

WHO in Action

Research and training in tropical diseases

Tore Godal, Howard C. Goodman & Adetokunbo Lucas

The work of WHO's Special Programme for Research and Training in Tropical Diseases since its inception in 1975 is outlined in the present article.

Tropical diseases affect hundreds of millions of people every year, causing immense suffering and hindering development. This situation can be tackled by improving the information provided about the diseases, the distribution and packaging of drugs, and the control of vectors. Research on the diseases is, however, a prerequisite, and for this reason the Special Programme for Research and Training in Tropical Diseases was established in 1975.

This Programme aims to obtain effective vaccines, diagnostic tests and measures of vector control through research and development, and to help tropical countries to improve their own research. Scientists from developing countries are trained to use the latest research tools and appropriate technology is transferred to these countries. The latest advances in molecular biology are used to develop new tools, and established technologies are applied more effectively. Specific research projects

are conducted in tightly managed networks.

The Programme is primarily concerned with:

- research and development of new and improved tools for controlling tropical diseases, involving scientists from both developing and developed countries;
- the training of scientists from developing countries and the strengthening of institutions so as to increase research capabilities in these countries; this part of the Programme accounts for 25% of its budget.

The following diseases are included in the Programme because of their significance as public health problems, the absence of satisfactory control methods, and the existence of research cues suggesting improved control methods: malaria, bilharzia (schistosomiasis), sleeping sickness, Chagas disease, lymphatic filariasis, river blindness, the leishmaniases and leprosy.

The temporary networks used for conducting projects are a key feature of the Programme's operational style. Network-

At the time of writing Dr Godal was Director of the Special Programme for Research and Training in Tropical Diseases, World Health Organization, 1211 Geneva 27, Switzerland. Dr Goodman, who, to our deep regret, died while this article was in press, was the first Director of the Programme. Dr Lucas was the second Director.

ing has allowed data to be collected from different parts of the world and has made it possible to draw broad conclusions.

Mode of operation

Housed and partly financed by WHO as the executing agency, the Programme receives the bulk of its funds from the United Nations Development Programme,

The management style of the Programme gives science precedence over politics.

the World Bank and various government and nongovernmental funding agencies. An independent board of donors and participating countries oversees the financial and administrative elements of the Programme, and an independent advisory committee supervises research planning and the work of steering committees and task forces, which are set up and dissolved as needed.

The steering committees, comprising experts from around the world, meet regularly to make decisions about funding

and, to some extent, the direction of research. Together with the task forces they are points of contact for scientists, launching specific research initiatives and inviting the participation of researchers from countries where the diseases covered by the Programme are endemic. Scientists apply to the steering committees and task forces with specific proposals, on the basis of which research and training grants are allocated. Some funds are allocated for proposals initiated by investigators so as to reap the benefits of new ideas and creativity. A further point of contact for scientists is provided by the research capability strengthening drive of the Programme, which offers grants for training in research related to the diseases in question in countries where they are endemic.

The research supported by TDR ranges from basic biomedical to community-based field investigations. For each disease, priorities are chosen in the light of:

- the problems confronting control programmes in the field;
- the state of knowledge about the disease;

Dr Howard C. Goodman, 1920–1998

Howard C. Goodman was an enthusiast who related to people, and touched the lives of everyone he met. In the early 1960s he pioneered WHO's first systematic attempt to harness medical research to the needs of human health. He developed the Immunology Unit and set up WHO immunology training centres in Ibadan, Nairobi, New Delhi, São Paulo and Singapore, with a base in Lausanne, Switzerland. Focusing always on the developing countries, he drew in the eminent and experienced to teach, train and support scientists of the Third World to acquire skills and apply research for the benefit of their peoples. In the early 1970s, Dr Goodman became founding Director of the Special Programme for Research and Training on Tropical Diseases, pioneering the search for better ways to control major tropical diseases. Many people have contributed to the success of the programme in many ways, but Howard Goodman's early steps will always be remembered for their vision and ideals.

- the tools available;
- the range of research leads.

This makes it possible to set goals and define paths of activities leading to these goals. Creativity and flexibility have been associated with this approach. In research on chemotherapy, for instance, there have been studies on:

- basic metabolism (as in African trypanosomiasis);
- the development and validation of drug screening systems (an approach taken in lymphatic filariasis control);
- compounds selected in previous screening programmes (as with the antimalarials mefloquine and halofantrine);
- compounds used in traditional medicine (as with the development of artemisinin and its derivatives for the treatment of malaria);
- drugs already in use for other diseases (such as liposomal amphotericin B, originally developed to treat severe systemic and deep mycoses, and subsequently used against visceral leishmaniasis);
- the improved use of registered drugs (as with multidrug therapy against leprosy);
- making established drugs affordable, for instance by negotiating preferential pricing for countries where diseases are endemic, or by developing less costly alternative products (an approach taken in African trypanosomiasis control).

