and men; as they are usually in charge of washing clothes and collecting water,[8] they are more exposed to contaminated water and therefore schistosomiasis and other water-borne diseases (McDonald, 2011).

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A local health worker distributes vaccines during an immunisation campaign in Nigeria. Photo © Gates Foundation.

Some NTDs are both specific to women and girls and/or affect them more severely. In sub-Saharan Africa, for instance, female urogenital schistosomiasis (UGS) causes severe pain, bleeding and lesions in more than 16 million women and girls. Similarly, lymphoedema (of which LF is the primary cause) occurs more frequently in women and often affects the breast and vulva (Hotez, 2009).

The scarring and disfigurement resulting from NTDs results in stigma and can prevent young women from marrying or can be grounds for spousal abandonment (Weiss, 2008). Research conducted in Sri Lanka showed that women with LF can lose their jobs and be abandoned by their families (Perera et al., 2007; Hotez, 2009).

Finally, given that women are disproportionally affected by poverty, illiteracy, lack of education, lack of land ownership and lack of political voice and power, these all act as barriers for health-seeking behaviours (McDonald, 2011). In this context, empowering women becomes crucial in the fight against NTDs.

MDG 4 – Reduce child mortality
MDG 5 – Improve maternal health

From a reproductive health perspective, NTDs can also exacerbate a number of pregnancy-related complications. For instance, chronic hookworm infection and schistosomiasis are major causes of anaemia, which can cause low birth weight and an increased risk of maternal mortality. Deworming has also been shown to be an important strategy for improving pregnancy outcome and reducing maternal morbidity and mortality (McDonald, 2011).

In terms of the link between NTDs and child health, STH infections and schistosomiasis represent the most common infections of children worldwide; together they represent the leading cause of physical-growth retardation in children and reduced cognitive function and memory loss. Periodic treatment for these NTDs therefore represents a major child-survival intervention (McDonald, 2011).

MDG 6 – Combat HIV/AIDS, malaria and other diseases

There is a significant geographic overlap between the big three diseases (HIV/AIDS, TB and malaria) and the highest-prevalence NTDs, and there is an increasing body of evidence supporting the fact that NTDs might promote susceptibility to, or worsen the course of, the big three (Hotez et al., 2011). Studies in Tanzania and Zimbabwe have shown a threefold increase in sexual transmission and incidence of HIV/AIDS in women with genital ulcers caused by UGS and/or helminthiases (Downs et al., 2011; Kjetland et al. 2006).

Other studies have also shown that NTD treatment might help reduce HIV viral load and therefore transmissibility of HIV: girls receiving periodic praziquantel treatments against schistosomiasis are less likely to acquire

HIV; pregnant women who receive anthelmintic drugs against parasitic worms (helminths)are less likely to pass the HIV virus to their foetus; and PCT for helminth infections may reduce HIV transmission among children and young adults by reducing viral loads (Hotez et al., 2011). Thus, integrating NTD control strategies and HIV education and treatment has the potential to generate positive synergies to tackle both diseases (Manne and Maciag, 2011).

TB has been associated with the presence of certain NTDs. For instance, in Africa the number of different helminth species with which a person is infected increases the chance of acquiring TB. Regarding the link with malaria, there is some evidence (although conflicting) that keeping children helminth-free through frequent and periodic deworming may reduce susceptibility to malaria (Hotez et al., 2011).

MDG 7 – Ensure environmental sustainability

Improvement in water, sanitation and hygiene (WASH), which is a key component of MDG 7, is also integral in the fight against NTDs. Insufficient or dirty water, poor hygiene practices, as well as limited or no access to sanitation, are at the core of the cause of infection for several NTDs. Thus improving WASH can reduce trachoma by 27%, ascariasis by 29% and schistosomiasis by as much as 77% (Esrey et al., 1991). Similarly, provision of safe drinking water (e.g. protected wells, boreholes) has been fundamental in the success of guinea worm elimination. Emphasis on disease prevention through improved WASH are key to sustain the benefits of treating NTDs (Nigut, 2012).

MDG 8 – Develop a global partnership for development

The NTDs agenda has moved forward in a way that is arguably quite unique in the field of development: it has been characterised by strong global partnerships, which, generally under the leadership of the WHO, have proved key to tackling the diseases effectively and have helped to mobilise resources (WHO, 2010).

The successful Onchocerciasis Control Programme in West Africa and the African Programme for Onchocerciasis Control are good examples of these partnerships.

The NTDs agenda has been characterised by strong global partnerships, which have proved key to tackling the diseases effectively.

Above: Participants wait at dengue clinical trials, Ratchaburi hospital, Thailand. Photo © Sanofi Pasteur.
Below: Nurses sort doses of deworming medication, Shinile Woreda, Ethiopia. Photo © Staff Sgt. Kat McDowell/US Air Force.

