

Popularizing Philanthropy for Developing World Research:

Fighting Malaria in Africa Goes Democratic via Internet

*British entrepreneur, 25, created world's top soccer website;
now teams with leading global health professors to innovate in malaria philanthropy*

Public offered chance of involvement in African malaria research projects

Philanthropy just got easier and a lot more accessible to the public thanks to the social networking power of the Internet and a ground-breaking partnership between a young British entrepreneur, a global health think tank and an African medical research institute.

Debuted April 20 to offer individuals a meaningful way to mark World Malaria Day (Friday, April 25), its creators hope www.MalariaEngage.org will do for African research what YouTube did for sharing videos and what eBay did for trading things – open it up in a creative and engaging way to the vast global community through the World Wide Web.

At MalariaEngage.org, people can enlist directly in the anti-malaria battle by contributing \$10 or more to an initial choice of seven highly varied projects involving selected scientists in developing countries. Over time, new projects will replace those that reach their funding goal (the original seven have objectives ranging from \$10,000 to \$50,000). The site features a discussion area where supporters can interact with researchers and each other, obtain news and photos of both funded and proposed projects, a running tally of money raised, and stories from the front lines in the war against the scourge of malaria.

Borne by mosquitos, malaria is a preventable disease that infects an estimated 515 million people yearly and kills between one and three million annually, the vast majority of them children in sub-Saharan Africa -- an estimated 3,000 child victims daily.

It is the leading cause of death in Tanzania, where the National Institute for Medical Research (NIMR) researchers proposed the initial suite of seven cutting-edge projects chosen to launch MalariaEngage.org.

The team behind MalariaEngage.org includes 25-year-old Tom Hadfield, a self-described “part-time student and full-time entrepreneur” who came to national attention in his native Britain when Soccernet, a website he developed as a high school student in his bedroom, was sold at age 17 to ESPN for \$40 million.

Honoured as a Global Leader of Tomorrow by the World Economic Forum in Davos, Switzerland, in 2001 and now studying at Harvard, Tom has parlayed his dot-com success and passion for launching entrepreneurial projects into innovative ways of tackling the planet's oldest and most intractable problems.

“It’s shocking that thousands of people are dying every day from a preventable disease,” says Hadfield. “When I came back from Africa last summer, a lot of people asked me what they can do to help.

“By encouraging individual participation and involvement, we will create international communities of common interest,” he says. “This is the essence of social networking – MalariaEngage.org connects people who want to help directly with researchers working in Africa on malaria prevention, treatment and capacity building projects. Everyone can help and I urge them to discover, learn, join, contribute, get results, share experiences and invite others to participate.”

Hadfield notes MalariaEngage.org will fit seamlessly into other social networking sites such as Facebook, whose users can add malaria research projects as a “cause” on their profile, join groups of project supporters, and communicate with others dedicated to helping eradicate malaria.

“When we tap into all that energy and creativity to promote and raise funds for malaria research projects, not just in Tanzania but elsewhere in Africa and the developing world, who knows what might be achieved?”

Hadfield co-founded MalariaEngage.org with leading global health professors Peter A. Singer and Abdallah S. Daar at Canada’s McLaughlin-Rotman Centre for Global Health at University Health Network and University of Toronto (MRC), the project’s lead partner.

Says Dr. Singer, MD: “Everyone recognizes that one of the most significant ethical challenges facing the world today is the inequity in global health. Life expectancy in industrialized countries is 80 years and rising; whilst in many African countries it is 40 years and falling. The key ethical value underlying efforts to do something about these inequities is solidarity.

“Many young people in the US, Canada, Europe and other industrialized countries feel a sense of solidarity with kids in Africa, but there is not much they can do to act on this ethical intuition. MalariaEngage.org was designed to give them a channel to do something in practice about that ethical value of solidarity, to mobilize a vast untapped pool of support – not just to raise funds but also to create a worldwide community of people committed to changing the face of global health,” he says.

“Imagine a world where like-minded people in the US, Canada, Europe and other industrialized nations are tightly connected in efforts to find solutions to malaria – one of the great, and unnecessary, plagues affecting humankind.”

According to Dr. Daar, MD: “Malaria is an ongoing global health catastrophe that must be addressed by empowering researchers in the developing world to find solutions to their countries’ own problems through creative, properly capitalized research programs.

