



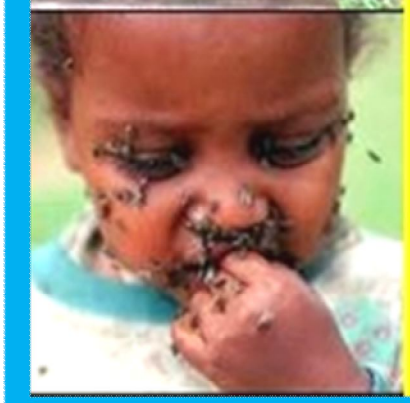

Efforts to stem the *neglect* of Neglected Tropical Diseases in Nigeria

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Cover pictures sources, clockwise:

Neglected tropical Diseases Control Program – Trachoma; available at http://www.theaccessproject.com/index.php/about/ntd/ [accessed March 2, 2011]

DNA Genotek's Sample Collection Blog; available at http://blog.dnagenotek.com/blogdnagenotekcom/?Tag=tropical%20disease [accessed March 2, 2011]

The AIDS funding dilemma available at http://www.miller-mccune.com/health/the-aids-funding-dilemma-16202/ [accessed March 2, 2011]

Neglected Tropical Diseases to be battled by new consortium available at http://www.ngpharma.eu.com/news/Neglected-tropical-diseases-to-be-battled-by-new-consortium/ [accessed March 2, 2011]

The Sandler Center for Basic Research in Parasitic Diseases available at http://www.sandler.ucsf.edu/ [accessed March 2, 2011]

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Introduction

Neglected Tropical Diseases, otherwise known as NTDs, occur commonly in rural and poor areas of low-income and middle-income countries. They are defined as a group of poverty-promoting chronic infectious diseases. This definition is based on a variety of reasons: their impact on child health and development, pregnancy, and worker productivity of infected persons, as well as their stigmatizing features[1]. The burden of NTDs is comparable to one-half of malaria, and more than twice the disease burden of tuberculosis in sub-Saharan Africa[2]. These statistics are alarming and provide a compelling argument for controlling and ultimately eliminating NTDs. However, globally and particularly in Nigeria, more attention is given to the fight against malaria, AIDs and tuberculosis. This neglect has led to severe physical, psychosocial and economic consequences on the poorest, most marginalized populations of the developing world[3]; despite the fact that NTDs are categorized as important co-factors affecting the susceptibility and clinical response to co-infections with malaria, HIV and tuberculosis[4].

NTDs vary and could be helminthic, protozoan, bacterial, fungal or ectoparasitic as shown in the table below[5]:

NTD	**Disease**
Helminthic	Lymphatic Filariasis, Onchocerciasis, Schistosomiasis, Dracunculiasis, Soil-transmitted Helminthiases (Ascariasis, Hookworm Diseases, Trichuriasis, Strongyloidiasis)
Protozoan	Leishmaniasis, Human African Trypanosomiasis, Amebiasis, Chagas Disease, Giardiasis
Bacterial	Trachoma, Buruli Ulcer, Cholera, Leptospirosis Enteric pathogens (Shigella, Salmonella, E. coli) Leprosy, Relapsing Fever, Treponematoses (Bejel, Pinta, Syphilis, Yaws)
Fungal	Mycetoma, Paracoccidiomycosis
Ectoparasitic	Scabies, Myiasis

[1] PLoSNTDS (2010) Available at PLoS Neglected Tropical Diseases Journal Scope Available from http://www.plosntds.org/static/scope.action [Accessed May 7 2010]
[2] PLoS Negl Trop Dis. 2009 August; 3(8): e412
[3] Molyneux, D.H. et al. (2005) 'Rapid-impact interventions': how a policy of integrated control for Africa's neglected tropical diseases could benefit the poor. PLoS Med. 10.1371/journal.pmed.0020336 (http://www.plosmedicine.org)
[4] Hotez, P.J. et al. (2006) Incorporating a rapid-impact package for neglected tropical diseases with programs for HIV/AIDS, tuberculosis, and malaria. PLoS Med. 10.1371/journal.pmed.0030102 (http://www.plosmedicine.org)
[5] PLoSNTDS (2010) PLoS Neglected Tropical Diseases Journal Scope Available from http://www.plosntds.org/static/scope.action [Accessed May 7 2010]

The Nigerian case

The population of Nigeria accounts for approximately 20% of the population of sub-Saharan Africa and globally ranks among the top three endemic countries for guinea worm, river blindness, schistosomiasis, and elephantiasis[6]. There is paucity of data in Nigeria related to these diseases, however, data from Sub-Saharan Africa is instructive to gauge the extent of the challenges.