Impact

Rapid progress has been made in the fight against leprosy, river blindness, lymphatic

filariasis and Chagas disease. More than 30 products or methodologies have been put into use, among them insecticide-impregnated bednets, low-cost diagnostic tests, vector control methods, and a manual for the improved care of women with tropical diseases. A similar number of products are in the pipeline.

The Programme has funded some 6800 projects involving more than 5000 scientists in over 120 countries. Furthermore, it has generated more published papers per million dollars invested than five other major bodies which fund malaria research; in 1994 it funded approximately 21% of the publications on malaria that came out that year, which is 9% more than the next largest supporter of research in this field (1).

The Programme has supported the formal training of over 900 scientists from developing countries. Many of these people

Multicountry studies enable different regions to be covered and researchers to be trained simultaneously, and make it possible for results to be broadly applied.

later assumed influential positions in ministries of health and elsewhere, in which they have introduced managerial, technical and political changes affecting research and development as well as the control of tropical diseases. Through its support for over 100 workshops, training within research and development projects, and training associated with the strengthening of institutions, the Programme has helped to build the research skills of many other people.

Over 200 grants have been allocated for the strengthening of institutions, many of which have had support lasting 10 years or more, while some have become centres of scientific excellence. For instance, the Programme has collaborated over long periods with FIOCRUZ in Brazil, Mahidol University in Thailand, Kenya Medical Research Institute, the Research Institute of Tropical Medicine in the Philippines, and the Shanghai Institute of Parasitic Diseases.

Linchpins of success

Each aspect of the Programme is closely monitored. Reviews conducted by scientists who are not members of the Programme's staff have helped significantly in this respect.

The management style of the Programme gives science precedence over politics. In what amounts to a peer review system, eminent scientists from all parts of the world meet to discuss research and make critical decisions about it. Decisions made at Programme meetings form the cutting edge of tropical disease research and are highly respected in the field.

Also of importance are the training and networking of researchers in sufficient numbers to make a difference in areas where diseases are endemic, and the building of sustained, multicountry partnerships for the creation of infrastructures for research activities and demonstration projects. Multicountry studies enable different regions to be covered and researchers to be trained simultaneously, and make it possible for results to be broadly applied. They are a particularly strong feature of the Programme, offering specific advantages in tackling globally significant health problems that could not be dealt

with as effectively through research efforts made by single countries or agencies or through bilateral funding mechanisms. Such studies have, for example, contributed in an important way to onchocerciasis control in Africa. Similarly, the best combination of insecticides to protect houses from *Triatoma infestans* (the vector of Chagas disease) was determined by a multicountry field trial.

The Programme provides long-term support for good investigators and for the strengthening of national research centres in regions of endemicity, on a regularly reviewed, flexible and competitive basis. In Brazil, for example, a research group was strengthened by support that lasted a decade and involved grants made to an institution and to individual workers. Knowledge was gained on the impact of basic hygiene and simple antibiotic treatment on acute lymphatic filariasis. This work also helped to make it clear that the sexual disability associated with genital manifestations of the disease was a primary concern of those affected, an observation that could only emerge from a long-term study.

The Programme bridges the divide found in many countries between public health science and fundamental health science, in respect of training, types of research, career structure and administration. Thus goals and the cooperation in research and development needed for achieving them can be defined on the basis of agreement between public health experts and researchers on fundamental health science.

Four diseases are on the verge of elimination as public health problems. Consequently, the Programme's disease portfolio

may have to be reviewed, although much research remains necessary on eliminable diseases. Malaria is likely to remain a major concern for some time, and the development of antimalarial drugs is certain to continue. ■

Reference

1. **The Wellcome Trust.** *Malaria research: an audit of international activity.* London, Wellcome Trust Unit for Policy Research in Science and Medicine, 1996 (Report No. 7).

Malaria today

Malaria accounts for 300–500 million cases of sickness a year globally and kills over 1.5 million people, including one million children under five. And it is costing Africa alone an estimated US\$ 2000 million a year in direct costs and lost earnings. . . . Epidemiological patterns of malaria are constantly changing. Mosquito habitats, parasite resistance to drugs, and human susceptibility to the disease are influenced by factors such as internal conflict and the collapse of health services, mass population movements, rising poverty, intensification of agriculture, changing weather patterns, and economic exploitation of land.

In 1992 a new strategy for the global control of malaria was adopted at a Ministerial Conference in Amsterdam, the Netherlands. It calls for: early diagnosis and treatment of malaria; selective and sustainable preventive methods, including vector control; prevention or early response to epidemics; and strengthening local capacity to analyse the malaria situation, especially ecological and socioeconomic factors involved. . . . The challenge now is to apply the new strategy successfully in high risk areas – especially in Africa, [where] most countries are already implementing national action plans for malaria control. For the foreseeable future at least, malaria control will continue to be a race to stay one step ahead of the emergence of drug-resistant forms of the disease.

- The mother of all fevers. *World Health*, Vol. 50, No. 2, March–April 1998: 12–13.