

TIGHTENING THE NET AROUND MALARIA

Brian Greenwood has spent 30 years working in sub-Saharan Africa coming up with ways to control malaria among other things. **Geoff Watts** talks to the man who is one of the joint winners of the Hideyo Noguchi Africa Prize

THE HIDEYO NOGUCHI AFRICA PRIZE

The Hideyo Noguchi Prize, funded by the Japanese government, comprises two separate awards: one for medical research in Africa; the other for medical services to the continent. Dr Hideyo Noguchi, who died in 1929, was a Japanese bacteriologist who joined the then Rockefeller Institute for Medical Research in New York where he worked on snake venoms, smallpox, and yellow fever vaccines, the diagnosis of trachoma, and on *Treponema pallidum*. He also travelled extensively in Central and South America and, in 1928, went to Africa. He died of yellow fever while working in Accra. The prize will be awarded every five years. The 2008 medical services award has gone to Miriam Were (left), a Kenyan doctor and chair of her country's National AIDS Control Council. She won it for her efforts at bringing basic medical services and health rights to women and children in rural East Africa.



In so far as attempts to thwart malaria have made progress in recent years, one man in particular is entitled to a share of the credit. He's Brian Greenwood of the London School of Hygiene and Tropical Medicine—and the recent decision to make him one of the joint winners of the newly created Hideyo Noguchi Africa Prize was a well deserved public acknowledgment of his personal contribution. The citation speaks of his bold and innovative work on the disease. At a time when malaria was spreading beyond restraint, it says, he contributed to the design and creation of strategies to control it.

Public health in Africa

Even for Professor Greenwood—a man who has spent 30 years working in sub-Saharan Africa and loves it—to say anything encouraging about the state of health of its people is not easy. Comparing things as they are today with the way they were when he first went there in 1965, he points to the many immunisation programmes that now exist at national level. “Roughly 70-80% of children get a measles vaccine. And the chances of a child surviving up to the age of 5 in most countries have doubled.”

But reality won't be denied. As he himself goes on to add, “Having 120 children out of a

thousand die by the age of 5 is hardly good.” Africa also has HIV—more of a hammer blow there than anywhere else. And the continent has a much older scourge: malaria. Worldwide it causes a million deaths annually, some 90% of them are among African children.

Treated bed nets

The bed nets treated with insecticide remain the most celebrated of Professor Greenwood's several contributions to tackling malaria. The net itself is an old idea, originally adopted to avoid the discomfort of being bitten. Later came the thought of dipping nets in kerosene, dicophane (DDT), or something equally nasty that might deter or even kill mosquitoes, and so increase the protection they offered. But the main advance depended on finding a substance to dip the nets in that neither smelt to high heaven nor posed a threat to human health as well as insect health.

“Common sense suggested that the net itself should reduce malaria,” says Professor Greenwood. “But no one had proved the point. So the first studies we did were of untreated bed nets.” In collaboration with the late medical entomologist Professor Chris Curtis, he showed that bed nets treated with insecticide did better. Bigger trials led to the creation of a national programme in

the Gambia, and of others elsewhere on the continent. “In the process we learned how to do intervention studies, which came in useful in the subsequent vaccine trials.”

Vaccines against malaria

A vaccine against malaria has been anticipated for decades, but still not achieved. Although a series of what seem like good ideas have failed to deliver, Professor Greenwood continues to believe that the biological hurdles can be crossed. Some 50 antigens have already been investigated, and even now there are 20 vaccine trials in progress. He thinks a product that is about to undergo phase III studies on 20 000 children is currently a good bet. “I'd be very surprised if it didn't reduce clinical attacks of malaria by 30% or 40%.” Paradoxically, the success of schemes like treated bed nets that reduce the prevalence of malaria also raise the bar to what constitutes success in a vaccine. If you've taken out 90% of the problem by non-vaccine methods, he points out, a relatively expensive and less than perfect vaccine that would have been seen as worthwhile now seems less so.