Though there are many actors working to control the spread of NTDs in Nigeria, the problem persists. TY Danjuma Foundation (TYDF) has firsthand experience in NTDs control. The Foundation's Founder and Chairman, General TY Danjuma provided support as a private individual to Mission to Save the Helpless (MITOSATH) for 10 years to address the NTDs scourge in his home state of Taraba. TYDF has continued its support of MITOSATH and has broadened its reach to include the reduction of burden and social economic consequences of Leprosy in Edo, Taraba and Zamfara States through its grantee, The Leprosy Mission, Nigeria (TLMN).

MITOSATH is a Non-Governmental Development Organisation (NGDO) committed to the control/elimination of Neglected Tropical Diseases (NTDs), Micronutrient Deficiency Control (MNDC) and support Community Based Rehabilitation (CBR) of the visually impaired in Nigeria. More information about MITOSATH is available at http://www.mitosath.org/

The Leprosy Mission Nigeria (TLMN) identifies hidden cases that are yet unreported as leprosy, treats such cases, rehabilitates the ones with deformities and provides sources of economic empowerment to people living with leprosy. More about TLMN is found at http://www.leprosymission-nig.org/about_tlmnig.htm

Globally, one billion people are affected by NTDs[7] and five key arguments for stemming the neglect of NTDs can be made:

1. Maternal health outcomes,
2. Child health outcomes,
3. Worsening of poverty
4. Loss of productivity
5. Integration of control measures

[6] Njepuome, NM et al (2009) Nigeria's War on Terror: Fighting Dracunculiasis, Onchocerciasis, Lymphatic Filariasis, and Schistosomiasis at the Grassroots, American Journal of Tropical Medicine and Hygiene, 80(5), 2009, pp. 691-698

[7] World Health Assembly, Geneva: Global Health Initiative presentation, available at http://www.globalhealth.gov/initiatives/05192010.html [accessed October 05 2010]

Maternal Health Outcomes

NTDs have serious maternal health outcomes and Schistosomiasis aptly demonstrates the link between NTDs and health outcomes in women, highlighting the ways in which it worsens reproductive and maternal health. Schistosomiasis is caused by trematode flatworms of the genus Schistosoma. New information reveals that the disease burden of schistosomiasis in Africa may be equivalent to malaria or HIV/AIDS[8]. Schistosomiasis is prevalent in tropical and sub-tropical areas, especially in poor communities without access to safe drinking water and adequate sanitation[9]. People become infected when larval forms of the parasite – released by freshwater snails – penetrate their skin during contact with infested water. The causative organisms infect the urinary bladder, the intestines and the Liver[10]. In urinary schistosomiasis, there is progressive damage to the bladder, ureters and kidneys while in intestinal schistosomiasis, there is progressive enlargement of the liver and spleen, intestinal damage, and increase in pressure of the abdominal blood vessels[11]. Women suffer considerably from female genital schistosomiasis which causes infertility, preterm labor, anaemia, menstrual disorders, and painful sexual intercourse[12].

The complication of Schistosomiasis that contributes to declining maternal health indices is anaemia. Generally, the main causes of anaemia are poor nutrition and infections which can coexist in the same individual and exacerbate anaemia[13]. The endemic poverty in our communities means that the poor have low nutritional status. This is complicated by lack of clean drinking water in rural communities; the process of fetching water for daily use exposes women and children to NTDs, such as Schistosomiasis, that lurk around these water sources. Schistosomiasis complications have strong implications in the attainment of the United Nations Millennium Development Goals (UN MDGs). The MDGs number 5 has the ambitious goals of reducing by three-quarters the maternal mortality ratio and achieving universal access to reproductive health[14]. Studies conducted over the last two decades provide evidence that the NTDs are important factors that impair reproductive health in developing countries, increase the transmission of sexually transmitted infections (STIs) and promote stigma and gender inequality[15].

[8] Hotez PJ, Fenwick A (2009) Schistosomiasis in Africa: An Emerging Tragedy in Our New Global Health Decade. PLoS Neglected Tropical Diseases 3(9): e485. doi:10.1371/journal.pntd.0000485
[9] Schistosomiasis Fact Sheet Available at http://www.who.int/mediacentre/factsheets/fs115/en/index.html [accessed September 4 2010
[10] Schistosomiasis available from http://www.merck.com/mmhe/sec17/ch196/ch196o.html [accessed September 4 2010]
[11] http://www.who.int/topics/schistosomiasis/en/
[12] Nour, NM (2010) Schistosomiasis: Health Effects on Women Reviews in Obstetrics and Gynecology. 2010;3(1):28-32 doi: 10.3909/riog0109
[13] http://www.who.int/water_sanitation_health/diseases/anemia/en/
[14] Goal 5: improve maternal health. Available from http://www.un.org/millenniumgoals/maternal.shtml [accessed August 30 2010]
[15] Hotez PJ (2009) Empowering Women and Improving Female Reproductive Health through Control of Neglected Tropical Diseases; PLoS Neglected Tropical Diseases 3(11): e559. doi:10.1371/journal.pntd.0000559

