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.

Competing interests: None declared.


(Accepted 17 April 2004)

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

David H Molyneux, Vinand M Nantulya

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
Further examples are available on bmj.com

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

Further examples are available on bmj.com
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. 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. 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. In addition, Spiegel et al reported a reduction in 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. 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, better micronutrient uptake, improved cognitive development of children, increased weight gain, improved physical fitness and appetite, and increased school attendance.

The donated drugs supporting the programme to eliminate lymphatic filariasis (ivermectin from Merck and Co and albendazole from GlaxoSmithKline) 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 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, cutaneous leishmaniasis, Chagas’ disease, and tick borne relapsing fever. The nets also reduce nuisance insects (Culex and Cimex bed bugs), which users often find the most valuable.

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 the healthcare system. The companies that would provide greater health benefits at reduced costs would support the onchocerciasis, filariasis, and trachoma programme.

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/ophc/apec
- Regional Program for the Elimination of Onchocerciasis www.iadb.org/EXR/doc97/apr/rgr4610e.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

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

<table>
<thead>
<tr>
<th>Drug</th>
<th>Ivermectin</th>
<th>Albendazole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascariasis</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Strongyloides</td>
<td>95</td>
<td>45</td>
</tr>
<tr>
<td>Enterobius</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Trichuris</td>
<td>10-50</td>
<td>40-60</td>
</tr>
<tr>
<td>Hookworm</td>
<td>0-20</td>
<td>95</td>
</tr>
<tr>
<td>Lymphonegranuloma minegrana</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>Onchocerca</td>
<td>95</td>
<td>—</td>
</tr>
<tr>
<td>Lice</td>
<td>100</td>
<td>—</td>
</tr>
<tr>
<td>Scabies</td>
<td>100</td>
<td>—</td>
</tr>
</tbody>
</table>

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

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.

Contributors and sources: DHM is professor of tropical health sciences in the University of Liverpool. He has worked on control of parasitic diseases (onchocerciasis, sleeping sickness, guinea worm, and lymphatic filariasis) over the past 20 years, particularly in Africa. VMN is senior adviser to the executive director of the Global Fund. He has published several research articles on immunology, parasitology, and public health.

Competing interests: The Lymphatic Filariasis Support Centre is supported by grants from the UK Department for International Development, GlaxoSmithKline, and the Bill and Melinda Gates Foundation. DHM is supported in part by GlaxoSmithKline, which donates albendazole to the global programme for the elimination of lymphatic filariasis. He is an observer on the Mectizan expert committee/albendazole programme for the elimination of lymphatic filariasis, onchocerciasis, schistosomiasis, or trachoma and lymphatic filariasis. VMN is senior adviser to the executive director of the Global Fund to Fight AIDS, Tuberculosis, and Malaria over the past 20 years, particularly in Africa. DHM is professor of tropical health sciences in the University of Liverpool. He has worked on control of parasitic diseases (onchocerciasis, sleeping sickness, guinea worm, and lymphatic filariasis) over the past 20 years, particularly in Africa. VMN is senior adviser to the executive director of the Global Fund. He has published several research articles on immunology, parasitology, and public health.

Competing interests: The Lymphatic Filariasis Support Centre is supported by grants from the UK Department for International Development, GlaxoSmithKline, and the Bill and Melinda Gates Foundation. DHM is supported in part by GlaxoSmithKline, which donates albendazole to the global programme for the elimination of lymphatic filariasis. He is an observer on the Mectizan expert committee/albendazole programme for the elimination of lymphatic filariasis, onchocerciasis, schistosomiasis, or trachoma and lymphatic filariasis. VMN is senior adviser to the executive director of the Global Fund to Fight AIDS, Tuberculosis, and Malaria over the past 20 years, particularly in Africa. DHM is professor of tropical health sciences in the University of Liverpool. He has worked on control of parasitic diseases (onchocerciasis, sleeping sickness, guinea worm, and lymphatic filariasis) over the past 20 years, particularly in Africa. VMN is senior adviser to the executive director of the Global Fund. He has published several research articles on immunology, parasitology, and public health.

Competing interests: The Lymphatic Filariasis Support Centre is supported by grants from the UK Department for International Development, GlaxoSmithKline, and the Bill and Melinda Gates Foundation. DHM is supported in part by GlaxoSmithKline, which donates albendazole to the global programme for the elimination of lymphatic filariasis. He is an observer on the Mectizan expert committee/albendazole programme for the elimination of lymphatic filariasis, onchocerciasis, schistosomiasis, or trachoma and lymphatic filariasis. VMN is senior adviser to the executive director of the Global Fund to Fight AIDS, Tuberculosis, and Malaria over the past 20 years, particularly in Africa. DHM is professor of tropical health sciences in the University of Liverpool. He has worked on control of parasitic diseases (onchocerciasis, sleeping sickness, guinea worm, and lymphatic filariasis) over the past 20 years, particularly in Africa. VMN is senior adviser to the executive director of the Global Fund. He has published several research articles on immunology, parasitology, and public health.