

Fixing Health Systems

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New Weapons in the War on Malaria

Halting the disease is crucial to improving overall health in Tanzania

Evidence showing the large impact of malaria on Tanzanians' health has provided the impetus for significant policy changes on how to treat and prevent the disease across the country. The fight against malaria is now proceeding on many fronts, from preventative measures such as the promotion of insecticide-treated bednets to the introduction of more effective treatments, such as new drug therapies.



IDRC: P. Bennett

Insecticide-treated nets provide vital protection against the mosquitoes that carry malaria.

A plastic bag hangs from the ceiling of a village clinic in Morogoro, Tanzania, where mothers and babies wait patiently for treatment. Inside the bag is a large colourful net. The picture on the bag shows an enormous mosquito held at bay by the symmetrical grid of a mosquito net. A few feet away, tacked up on a wooden door, a bright yellow poster depicts a warrior — shield and spear extended — ready to repel malaria-carrying mosquitoes. Still another poster shows a smiling mother and baby resting securely against the warrior's shield. The unmistakable message of all these images? That insecticide-treated nets (ITNs) provide vital protection against the mosquitoes that carry malaria. That message is being heard throughout Tanzania. As the message spreads, treated bednets are becoming increasingly common.

More than an illustration of the rising acceptance of ITNs, those posters are proof of the new prominence antimalaria efforts have acquired as health officials struggle to reduce Tanzania's high levels of mortality. The fight against malaria is proceeding on many fronts, from preventative measures such as the promotion of ITNs, to the introduction of more effective treatments, such as new drug therapies.

Combating a major killer

This multipronged effort comes in response to the realization of the high toll malaria takes on the health and well-being of Tanzanians. Statistics compiled by the Tanzania Essential Health Interventions Project (TEHIP) show that malaria accounts for roughly 30% of the country's burden of disease (BOD). In some districts, such as Morogoro, it is the largest single contributor to loss of life. Even those who survive can pay a heavy price, with recurrent bouts of debilitating illness.

This, in turn, has a large economic impact in countries where malaria is endemic. A recent study by the Centre for International Development at Harvard University and the London School of Hygiene and Tropical Medicine suggests that malaria-prone countries pay an economic "growth penalty" as high as 1.3 percentage points per year, with the cumulative effect that — when the loss is compounded over 15 years — the gross national product of those countries can be reduced by nearly 20%.

TEHIP — a joint project of the Tanzanian Ministry of Health and Canada's International Development Research Centre (IDRC) — contributed to this new focus on malaria. By developing a series of computer-based planning tools, TEHIP made it possible for District Health Management Teams (DHMTs) in two highly populated Tanzanian districts to weigh their budget commitments and priorities against the local BOD. The research showed that malaria accounted for 30% of the years of life lost to death and disease in the two regions. Yet, in 1996, only 5% of health budgets went toward malaria treatment and prevention. Today this has changed: spending on malaria has increased to 25% of the health budget.

In the test districts of Rufiji and Morogoro, DHMTs redirected funding priorities toward two large but previously under-supported problems: malaria and a cluster of childhood ailments that could be addressed collectively by a system of treatment known as the Integrated Management of Childhood Illness (IMCI). At the national level, the presentation of data showing the large impact of malaria on Tanzanians' health provided the impetus for significant policy changes on how to treat and prevent the disease across the country.

The two test districts' new focus on malaria and IMCI were mutually reinforcing. TEHIP Project Coordinator Dr Harun Kasale recalls that it was the districts' inability to effectively implement IMCI without changes to the standard procedure for treating malaria that led TEHIP to lobby the Ministry for a new antimalaria drug policy. Malaria, he recounts, was one of that interlocking group of childhood illnesses that IMCI was designed to address. Yet since chloroquine, the standard drug for treating malaria, had lost much of its effectiveness as the malaria parasite has grown increasingly resistant to the drug, IMCI could not significantly improve children's health until a better remedy was found.

A need for effective treatment

"We reported to the Ministry that IMCI would not work if we continued working with the wrong drug, chloroquine, because the research showed that resistance ranges from 50% to 70%," says Dr Kasale. "If you look at data from the surveillance, it showed that children suffering from malaria did attend the clinic, but they still died. That's because they were getting the wrong medicine. The Ministry did allow the districts to change to new drugs, and that meant that IMCI became a viable intervention using viable drugs — using credible, effective drugs."

At first it was decided to replace chloroquine with alternative drugs that would comprise three new tiers of treatment. The first-line drug for treating malaria would be sulfadoxine-pyrimethamine (SP), with amodiaquine (AQ) as the second line, and quinine as the third line (although quinine would be the first-line drug in severe cases). The problem that remained, however, was that resistance was already being observed with these new drugs: SP's treatment failure was calculated at 9.5%, and AQ's treatment failure was 4.6%.

It was therefore suggested to get ready to move to "combination therapy" (CT) in which malaria patients would be prescribed a course of pills containing more than one anti-malaria medicine. The advantage of CT to the patient is that if one drug fails, the other one takes over. More generally, it is believed that CT can slow the progression of drug resistance in malaria parasites. This resistance generally develops when a malaria parasite that is partially resistant to a drug survives long enough to reproduce. With combination therapy, however, the second drug kills the malaria parasite before it has an opportunity to pass on its genetic material, thus interrupting the process of selection of resistant strains.

