

ours to shame. We may well find ourselves not the teachers we thought we were, but students of those who simply will not be stopped under circumstances that would have stopped us long ago.

Contributors and sources: DB is chief executive officer of the Institute for Healthcare Improvement and a leading authority on healthcare improvement in the United States. He is working with colleagues from the institute, the University Research Consortium in Bethesda, and the MacColl Institute for Healthcare Innovation in Seattle to better understand the proper application of healthcare improvement approaches in developing settings.

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Linking disease control programmes in rural Africa: a pro-poor strategy to reach Abuja targets and millennium development goals

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The effectiveness of programmes to tackle malaria could be improved by linking them to initiatives to prevent other diseases

The global community has committed itself to halving the morbidity and mortality from malaria worldwide by 2010 through the Roll Back Malaria initiative (box).¹ This goal was endorsed by the African heads of state at a summit held in Abuja, Nigeria, in April 2000.² The leaders set three targets to achieve by 2005: 60% of malaria patients to have prompt (within 24 hours of malaria attack), affordable, and appropriate treatment; 60% of all pregnant women to have access to preventive presumptive intermittent therapy; and 60% of children under 5 years and pregnant women to be sleeping under insecticide treated mosquito nets. However, progress is currently slow. We suggest how progress could be increased through linking disease control or elimination programmes under way in Africa to malaria control programmes. These programmes, many of which are based on drug donations, bring additional public health benefits to affected populations such as reduced anaemia, improved nutrition, better child growth and development, and higher school attendance. Such a strategy would have a rapid effect on malaria morbidity and mortality among underserved populations.

Feasibility of targets

The tools for achieving the Abuja targets already exist—namely, insecticides, bed nets, and highly effective drugs. However, they are not being provided fast enough to the people who need them. Most malaria attacks are managed outside the formal health service as an out of pocket expenditure in the poorest

countries.³⁻⁵ Indeed, because of the AIDS epidemic, children with malaria may be orphans cared for by their grandmothers. Thus, for many countries in sub-Saharan Africa, assuring treatment within 24 hours after a malaria attack means that antimalarial drugs have to be available at an affordable price and in simple formulations from the lowest level of the healthcare system—that is, informal care givers in rural villages. It will not be easy for poor countries to reach this target of prompt treatment, especially if the more

Editorial by Yamey

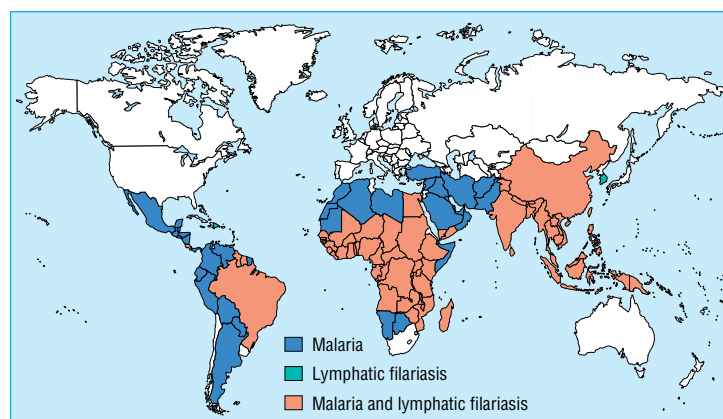
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Further examples of programmes that could be linked with malaria control are on bmj.com

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Map showing countries with endemic malaria and lymphatic filariasis in 2003

Roll Back Malaria strategies

- Providing prompt access to effective treatment, especially in young children
- Preventing and controlling malaria during pregnancy
- Promoting the use of insecticide treated mosquito nets as a means of prevention
- Dealing effectively with malaria in emergency and epidemic situations

effective, but more expensive, artemisinin based combination treatments are to be used. The donor community, governments of recipient countries, and the pharmaceutical industry need to redouble their efforts to make this happen.

The target is equally challenging for intermittent presumptive therapy for pregnant women. Antenatal services are not readily accessible to pregnant women in rural areas in sub-Saharan Africa, largely because of household poverty and poor health infrastructure. A high proportion of women that attend antenatal services make one or just a few irregular visits, after which they deliver their babies at home without the aid of a qualified attendant.

The most effective approach to reducing morbidity and mortality from malaria among the poor and hard to reach populations in rural areas in Africa is to control the mosquito vector. Effective control of the vectors should also reduce the selection pressure for drug resistance against available drugs.⁶ Current emphasis in vector control is on the use of insecticide treated bed nets, with the aim of achieving 60% coverage. However, the approach recommended for sub-Saharan Africa—a voucher scheme for pregnant women—has had a slow uptake and may be insufficient to meet the target.

Under the scheme, touted as an example of public-private partnership, vouchers are given to pregnant women attending antenatal services. The women can use the vouchers to buy bed nets at local outlets at subsidised prices. However, since a high proportion of pregnant women in rural sub-Saharan Africa do not attend antenatal services, the voucher scheme misses them and their children. Moreover, malaria is a disease of poverty. The women receiving the vouchers may not be able to afford to pay for the nets, even at subsidised

prices, especially as they do not have control over the use of the household resources.