Tapping the talent and motivation of developing country scientists is critical if we're going to win this fight.”

If this initial proof of concept is successful, MalariaEngage.org will scale up by involving other African-based institutions fighting malaria, he adds.

Detailed descriptions of the seven malaria research projects follow.

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Plants that repel mosquitoes

The mosquito-repellant properties of certain plants and shrubs have been known for years but it wasn't until a few years ago that the idea of targeted plantings to fight malaria was put to the test at the Lukole refugee camp in Tanzania's Ngara district. When lantana, lemongrass, Mexican marigold, American basil and other seedlings were grown around camp houses, mosquito bites and malaria cases in the camp dropped significantly.

Hamisi Malebo, a NIMR researcher specializing in natural products, traditional medicine and traditional anti-mosquito agents and health systems, is principal investigator on a project to establish large-scale production of the seeds and seedlings of eight plants and shrubs known to repel or kill mosquitoes. The aim is to distribute seedlings and instructions on where and how to plant them to every malaria-prone region of Tanzania.

The main plant nursery will be established at Amani Medical Research Centre in north-east Tanzania, an area where malaria causes many deaths, especially among young children and pregnant women. Smaller nurseries will be established in 10 nearby villages with high infection rates. The other goal of Malebo's project is to extract the plants' oils to make mosquito repelling creams and lotions, as well as mosquito coils that burn for several hours.

Insecticide treated mosquito nets

Research in malaria-prone regions of sub-Saharan Africa shows that insecticide-treated mosquito nets (ITNs) can reduce infections by 50% and malaria-related child deaths by 20%. Despite the efforts of international aid agencies and NGOs, which have distributed millions of free ITNs throughout Africa, the lifesaving nets are not readily available in many of the rural areas where 80% of people at risk of getting malaria live.

NIMR research scientist Emanuel Makundi is leading a project looking for solutions to the problems of access – including the high cost of ITNs (\$6.50 each, putting them out of reach of many households) – as well as the social and cultural factors preventing more widespread use of the nets in malaria areas.

Muslims, for example, do not use white bed sheets as religious burial cloths are white. They will not use the white mosquito nets for the same reason. In coastal communities, some fishermen prefer to use the mosquito nets to catch fish.

The NIMR project is focusing on education, with particular emphasis on school children and youth groups as well as community leaders, local organizations, religious groups and traditional healers. Community owned resource persons (CORPs) are being recruited to lead the education initiative which will be reinforced with community-based payment and distribution programs.

Drug combination therapy

Combination therapy to treat malaria is the simultaneous use of two or more drugs that kill the plasmodium parasite in different ways. NIMR researcher Dr. Julius Massaga is investigating the combination of Artesunate, one of the artemisinin family of highly effective anti-malarial drugs, and artemether-lumefantrine, Tanzania's drug of choice for treatment of uncomplicated malaria.

The study is focusing on children under five. They are typically the most severe cases of malaria because they have developed no immunity through previous exposure. They need to be treated within 24 hours of the first symptoms to minimize the chances of simple malaria progressing to the severe complicated form of the disease which can be fatal.

Dr. Massaga is evaluating two different approaches to community-based treatment of infected children with Artesunate combination drug therapy:

- Mother coordinators (MCs) – the village is divided into segments and each segment has a “mother” trained to oversee malarial fever management in small children.
- Community owned resource persons (CORPs) – One person in each village is trained to support malaria case management and act as a service delivery point.

At the first sign that a child has contracted malaria, he is taken to the MC or CORP, who administers the first dose of combination drugs. The remainder of the three-day, six-dose regimen is administered at home.

If Dr. Massaga's study determines that this Home Management of Malaria (HMM) strategy is feasible, socially acceptable, safe and effective, it could lead health policy planners to focus on scaling up HMM programs throughout Tanzania.

Assessment of artemisinin drugs

Artemisinin is a strong antimalarial drug isolated from the Chinese anti-malarial traditional medicinal plant, *Artemisia annua*, commonly known as sweet wormwood. Artemisinin and its derivatives are the most powerful and efficient drugs ever discovered for the treatment of malaria.