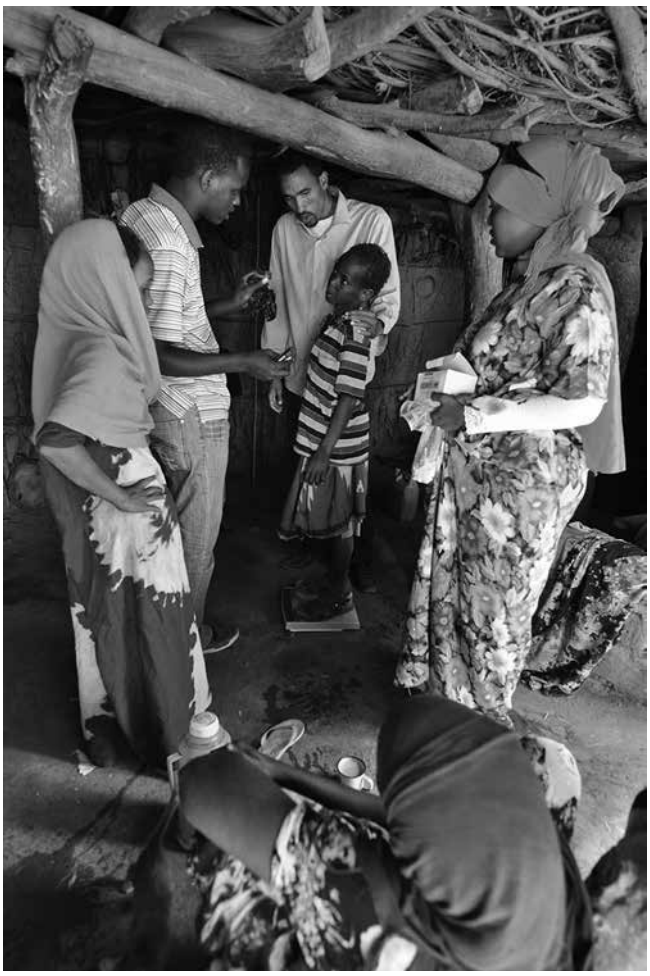
Such partnerships have brought together a broad range of actors, including governments and other stakeholders in endemic countries, international agencies, pharmaceutical companies, international non-governmental organisations, academia, civil society and UN agencies (Molyneux, 2012).

As explained below, these partnerships gained even more relevance after the engagement of the pharmaceutical companies, which pledged to donate the drugs needed to eliminate and eventually eradicate NTDs.

Promising approaches

While there is still much left to explore in terms of NTDs,[9] a broader analysis – one that goes beyond the technical and epidemiological to include the political, sociological and economic – is useful. In a review of literature and drawing from our own initial case study research, certain approaches begin to emerge as promising in addressing NDTs.

Leveraging existing infrastructure/platforms. Evidence shows that the countries most able to make progress are those that have incorporated NTDs into existing programmes and structures. Sierra Leone, for example, used the Onchocerciasis Control Programme established in 1988 (prior to the civil war) to implement its National NTD Control Programme, which by 2010 had reached national coverage (Hodges et al., 2011).



Nursing students dispense medication in Shinile Woreda, Ethiopia. Photo © Staff Sgt. Kat McDowell/US Air Force.

Likewise, the integrated national NTD Control Program in Mali was implemented through the primary health-care system using community health workers and community drug distributors (Dembélé et al., 2012). School-based deworming programmes have been extremely successful in a number of countries in South-East Asia, including for instance in Cambodia (Luong, 2003). Thus building on existing structures is critical.

Successful private–public partnerships lead to cost-effective treatment. 'Public–private partnerships (PPPs) in NTDs have led to the biggest single health venture in the history of disease control' (Bush and Hopkins, 2011:169). Unprecedented donations have been pledged by major pharmaceutical companies, with an estimated annual value of $2 billion in the past few years.

A range of constituencies are involved in these PPPs; in particular, NGOs, working in partnership with governments, have played a critical role in advocacy, resource mobilisation and implementation. Their technical assistance has helped governments to develop community-based methods of drug distribution, ensuring that 'essential drugs' reach those most in need (Bush and Hopkins, 2011). PPPs have also allowed NTDs to be treated in an extremely cost-effective way – treating one person for all seven major NTDs costs approximately 50 cents per year (Conteh et al., 2010; Sinuon et al., 2005, Goldman et al., 2007).

Potential linkages with health system strengthening (HSS). According to some studies (CDI Study Group, 2010; Cavalli et al., 2010), various key informants and preliminary findings from the Sierra Leone case study, integrating NTD strategies into health systems has the potential to contribute to their strengthening through capacity-building of the health workforce and the

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Without addressing these diseases, the broader aim of poverty alleviation is unlikely to be achieved.

Health extension worker in Tehuledere Woreda, South Wollo, Ethiopia. Photo © UNICEF/Ethiopia.

introduction of procedures and elements that benefit the health system more broadly (e.g. supply chains for drug delivery, systems for monitoring, surveillance and evaluation, and mechanisms for engaging community action). More research on this is needed.

Sensitisation and community involvement. Awareness-raising using information, education and communication tools, as well as outreach practices encouraging community members to be in charge of sensitisation and treatment provision, have proven effective in controlling/eliminating NTDs and accessing hard-to-reach populations.