A powerful demonstration effect

According to Dr Kasale, introducing more effective approaches for managing malaria has bolstered the public's confidence that the health system can deal with the disease. For instance, many mothers whose children suffered from late stage malaria with convulsions were reluctant to have those children treated in a health facility. Although malaria with convulsions is very dangerous — likely to lead to death — the condition, known in Tanzania as *ndegegede*, is often not associated with malaria, but to the presence of spirits or changes in the weather. These parents were more likely to consult traditional healers. This was reinforced by the fact that health practitioners conventionally gave the child an injection to treat the convulsions. "The parents also believed that if that child got an injection [to treat convulsions], that was a ticket for that child to die," says Dr Kasale.

To assuage parents' fears, practitioners in community health facilities opted for a new form of treatment to stop

the convulsions: they mixed valium with water and administered the solution rectally. "Within a minute the child is better," says Dr Kasale, adding that the child who is no longer convulsing can then be treated with oral anti-malarial drugs and transferred to a larger health centre for treatment.

This nearly instant recovery from convulsions had a miraculous impact on the public perception of the health system. "The health worker gave the child this treatment in front of the rest of the mothers," continues Dr Kasale. "After seeing the child recover without an injection, they were amazed. So the word went around, and mothers started bringing these children to the health facilities." Dr Kasale believes that this demonstration effect — patients seeing the beneficial results and then telling others about them — is one reason that attendance at clinics in Rufji and Morogoro has risen dramatically.

The efficacy of treated nets

Better treatment, however, is only half of the struggle against malaria. Policymakers and practitioners know that making inroads against this devastating disease also requires an effective prevention program. The main tool: insecticide-treated bednets.

According to Dr Kasale, communities have long understood that there are advantages to being shielded from mosquito bites. In Rufiji, for instance, many households used traditional woven grass sleeping bags to protect against mosquito bites. But while untreated nets and traditional barriers can reduce the nuisance factor associated with mosquitoes, they have their limitations. Mosquitoes can enter the net if it is torn or hung badly, and can bite any part of the body in contact with the net.

By contrast, nets treated with pyrethroid insecticides (ITNs) provide much more than a physical barrier; they actually kill or deter mosquitoes from feeding and drive them from their hiding places. Even a treated net with large holes in it provides as much protection as an intact one, reducing mosquito bites by up to 95%. Mosquitoes are killed by the insecticide before they can find a place to bite through the net or push through a hole. The Ifakara Health Research and Development Centre has determined that ITNs could avert 30 000 deaths and more than 5 million clinical episodes of malaria annually in Tanzania.

Research results summarized in *Net Gain: A New Method for Preventing Malaria Deaths*¹, a copublication of IDRC and the World Health Organization, indicate that ITNs could reduce child mortality by at least 17%. The benefits of using treated nets also accrue to the entire community. Recent evidence shows that a high-concentration of



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treated nets in a community will afford some protection to all people in the area, even those who do not own a bednet themselves.

Not surprisingly, promoting the use of ITNs has become a key weapon in health officials' battle against malaria. Because the high cost of the early treated nets — about US \$10 for a family-sized net — discouraged many people from purchasing them, the nets were promoted through a social marketing campaign in Tanzania, led by Population Services International, a nongovernmental organization, with support from the UK Department for International Development. These efforts proved effective at enhancing awareness of the benefits of ITNs, dramatically decreasing the cost of nets and increasing their use.

Today, the nets are widely available. As their popularity spread, the cost declined to about US \$4 and public health officials have turned their attention to those at highest risk from malaria — pregnant women and young children. The goal: to see 60% of children and pregnant women protected by a net by 2005. In the next phase of the national ITN strategy, every pregnant woman who visits a health centre will receive a voucher for a bednet. She can redeem the voucher for an ITN by visiting a private vendor. In turn, the vendor will be reimbursed after bringing the voucher to an authorized government agent.

Delivering multiple benefits

The voucher system is expected to bring multiple benefits. First, it transfers responsibility for procuring and distributing the nets away from overburdened community health workers to private manufacturers, wholesalers, retailers,

¹ *Net Gain: A New Method for Preventing Malaria Deaths*, edited by Christian Lengeler, Jacqueline Cattani, and Don de Savigny. IDRC 1996, ISBN 0-88936-792-2; 260 pp. http://web.idrc.ca/en/ev-9338-201-1-DO_TOPIC.html

and distributors. Second, it focuses on a particularly vulnerable group: pregnant women and young children. Research has shown that women infected with malaria during pregnancy are highly likely to deliver low birth weight babies. As well, infants quickly lose the immunity they may have acquired passively from their mothers. This makes them highly susceptible to malaria and a range of secondary conditions (anemia, malnutrition, febrile seizures, sudden cardiac arrest, and a general failure to thrive, among others) that are a direct result of malaria.

The voucher system also entices women who may not otherwise receive care to establish a relationship with a health facility. Offering a pregnant woman a voucher for an ITN — an item of significant value — is a powerful incentive for her to visit a clinic where she can receive antenatal care. The baby can also be immunized and mother and child can receive follow-up health care.

This is just one of the many ways in which more effective and integrated initiatives against malaria have become a cornerstone of broader efforts to revitalize Tanzania's health system.

This case study was written by Stephen Dale on behalf of IDRC's Communications Division.



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Public health officials have turned their attention to those at highest risk from malaria — pregnant women and young children.

www.idrc.ca/tehip

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Fixing Health Systems

More information on the capacity building of District Health Management teams in Morogoro and Rufiji can be found in *Fixing Health Systems*, by Don de Savigny, Harun Kasale, Conrad Mbuya, and Graham Reid. The book describes the Tanzania Essential Health Interventions Project – its origins, impact, important lessons, observations, and recommendations for decision-makers and policy analysts. The full text of the book is available on a thematic Web dossier, which leads the reader into a virtual web of resources that explores the TEHIP story:

www.idrc.ca/tehip.

More information on malaria control can be found at:

<http://www.rbm.who.int/>



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