To achieve the Abuja targets and the United Nation's millennium development goals, African countries will need novel and creative approaches to increase access to preventive measures. Access to health care by needy populations is a particular challenge.

Another approach

We believe that an effective way to increase use of bed nets would be to link their distribution to other community driven global health initiatives that have similar requirements. This would improve access to poor and hard to reach populations and potentially save costs. It also offers the opportunity to extend other public health benefits (such as mass de-worming, immunisation, and provision of clean water) to hard to reach rural populations. Table 1 gives some examples of these initiatives.

The feasibility of our proposed strategy is shown by a recent, albeit limited, experience that linked the distribution of free nets to a measles vaccination campaign in remote rural districts in Zambia and Ghana.^{7 8} Through the measles immunisation campaign, families with children under 5 years old were readily targeted for distribution of nets. The immunisation campaign achieved the Abuja target for net coverage in one week. Follow up after the campaign showed that coverage for both the nets and measles vaccination in the poorest quintile was as high as in the richest quintile, showing that this approach can extend public health benefits to poor populations.

Linking with lymphatic filariasis

For both programmatic and technical reasons, the global programme to eliminate lymphatic filariasis lends itself particularly well to linkage with malaria control programmes. The programme aims to reach all eligible individuals living in areas at risk of lymphatic filariasis once a year to deliver single dose drugs. Many of these areas are also affected by malaria (figure). The programme ensures repeated access to entire populations and thereby makes it an ideal partner for other programmes where yearly contact with hard to reach populations is essential, such as distribution of insecticide treated nets.

Table 1 Health initiatives that could be combined with malaria control programmes

	Onchocerciasis	Lymphatic filariasis	Intestinal helminths/ schistosomiasis	Measles	Trachoma
Objective	To establish within 12 years, effective and self sustainable community based ivermectin treatment throughout endemic areas in Africa	Elimination of lymphatic filariasis as public health problem by 2020	Reduce morbidity and mortality; target school aged children through regular treatment	Global eradication	Elimination of blindness due to trachoma
Programme strategy or intervention	Community directed treatment with ivermectin	Annual drug treatment with diethylcarbamazine plus albendazole or albendazole plus ivermectin in areas co-endemic for onchocerciasis. Vector control where appropriate	Mass chemotherapy through community treatment and school health programmes, improve sanitation, health education	High vaccination coverage of susceptible people: Catch up campaigns Follow up campaigns Surveillance	SAFE strategy (surgery, antibiotics, face washing, and environmental improvement—clean water and sanitation)
Affected regions	19 countries in WHO's AFRO region	≥80 endemic countries in the tropics	All developing countries in tropics and subtropics; schistosomiasis particularly in Africa, South East Asia, and parts of the Americas	All except Americas	Global tropics

Further examples are available on bmj.com

Table 2 Broad antiparasite effectiveness (%) of single dose of drugs used to control lymphatic filariasis¹²

	Ivermectin	Albendazole
<i>Ascaris</i>	100	100
<i>Strongyloides</i>	95	45
<i>Enterobius</i>	85	85
<i>Trichuris</i>	10-50	40-60
Hookworm	0-20	95
<i>Larva migrans</i>	100	80
<i>Onchocerca</i>	95	—
Lice	100	—
Scabies	100	—

Albendazole is also effective against cysticercosis, hydatids, *Giardia*, trichomonads, *Microsporidia*, and *Cryptosporidia* but requires more than one dose.

In addition to the opportunity for repeated access to entire populations, technical similarities favour strong linkages between programmes to eliminate filariasis and control malaria. Lymphatic filariasis is transmitted by mosquitoes, and in sub-Saharan Africa and parts of the Pacific *Anopheles* species of mosquitoes are vectors of both malaria and the filarial parasite *Wuchereria bancrofti*.⁹ Vector control through insecticide treated nets has also been shown to protect against filariasis, although it is not part of the recommended strategy to eliminate the disease. Indeed, in East Africa and Papua New Guinea bed nets, primarily deployed to prevent malaria, also greatly decreased transmission of filariasis, even without being impregnated with insecticide.^{10 11} Thus, joint control programmes have clear potential for enhancing public health benefits in rural communities in co-endemic regions.