The use of volunteers as community drug distributors has built a sense of community ownership, as has the involvement of traditional leaders and elders in spreading messages and supporting MDA campaigns (according to the preliminary findings from our Sierra Leone case study). Such activities and mechanisms have also provided entry points for other area/sectors for which community sensitisation and engagement are critical, e.g. health education, water and sanitation, and broader education.

Remaining challenges

For NTDs to remain in the public eye there needs to be ongoing commitment and support at the highest level within each country as well as at regional and international levels. Drawing on discussions on the linkages to MDGs and to broader poverty-reduction agendas will help ensure that NTDs remain on programmers' and policy-makers' agendas. The recent proposal to include NTDs as a health goal in the post-2015 development agenda (UN High-Level Panel Report)[10] and the latest World Health Assembly (WHA) Resolution on NTDs[11] are encouraging steps forward.

Health post in Bilinyang village, near Juba, South Sudan. Photo © Arne Hoel/World Bank.

The ODI case studies currently under way in Sierra Leone and Cambodia will further add to the knowledge base on how to achieve progress in NTDs.

That said, a few remaining challenges stand out.

Policy priority. Clearly, different countries have different priorities within the health sector. Although NTDs have a large impact on morbidity, this occurs over a longer time frame and as such can be relegated to a lower priority level relatively easily. Ongoing advocacy, maintaining NTDs in the public eye and policy-makers' consideration and, in particular, making the linkage to other MDGs and to broader poverty are all critical. Without addressing these diseases, the broader aim of poverty alleviation is unlikely to be achieved.

Supply and demand. Without working on demand-side measures, supply-side initiatives will not be successful, and vice versa. On the supply side, among others, financing, staffing, infrastructure, supply chains, training and incentives for staff, and monitoring and surveillance systems need to be in place. On the demand side, awareness-raising, addressing stigma, information/education and community

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Health workers stand ready to begin vaccinating in Burkina Faso. Photo © PATH/Gabe Bienczycki.

involvement are all measures that have proven to be fundamental in addressing challenges associated with NTDs, and they need to be continued.

Data. Most countries have scanty or non-existent data on the status of NTDs. There is a need for the standardisation of data-management systems and common agreement on how to access this data, recognising that this can lead to sensitivities about ownership.

Over the past decade, many countries have started mapping NTDs as data on endemicity and baseline prevalence allows for specific objectives to be measured. Since PCT has made a breakthrough in this field of health, programmes' therapeutic and geographical coverage of MDA are also being used as a proxy to measure progress and are being reported by WHO annually. However, more mapping is necessary to understand more accurately the status of these diseases.

Culture, norms, traditions and beliefs. Historically, NTDs have been linked with witchcraft and other beliefs relating to, for example, bad behaviour – the disease is seen as punishment. These beliefs often result in stigma, silence and hiding, with people resorting to traditional healers and other forms of informal treatment and self-treatment, all of which may be counterproductive and detrimental to controlling and eventually eliminating NTDs, as well as being costly to poor families. Hence awareness raising, information and education at all levels (local, district, national) as well as the need to work with a range of people, including formal and informal health providers, traditional leaders and religious organisations, is critical.

Crossing borders. Given the nature of NTDs, a country- or state-specific approach is often insufficient. Non-state actors who can cross borders relatively easily, e.g. NGOs or faith-based organisations, as well as other regional or global partnerships and networks, have a critical role to play in the fight against both NTDs and a range of other diseases that neither recognise nor are controlled by borders.

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Endnotes

1. See www.developmentprogress.org. As part of this phase of Development Progress, two case studies looking at progress in NTDs will be conducted in Sierra Leone and Cambodia. A further two case studies are being conducted on progress in maternal health in Nepal and Mozambique.
2. See www.developmentprogress.org/sectors/health. The first phase of Development Progress took place between 2009 and 2011, with case studies focused on progress in health systems and taking place in Bangladesh, Rwanda and Eritrea.
3. In 1987, Merck & Co. Inc. created the Mectizan Donation Program by donating ivermectin for the treatment of onchocerciasis. Later on, other laboratories came on board (among others, Pfizer started the donation of azithromycin for trachoma control (1997) and GlaxoSmithKline (GSK, then SmithKline Beecham) with albendazole for LF (1998) (WHO, 2010; Bush and Hopkins, 2011).
4. Some individuals are not eligible to take these drugs – children under two or five years old, pregnant women or the very sick.
5. Drugs might be available but some are toxic and some require long courses of treatment, and sometimes access to these drugs is difficult.
6. For a full listing of the MDG goals and their indicators see http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm
7. See also www.globalnetwork.org
8. According to WHO and UNICEF (2008), women account for 64% of water collection globally, while men account for 25%.
9. www.irinnews.org/report/98175/despite-decade-of-innovation-much-left-to-do-on-neglected-tropical-diseases
10. www.sabin.org/updates/blog/ntd-control-eradication-poverty-2030
11. http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_20-en.pdf

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