Child health outcomes

Child health outcomes of NTDs are closely linked to maternal health outcomes. The NTD that typically illustrates this relationship is Trachoma, which is an infection of the eye with the bacteria, Chlamydia Trachomatis. The pathology of Trachoma is such that it manifests gradually.

Facts about trachoma:

Trachoma is the world's leading cause of blindness and of the 500 million at risk, most of them are children and 75% of those blinded by it are women[1].

The effects of Trachoma become evident in adulthood when scarring from repeated infections causes the eyelashes to turn inward and scratch the cornea, leading slowly and painfully to complete blindness[1].

It brings with it discomfort, pain, disability, dependence, and deepening poverty. It does not kill people, it kills hope.

The infection is frequently passed from child to child and from child to mother, especially where there are shortages of water, numerous flies, and crowded living conditions[16]. Trachoma attacks infants as young as a few months of age, and keeps attacking children with recurrent infections. It is responsible for ending the education of many young children—girls particularly, who are taken out of school to help family members afflicted with the disease[17]. The girl child's discontinuing education creates long-term socio-economic consequences for the child and the society at large.

The World Health Organisation (WHO) recommends the SAFE (Surgery, Antibiotics, Facial Cleanliness and Environmental Sanitation) strategy for the treatment and prevention of Trachoma. The SAFE strategy which is; surgery to correct advanced Trachoma, antibiotics to treat infections, facial cleanliness to reduce the transmission of Trachoma and environmental improvement through increased access to clean water and improved sanitation[18]. TYDF's grantees work with this SAFE strategy in its work in communities through the interventions of MITOSATH and the rehabilitation of hand pumps implemented by Tulsi Chanrai Foundation[19]. Practical basic actions such as making

[16] Trachoma available at http://www.who.int/topics/trachoma/en/ [accessed October 17 2010]
[17] Bring on the light: The coming defeat of blinding trachoma, International Trachoma Initiative 10th Anniversary Report (page 1)
[18] SAFE Strategy available at http://www.trachoma.org/core/sub.php?cat=trachoma&id=SAFE [accessed October 20 2010]
[19] TCF-TY Danjuma Water Project available at http://www.tcfnigeria.org/events.htm [accessed October 29 2010]

children wash their faces as they enter schools in rural communities where Tulsi Chanrai Foundation works is contributing to the reduction of trachoma transmission.

Worsening of poverty and loss of productivity

In addition to their disproportionate impact on the poor, NTDs if not treated can persist for years or decades; thereby leading to disabling effects on child development, farm worker productivity and increase in the risks of pregnancy. Chronic hookworm infections in childhood reduce cognition, school performance, and future wage-earning potential by 40% or more[20]. All NTDs lead to loss in economic productivity and therefore worsen the existing poverty states of most communities in developing countries. To illustrate this, Onchocerciasis also known as river blindness is a major cause of blindness in African countries with severe socio-economic challenges. It is a parasitic disease caused by the filarial worm Onchocerca Volvulus and it is transmitted through the bites of infected simulium blackflies, which breed in fast-flowing streams and rivers[21].

Onchocerca volvulus worms

Black fly

Source: http://www.who.int/apoc/onchocerciasis/lifecycle/en/

Onchocerciasis is a systemic disease that is associated with decreased productivity[22], and the fear of blindness from onchocerciasis has led to the depopulation of fertile river valleys of the West African savannah, thereby greatly diminishing agricultural production and increasing poverty and famine[23]. Decreased economic activities worsen poverty and reduce people's access to treatment for the disease conditions. This results in a vicious cycle of disease and poverty.