Since 2000, artemisin-based combination therapies (ACTs) have become the first-line malaria treatment in the many African countries where drug-resistant strains of the disease have dramatically reduced the effectiveness of chloroquine and sulfadoxine / pyrimethane.

Tanzania is one of the countries where ACT (artemisinin in combination with artemether-lumefantrine) has had excellent results. But many factors keep this treatment from reaching residents of the poor rural communities who need it most, including lack of health services in remote areas, distribution problems and cost.

Scientist Emanuel Makundi of NIMR will examine a range of issues related to ACTs – accessibility, affordability and drug use compliance – to discover the extent to which the new treatment has penetrated public and private health facilities at the community level and how access can be improved for poor people in rural areas.

Intermittent Preventive Treatment for pregnant women

Pregnant women and their unborn children are particularly vulnerable to the ravages of malaria. Maternal infection during the second half of pregnancy causes impaired foetal weight gain. Malaria infection of the placenta and malaria-caused maternal anaemia can lead to low birth weight, which contributes to higher infant mortality and impaired development.

Malaria causes an estimated 8-14% of all low birth weight babies and 3-8% of all infant deaths in malaria areas of Africa. For the mothers, malaria is responsible for up to 15% of the 10,000 deaths from maternal anaemia in Africa each year.

Intermittent preventive treatment (IPT) – giving pregnant women preventive treatment doses of an effective antimalarial drug in the second and third trimesters – has been shown to be a safe, inexpensive and effective way to save the lives of mothers and their babies by reducing placental infections, maternal anaemia and low birth weight.

NIMR research scientist Dr. Julius Massaga is leading a wide-ranging education campaign to increase IPT coverage throughout rural Tanzania. While health workers are trained in the proper implementation of IPT, patients are targeted through media campaigns and community health education sessions explaining the benefits of the IPT strategy.

Sweet wormwood as a herbal remedy.

For many centuries, Chinese herbalists used the sweet wormwood plant (*Artemisia annua*) as a kind of all-round wonder drug. A tea made from its leaves was used to treat malaria as well as fevers, colds, diarrhea and bleeding. A poultice of leaves was placed on boils, abscesses and nose bleeds.

Western researchers began to focus on the plant's specific anti-malarial properties in the early 1970s when they isolated and tested the active ingredient artemisinin. Subsequent

trials have shown it to be a very effective malaria drug, even against multi-drug resistant strains of the disease.

But while access to the expensive artemisinin group of drugs is still problematical, especially for people living in the remote rural areas of Tanzania where malaria strikes most frequently, the sweet wormwood plant will grow virtually anywhere and is common throughout Africa.

NIMR scientist Vitus Nyigo leading a project to validate the safety and effectiveness of sweet wormwood as a cheaper, standardized malaria herbal remedy for use in remote rural areas. He is conducting clinical trials with malaria patients and investigating a concoction of sweet wormwood and two other plants he believes may help to synergize the parasite-killing properties of artemisis annua.

Improving collaboration between traditional healers and health workers

The relationship between traditional healers and health workers is often an uneasy one. The traditional healer may fear a loss of prestige and patients when health workers come to his village. Medical personnel, for their part, are often reluctant to cooperate with healers out of a genuine, but sometimes misplaced concern that their methods may harm the patient.

In the case of young children infected with malaria, traditional healers were often blamed for delaying medical treatment while they tried to drive out the evil spirits they believed were causing degedege or malarial convulsions.

That began to change in Tanzania thanks to a project to convince traditional healers and community members that when a child has the symptoms of severe malaria – convulsions and coma – the anti-degedege ritual must be postponed until after the patient receives urgent medical attention.

By actively involving traditional healers as treatment partners and encouraging them to refer young malaria victims to health facilities for immediate attention, the project lowered malaria mortality rates in the study area.

Building on that success, NIMR research scientist Emanuel Makundi's project will look for ways to further improve communication and collaboration between traditional healers and health workers in addressing child malaria in remote rural communities.

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The McLaughlin-Rotman Centre for Global Health, Program on Life Sciences, Ethics and Policy is based at the University Health Network and the University of Toronto. Created in 2001 and led by Professors Abdallah Daar and Peter A. Singer, the program works at the nexus of life sciences, the developing world and entrepreneurship, using scholarly research to help move health technologies from “lab to the village.” For more information: www.mrcglobal.org