The resurgence of a killer disease

Millions die each year of malaria

Kaye Tucker
7 November 1998

Poverty, the decay of public health systems, the emergence of drug resistance strains and a lack of research funding are all responsible for a resurgence of the tropical disease malaria, and the staggering toll of death and ill-health it exacts each year around the world.

In a special issue of the journal *Emerging Infectious Disease (July-September 1998)*, Dr Thomas Nchinda of the World Health Organisation (WHO) warned that the prevalence of malaria had escalated at 'an alarming rate' over the last decade, particularly in Africa.

Malaria infects an estimated 300 to 500 million people each year and causes between 1.5 and 2.7 million deaths, 90 percent of which are children under the age of five in Africa. Between 1994 and 1996, malaria epidemics broke out in 14 countries in sub-Saharan Africa, many in areas previously free of the disease.

Up to 100 countries and territories, containing over 40 percent of the world population, are areas of malaria risk. In endemic regions, where transmission is high, people are continuously infected so that they gradually develop an immunity to the disease. But until they have acquired such immunity, children remain highly vulnerable.

Malaria is caused by parasites of the genus *plasmodium*, which are transmitted from one person to another by the female *anopheline* mosquito. The parasites develop in the gut of the mosquito, enter a victim's bloodstream via a mosquito bite and then invade and multiply in the liver. After nine to 16 days they return to the blood stream and infect the red blood cells, producing bouts of fever and anemia. Cerebral malaria occurs when infected red cells obstruct the blood vessels in the brain. Other vital organs can also be damaged often leading to the death of the patient.

The search for a means of combatting malaria was given an impetus during World War II when thousands of soldiers from the US, Britain and Australia were sent to fight in infected areas in the Pacific and Asia. The powerful insecticidal effect of DDT was discovered and anti-malarial drugs of the *chloroquine* group were developed.

Between 1955 and 1969, WHO conducted a global malaria eradication program, based on a series of campaigns aimed at spraying the insides of homes with DDT. While successful in large areas of North America, Southern Europe and the former Soviet Union, the disease persisted in Latin America and most Asian countries. The costs for the program were minimal, around 25 cents per person a year. However large-scale eradication was never attempted on the African continent as it was considered too expensive.

In 1969, WHO halted its preventative program, claiming that too much money was being spent on eradication at the expense of research and that the mosquitoes had developed DDT resistance. Its aims shifted from the elimination of malaria to control. But catastrophic epidemics continued to break out frequently in Africa, Central America and South East Asia, including one in 1988 in Madagascar in which 25,000 people died.

The rapid spread of malaria strains resistant to *chloroquine* and the other *quinolines*, drugs once used so effectively to treat patients suffering from the disease, has further complicated efforts to control malaria. In addition, changing rainfall patterns and water development projects such as dams and irrigation schemes have created many new breeding grounds for the mosquito.

These factors have been greatly exacerbated by the worsening economic situation in the underdeveloped

nations.

The WHO Division for Control of Tropical Diseases reports that malaria has re-emerged in Central Asia and the Caucasus following massive socio-economic degradation and the collapse of health and social services.

A recent report by the British-based international aid agency Oxfam drew attention to the ramifications of International Monetary Fund (IMF) demands for 'stringent financial discipline' in the Philippines. The agency estimated that the 27 percent cut in the preventative health care budget for malaria would result in an additional 29,000 deaths from the disease.

It is widely recognised that more medical research into malaria is needed. Resistance to *chloroquine* was first noticed in Asia and now exists in eastern and southern Africa where it is spreading westward. Other drugs developed in the 1980s such as *melfloquine* have suffered the same fate. Dr Nchinda warns that the emergence of African strains of malaria with a pattern of drug resistance similar to Southeast Asia would be 'a major disaster'.

Despite lack of support by governments and pharmaceutical companies, significant progress has been made over the last 10 years in the development of a malaria vaccine. A limited number of field trials of vaccines are underway in Africa and during the next five years it is hoped that other vaccines will be studied.

Investigators have been studying malaria transmission-blocking vaccines. Malaria parasites have both a sexual and an asexual phase of development. Dr David Kaslow of the US National Institute of Allergy and Infectious Disease (NIAID) has developed a vaccine that prevents the sexual development of the parasite from occurring in humans and therefore in the mosquito, thus breaking the cycle of transmission.

Dr Thomas Wellems of the Laboratory of Parasitic Diseases has discovered the location of the genes controlling *chloroquine* resistance in the malaria parasite. Scientists now hope to find out how the genes confer drug resistance and to develop methods of testing for drug-resistant malaria parasites in human blood. Other promising research is seeking to genetically engineer a strain of the *anopheline* mosquito, which is intractable to malaria parasites.

New drugs are also being developed and some are in use, but research into malaria is grossly underfunded. Nchinda reports that between 1990 to 1992, only $58 million a year was spent on malaria research while $56 billion was spent internationally on medical research as a whole. 'Expressed as research investment per death, malaria research receives about $42 per fatal case, much less than for other diseases such as HIV/AIDS ($3,270) and asthma ($789),' he stated.

The reason is obvious. Neither corporations or governments have any interest in developing drugs for malaria and other fatal diseases which affect areas of the world where the majority of people have no money to pay for the treatments. Nchinda reports that research centres in Africa are badly in need of improvement. Laboratories require refurbishing and equipment; supplies and vehicles are urgently needed for field studies.

Lack of funds is also a barrier to the use of other preventative measures such as insecticide-treated nets. Research carried out in at least six countries across Africa has proved the effectiveness of these nets in reducing infant death. If used widely, up to 500,000 lives could be saved. But the cost of the nets, around $17, is beyond the means of the average person and governments are unwilling or unable to pay.

Furthermore following the Bamako conference of African health ministers in Mali in 1987, a number of countries have begun charging fees for services and drugs provided by community health workers in rural communities. The result has been a fall in their use.

Millions of people, mostly children, die needlessly each year of malaria for the lack of a few dollars to buy the necessary drugs or to pay for other preventative measures. This simple fact is proof of the inability of the profit system to provide for the elementary needs of the world's population.

See Also:
A new UN report: AIDS devastation in Africa
[31 October 1998]