[20] Gandhi's Hookworm available at http://www.foreignpolicy.com/articles/2010/01/21/gandhis_hookworms [accessed October 22 2010]
[21] Onchocerciasis available at http://www.who.int/apoc/onchocerciasis/en/ [accessed October 25 2010]
[22] Basáñez M-G, Pion SDS, Churcher TS, Breitling LP, Little MP, et al. (2006) River Blindness: A Success Story under Threat? PLoS Medicine 3(9): e371. doi:10.1371/journal.pmed.0030371
[23] Kevin Naidoo Poverty and Blindness in Africa Clinical and Experimental Optometry 2007; 90: 6: 415–421

Integration of control measures

Most control and treatment programs for NTDs focus on a single disease, but affected populations usually face the threat of more than one disease at a time[24]. To end the neglect of NTDs, innovative approaches to community health programmes are necessary. One of such approaches is the integration of primary health care services to address multiple disease conditions while saving costs. Small-scale efforts to integrate vertical NTDs programmes have been undertaken in several African countries In Nigeria, integrated distribution of anthelmintic treatments combined with insecticide-treated nets (ITNs) by community-based volunteers resulted in increased uptake of ITNs without an adverse effect on the coverage of Mass Drug Administration (MDA) of antihelminthics[25]. ITNs are very strategic in the prevention of malaria in pregnancy; as one of the causes of anaemia during pregnancy is malaria. So it can be argued that if anaemia is reduced or non-existent in pregnancy, the mother and baby would have better health outcomes despite other morbidities the woman may face during pregnancy, labor and after delivery of the baby.

MDA with safe oral antihelminthic drugs (Praziquantel, Ivermectin and Albendanzole) is the strategy for the control of onchocerciasis, lymphatic filariasis and schistosomiasis[26]. Research has shown that the integration of preventive chemotherapy programs targeting multiple NTDs with similar strategic approaches, offers opportunities for enhanced cost-effectiveness. This study estimates that if all targets for 2006 in Sub-Saharan Africa were met, savings of 26–47% can be projected from such integration (a cost of US $58–81 million versus $110 million for stand-alone programs)[27]. This integration involves the control of lymphatic filariasis, onchocerciasis, intestinal helminthiasis, schistosomiasis and trachoma; and will make resources available for interventions in other aspects of community health. The following are projected benefits of an annual integration of preventive chemotherapy programmes in Sub-Saharan Africa:

- 10.5 million Children protected from soil-transmitted helminthiasis (STH) disease (eg. Hookworm);
- 14.7 million adults protected from STH disease;
- 5 million cases of skin disease and itching prevented;

[24] Integrating programs to fight neglected tropical diseases available at http://www.cdc.gov/globalhealth/FETP/pdf/Nigeria_factsheet_JULY_2010.pdf [accessed October 28 2010]
[25] Jan H. Kolaczinski, Narcis B. Kabatereine, Ambrose W. Onapa, Richard Ndyomugyenyi, Abbas S.L. Kakembo, Simon Brooker Neglected tropical diseases in Uganda: the prospect and challenge of integrated control Trends in Parasitology, Volume 23, Issue 10, October 2007, Pages 485-493
[26] Frank O Richards et al Mass administration of schistosomiasis drugs in Nigeria Bulletin of the World Health Organisation 2006;84:673-676
[27] Molly A. Brady, Pamela J. Hooper and Eric A. Ottesen Projected benefits from integrating NTD programs in sub-Saharan Africa Trends in Parasitology Vol.22 No.7 July 2006

- 569, 000 women who will get pregnant within one year protected from anaemia;
- 105, 000 people prevented from getting severe kidney or bladder disease;
- 62, 500 cases of hydrocele prevented;
- 28, 400 cases of lymphedema prevented;
- 25, 500 cases of blindness prevented; and
- 4,600 people prevented from getting life-threatening liver disease.

Another innovative strategy is to educate communities affected by these diseases on the possibilities of improving quality of life, removing stigma attached to these diseases and providing economic opportunities. TYDF's 2010 grant to The Leprosy Mission Nigeria attempts to achieve all the above. The beneficiaries of TYDF leprosy grant gain from active search for leprosy cases, treatment of new cases, prevention of deformities, rehabilitation of deformities and economic empowerment of people living with leprosy.

It is pertinent to note that integration of control measures is not without its challenges. These include: difficulties in identifying cost-effective ways to map areas at high risk of NTDs; instituting the most suitable monitoring systems; and development of post-intervention surveillance strategies[28]

In conclusion, removing the "neglect" from Neglected Tropical Diseases in Nigeria and arguably across Sub-Saharan Africa is the only sustainable approach to controlling these diseases. This entails positioning NTDs at the center of policy discourse on community health. The millions of people affected by these diseases deserve our attention, commitment and collective resources to reduce the stigma and livelihood challenges associated with NTDs and assist them in living productive lives.

[28] M C Baker, E Mathieu, F M Fleming, M Deming, J D King, A Garba, J B Koroma, M Bockarie, A Kabore, D P Sankara, D H Molyneux (2010) Mapping, monitoring, and surveillance of neglected tropical diseases: towards a policy framework. Lancet 2010; 375: 231–38