The use of albendazole in the filariasis programme also reduces the anaemia caused by hookworm and *Trichuris* infections (table 2). This in turn will affect the anaemia associated maternal and infant and child morbidity and mortality closely linked to malaria.^{13 14} In addition, Spiegel et al reported a reduction in malaria episodes in children in Senegal who were not infected with helminths.¹⁵ The degree of protection conferred by a worm free status, estimated to be 10-fold, is equivalent to or greater than that conferred by the sickle cell trait.¹⁶ This finding, although needing to be repeated on a larger scale, suggests that filariasis control programmes could also reduce morbidity and mortality from malaria and helminth infection. Other well documented effects of deworming include improved nutritional status,¹⁷ better micronutrient uptake, improved cognitive development of children,¹⁸ increased weight gain,¹⁷ improved physical fitness and appetite,¹⁹ and increased school attendance.^{19 20}

The donated drugs supporting the programme to eliminate lymphatic filariasis (ivermectin from Merck and Co and albendazole from GlaxoSmithKline²¹) could become important incentives to communities for participating in bed net utilisation programmes. Uptake is likely to be even higher if the nets (preferably long lasting, insecticide treated nets) could also be given free to rural populations. Distributing free insecticide treated nets to these populations will increase their productivity, reduce out of pocket costs for treating malaria, and thereby help alleviate household poverty. An economically empowered community may be able thereafter to access other health services, including replacement of nets. Reimpregnation of nets

Further resources

- Roll Back Malaria www.rbm.who.int
- International Federation of Red Cross and Red Crescent Societies www.ifrc.org
- Global Initiative to Eliminate Filariasis www.filariasis.org
- Filariasis.net <http://filariasis.net>
- International Trachoma Initiative www.trachoma.org
- African Programme for Onchocerciasis Control www.who.int/ocp/apoc
- Regional Program for the Elimination of Onchocerciasis www.iadb.org/EXR/doc97/apr/rg4610e.htm
- Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria www.theglobalfund.org
- Schistosomiasis Control Initiative www.schisto.org
- Partnership for Child Development www.child-development.org
- Partners for Parasite Control www.who.int/wormcontrol/en

with insecticide may also be increased if the retreatments were provided alongside mass drug administration programmes targeting lymphatic filariasis, onchocerciasis, schistosomiasis, intestinal parasites, and trachoma.

The broader public health value of insecticide treated nets for controlling transmission of vector borne infections has been amply shown not only in malaria, but also for lymphatic filariasis,²² cutaneous leishmaniasis,²³ Chagas' disease,²⁴ and tick borne relapsing fever. The nets also reduce nuisance insects (*Culex* and *Cimex* bed bugs), which users often find the most value.

Making linkage work

Linkage of programmes to control individual diseases would provide greater health benefits at reduced costs to the healthcare system. The companies that manufacture drugs for elimination of onchocerciasis, filariasis, and trachoma have agreed to donate them for as long as required. Programmes currently focused on single diseases should now create linkages at national, district, and community level. Community workers already trained through complementary initiatives, such as the polio eradication programme, could be used for mass programmes to deliver drugs to treat filariasis and distribute insecticide treated nets. For instance, in the first annual mass drug administration in Zanzibar in 2001, over 4000 community workers, initially trained through other programmes, reached 76% of the 800 000 target population at risk of lymphatic filariasis in a well planned, single day, door to door campaign. Linking distribution of nets to such a campaign would deliver on the Abuja targets for coverage and also meet other health related millennium development goals.

Such integrated distribution strategies also reduce operational costs. The average cost for the delivery of free nets when linked to a measles campaign was \$3.74 (£2.07, €3.11) for each net delivered, of which \$3.42 was for the cost of a net, and only \$0.32 for distribution logistics.²⁵ These are among the lowest figures documented in Africa.

Summary points

The global community has committed to halving mortality from malaria by 2010

Current strategies focus on prompt access to treatment, presumptive treatment for pregnant women, and use of insecticide treated bed nets

Distribution of nets to hard to reach poor populations could be accelerated by linking it to programmes to control other disease

Such linkages offer other health benefits that could also have a positive effect on morbidity from malaria and enable Abuja targets to be achieved

Current Global Fund financing mechanisms present unique opportunities for dialogue and cooperation between programmes at all levels

Conclusions

A proactive pro-poor strategy linking well funded malaria control programmes to other community directed health initiatives, such as elimination of lymphatic filariasis, onchocerciasis, schistosomiasis, or trachoma and childhood immunisation, could greatly accelerate progress towards achieving the Abuja targets. These health initiatives, focused largely on full community participation, offer other public health benefits to the poorest and hardest to reach populations. The current financing mechanism through the Global Fund to Fight AIDS, Tuberculosis, and Malaria encourages broad partnerships at all levels and emphasises country ownership of the design and implementation of intervention programmes. This presents opportunities both for public health dialogue and for cooperation between programmes at national, district, and community levels. We urge a shift in malaria control strategies to maximise opportunities for bringing improved health to vulnerable communities.

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Endpiece

Deafness makes you depressed

[A]nd in the next year [1690] he [Anthony a Wood] found a deafness, first in his right, and afterwards in his left, eare, which continued more or less till death. This disaster he look'd upon as the first and greatest misery of his life. It made him exceeding melancholy and more retir'd; was also at great charge in taking physick and slops, to drive the noises out of hie ears, and Dr John Lamphire took a great deal of paines about them, but in vaine.

The life and times of Anthony A Wood.
Oxford: Oxford University Press, 1961:181

Simon Barley