The Hideyo Noguchi citation also refers to Professor Greenwood's achievements in “reinventing field research” in tropical medicine. He laughs: “A bit over the top really. What they were getting at was that malaria research had mostly been done by entomologists and parasitologists. I tried to take a more

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BRIAN GREENWOOD: A LIFE IN BRIEF

Having trained at London's Middlesex Hospital Medical School and, driven by what he now rather sheepishly describes as "youthful idealism," Professor Greenwood (right) took the first opportunity he could to get a job in Africa. After two years in Nigeria at Ibadan's University College Hospital he returned to the United Kingdom to learn immunology, and then went back for a further eight years, this time at Ahmadu Bello University in Zaria. In 1980 he moved to the Gambia to become director of the Medical Research Council Laboratories. In 1996 he joined the London School of Hygiene and Tropical Medicine, first as professor of communicable diseases and later as Manson professor of clinical tropical medicine.

SHIZUO KAMBAYASHI/APPA

clinical perspective, looking at what it did to the people." He also enlisted the help of an economist and an anthropologist. "It just seemed sensible to find out how much money we were saving and what people thought about nets and whether they'd accept them. It seems common sense now, but looking back I suppose it was one of the first times this approach had been taken."

Eradicating malaria

The other big issue in malaria is eradication. Is it feasible in Africa? Not in the sense that smallpox has been eradicated, Professor Greenwood thinks. A more realistic goal for most places is elimination—which means that although the disease may still be present to some extent, it's not transmitted. For Africa he favours what has been described as "squeezing the map:" starting at the edges of the malaria belt and moving inwards. In Namibia, Swaziland, and Mozambique elimination would be feasible over five to 10 years. "But in the heartlands of Africa, where the transmission is highest, I don't think with the present tools we'll be able to stop transmission. But we can probably lower the disease burden by as much as 80-90%."

Childhood pneumonia

Professor Greenwood has also worked extensively on childhood pneumonia. "When I went to the Gambia, much of the malaria

research had been done focusing on the parasite or the mosquito rather than on the epidemiology of malaria. So I thought we ought to find out how many children a year it kills, how many attacks they have, and so on." He and his wife started visiting the families of children who'd died, trying to find out what had happened. "Sitting in a village in the evening, waiting for a mother to come back from the rice field, was a good education. And it was very humbling; everyone was so nice." To their surprise they found that pneumonia was killing as many children as malaria. The programme on the condition, which this insight kick started, is still going strong.

Research in Africa

The importance of research in Africa—ideally done by Africans themselves—is another of Professor Greenwood's convictions. In a country with minuscule resources it's essential to spend wisely; hence the importance of health services research. He cites the debate that took place over bed nets: should they be handed out for nothing, or should they be distributed through a social marketing scheme of some kind? With an issue like this, wrong choices can undermine progress. And the more that local people and institutions take responsibility for research, the sooner it can become self sustaining rather than dependent on imported expertise.

On the whole he is encouraged by what he

sees of the condition of research in African universities. Outside South Africa the few high quality medical research universities that were built up in the colonial era—such as Makerere in Kampala and University College Hospital in Ibadan—went into decline after independence. Research withered or moved into specialised institutes. Now, with the help of bodies such as the Wellcome Trust, the research capability of some universities is being restored.

Recently the Wellcome Trust—traditionally a supporter of research in tropical disease—has been joined by an ally from the United States: the Bill and Melinda Gates Foundation. The Gates Malaria Partnership is based at the London School of Hygiene and Tropical Medicine, with Professor Greenwood as its director—and he takes delight in describing how it came about. In 1999, when the school was celebrating its centenary, he was asked to write to the foundation requesting funds for the school's new Malaria Centre. Some months later he received a reply saying that the suggestion had found favour and could he prepare a formal application. He did so. Soon after that the school received its biggest grant ever: a cheque for \$40m (£20m; €27m).

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Competing interests: None declared.

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Cite this as: *BMJ* 2008;337:a1267