The invisible victims

The exact number of malaria sufferers in Africa is hard to quantify.

We need to know how bad the malaria situation is before we can make it better, says Robert Snow.

Despite the fanfare surrounding pledges to halve the number of malaria deaths over the next decade, the truth is that scientists have little idea how many people get sick or die from malaria, or where, let alone whether control efforts are working. Researchers lack data to evaluate accurately the impact of interventions such as drugs or insecticide-impregnated bednets. The international community must address this deficiency if it is to improve control strategies and measure their progress.

In Africa, the number of children dying of malaria has increased dramatically over the past 20 years, whereas other causes of childhood mortality have steeply declined¹. Some

90% of the world's malaria deaths probably occur in Africa. But many of our assertions about baseline data for Africa and elsewhere are couched in terms of 'probably' and 'likely', because the simple truth is we do not know.

The Roll Back Malaria (RBM) initiative aspires to halve malaria deaths by 2010 (ref. 2), and the United Nations' Millennium Development Goal is to halt and then reverse the rising incidence of malaria by 2015 (ref. 3). These targets are certainly optimistic, but are they even measurable?

National data on malaria illness and death are full of gaps and inaccuracies due to under-reporting and misdiagnosis. At the Kenya Medical Research Institute in Nairobi, we are instead using satellite data and climate models linked to demographic data to provide new scientific tools for predicting on a continent-wide scale where people live in relation to mosquitoes and malaria parasites^{4,5}.

Combining data from epidemiological studies of malaria deaths and illness, this new science is helping RBM to overcome deficiencies

of national health information systems in Africa, providing more reliable estimates of the continent's *Plasmodium falciparum* burden⁶ (see map, opposite). But for other regions of the world, similar approaches have yet to be developed, or to be extended to other malaria parasites such as *P. vivax*.

RBM's decisions cannot be made effectively without accurate scientific data. What is needed is a properly funded, science-based strategy to evaluate the use of both existing and future control tools.

There are two relatively simple, effective and affordable interventions for malaria control: insecticide-treated bednets and artemisinin-based combination drugs.

RBM relies on national household sample surveys to monitor progress towards its goal of providing antimalarial drugs to 60% of febrile children by 2010. Current surveys report that 54% of febrile children in Africa receive an antimalarial drug⁷, but fail to capture information on the effectiveness, dose, timing or support of treatment. This is not surprising

given that the relevant questions are buried in a national-health survey questionnaire the size of the *Oxford English Dictionary*.

Similarly, RBM's target of providing bed-nets to 60% of children is not framed scientifically to ensure that these reach the most vulnerable. The distribution often correlates more closely with wealth than areas of high malaria risk⁷.

In 2001, the UK government granted one non-governmental organization US\$22 million to market nets in Kenya. But it focused on urban rather than rural areas. The outcome: a mere 1.5% increase in children protected—hardly a stunning success.

The best way to measure the impact of interventions would be to use rigorous, longitudinal demographic and epidemiological studies, such as those provided by the INDEPTH network of sentinel sites (www.INDEPTH-network.org). But such sites are few—there are only 11 in Africa. We urgently need a properly funded, science-based strategy to evaluate the use of both existing and future malaria control tools.

Clinical trials of new vaccines and drugs for malaria, such as those planned by the recently launched European and Developing Countries Clinical Trials Partnership, will eventually require sites where operational

effectiveness can be measured.

More money won't be enough. Donors, governments and international initiatives must take on board the concerns of scientists in the field, and back political goals with hard science. Without a greater appreciation of the importance of creditable baseline data, and the need for adequate funding and resources to gather such data, in a decade or so we will not be celebrating the rolling back of malaria—we will be scratching our heads wondering whether we made any difference at all. ■

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Struggling to make an impact

Hampered by bureaucracy, politics and ineffectual policies, critics claim that the international Roll Back Malaria (RBM) partnership is failing, and is a long way off its goal of halving malaria deaths by 2010. Few of the 44 African countries that signed up to its main goals, including providing immediate access to treatment for 60% of patients by 2005, have followed up with increased resources.

Allan Schapira, RBM coordinator at the World Health Organization (WHO), disputes that the programme is off-course, arguing that it will take years for the impact of current initiatives to become apparent. "There's no basis for the contention that deaths from malaria have gone up," he says, adding that tracking trends in malaria-specific deaths over short periods is difficult. What is clear, however, is that no data show substantial drops in deaths in sub-Saharan Africa, where most cases occur.

RBM was launched in 1998 by the WHO, the World Bank, the United Nations Development

Programme and UNICEF, and is now supported by 90 countries. It has raised the disease's international profile, says Roger Bate of the American Enterprise Institute for Public Policy Research, a Washington-based think-tank. "Unfortunately, I think that's kind of where the good news ends," he says. "If RBM were a government, it would be voted out of office."

In 2002, an external evaluation panel concluded that RBM was failing at regional and national levels, and was too isolated from local health policies (see *Nature* **419**, 422; 2002). It also found the World Bank's commitment to be ambivalent. "We are committed to doing a lot more, to doing much better," says Olusoji Adeyi, communicable-diseases coordinator at the bank.

RBM has since been reorganized to make it more accountable to malarial countries, and to have a tighter focus on fewer countries. Mark Young, UNICEF's senior health adviser for RBM, points to 'basket funding', where money is pooled nationally and health

ministries make spending decisions.

But critics also complain about the programme's inertia in replacing obsolete drugs with more effective, but costlier, artemisinin-based drugs (see *Nature* **429**, 588; 2004). In addition, they question its focus on mosquito nets soaked in insecticides to the exclusion of indoor spraying with DDT and other insecticides.

RBM claims that it promotes DDT wherever appropriate, but argues that nets are safer and more effective. Spraying is difficult to push through politically, says Schapira, with pressure from government and other donors. "We have had very, very strong lobbying over DDT," he says. "We have had to give up."

The biggest issue, says Schapira, is money. Most new funding for African countries is coming from the Global Fund to Fight AIDS, Tuberculosis and Malaria, although it is far short of the billions needed. "We have the tools and the strategies, but without more money it will be a disaster."

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