Workers adding chemicals to a fermenter at Wanxing Pharmaceuticals, part of the Shanghai partnership working to develop a malaria vaccine. Photo: WHO/ TDR/ Crump
Partnerships and capacity building
Area E of the TDR strategy, concerned with partnerships and capacity building, particularly relates to the activities of TDR Research Capability Strengthening (RCS). RCS is a cross-cutting programmatic area of TDR, established to promote and fund research training and institution development, and to increase the participation of developing countries in the development and use of new tools for the diagnosis, treatment, prevention and control of communicable diseases. The mission of RCS is to foster self-reliance in biomedical and social science research in disease-endemic developing countries (DECs) by building a critical mass of human resources, institution capacity, and a conducive environment able to respond to public health research needs.

RCS activities aim to contribute to the definition of research priorities, conduct of research, and translation of results into evidence-based health policy. This can be ensured by increasing access to, and use of, new scientific knowledge by DECs through modern information and communication technologies. The core of the RCS strategy is to create partnerships, increase networking, and promote equal opportunities, ensuring a gender and geographically balanced generation of scientists.

Measures of success in area E relate to progress towards the goal of research self-reliance in areas relevant to public health. They include production of research results of national and international significance; development of research leadership (e.g. a research group develops around an individual, an institution becomes a leading centre for a particular area of research); resources generated through competitive processes; and adherence to ethical principles and internationally accepted scientific standards.

Partnerships are not a new concept to TDR as TDR itself is founded on a partnership between its co-sponsoring agencies and member countries. The previous Programme Report, for 1999-2000, detailed a series of partnerships leading to new knowledge, new tools, new methods and new strategies – the key expected results for TDR. During the past biennium, new partnerships from within RCS have been developed and existing ones extended that build on a growing network of hundreds of researchers and research institutions committed to developing new tools for the prevention, control and treatment of tropical diseases.
RCS: TDR’s strategy for capacity building, 2002-2005

TDR’s RCS strategy, developed in consultation with the TDR Joint Coordinating Board (JCB), Scientific and Technical Advisory Committee (STAC), and Research Steering Group (RSG), was approved by JCB (25) in June 2002. The new strategy consolidates TDR’s vision and objectives for research capacity strengthening. It outlines a revised operations framework which implicates different funding approaches for low-income/least developed endemic countries (LDCs) in particular and for developing disease endemic countries (DECs) in general. The new R&D-driven approach proposes targeting the RCS investment to priority research and development areas. The strategy responds to stakeholders’ expectations and is expected to produce measurable outcomes of the RCS investment. Critical indicators of RCS success were further defined.1, 2

The major thrust of the RCS strategy is to support LDCs in researcher-driven, individual and institutional capacity building activities while synergizing RCS activities with TDR research and development (R&D) priorities and increasing the participation of all DECs in R&D, taking advantage of their already available capacity. R&D-driven support promotes projects and activities as part of joint initiatives developed across TDR teams and steering committees and thus stimulates networking and partnerships. A number of these initiatives are currently under implementation: bioinformatics training, clinical trials of drugs for tuberculosis (TB) and schistosomiasis, social economic and behavioural (SEB) research, Leishmania vaccine trials, and scaling-up malaria home management. Other programmatic capacity building investment initiated during this biennium included an initiative on African medical journals, internet connectivity and training in research project planning and implementation.

The implementation of the new strategy is progressing well and fostering the integration and commitment of all TDR units to research capacity. The indicators of RCS success as well as the indicators of outcome and impact for TDR performance in expected results E will allow a more comprehensive picture of performance in support of research capacity in developing countries. These indicators capture capacity building activities developed in the context of R&D projects across TDR. The programmatic funding through specific initiatives enhances visibility and accountability of the investment and makes RCS more attractive to potential partners.

FAME: Partnership to promote local medical research publishing in Africa

Through a wide range of grants, TDR supports major health research projects in African countries and other regions, the results of which are published in well known biomedical journals. Repeated bibliometric analyses to assess the impact of TDR grants in published literature have shown that the vast majority of TDR grant recipients publish in mainstream biomedical journals with a high impact factor rather than in their national medical journals. Since the same bibliometric analyses show that most of these research results are cited by scientists outside of Africa, the impact of this research on local researchers, health professionals and policy-makers in Africa, all of whom have little access to major international health journals, is questionable.

In 2002, TDR/RCS launched an initiative to strengthen local publication of health research conducted in or relevant to Africa in order to give greater visibility to African medical research. A postal survey carried out on 69 African medical journals in July 2002 found that the majority of medical and health journals were under-funded, did not publish regularly, lacked high quality articles and standard peer review practice and were mostly invisible to the rest of the international medical community.

Fifteen African medical journal editors, four mainstream medical journal editors (from British Medical Journal, Tropical Medicine and International Health, Médecine tropicale, Cahiers Santé), representatives from international editors' associations (World Association of Medical Editors, Council of Science Editors) and other interested partners (Fogarty International Center, BioMed Central, Biblioteca Regional de Medicina – BIREME, US National Institutes of Health/ National Library of Medicine – NIH/NLM, International Network for the Availability of Scientific Publications – INASP) were brought together into a consultative meeting and workshop last October in Geneva. The Forum of African Medical Editors (FAME) was the first step made by these 15 African medical journal editors to set up a professional association and network that will review the problems faced by their journals and try to find common solutions. The FAME secretariat is located in Kenya Medical Research Institute (KEMRI), Nairobi, Kenya. The Steering Committee of FAME will meet for the first time in Mombasa at the end of April 2003 to draw up the association mission statement and a five-year work plan. A list-serv for FAME members and interested partners is already operational at fame@who.int.

Capacity building within existing African medical journals and collaborative projects with interested parties should lead to greater journal sustainability and regular publishing, improved quality of peer review process and contents, and higher regional and international visibility of African medical research through indexing in major bibliographic databases.
Partnerships and capacity building

BIOINFORMATICS: Partnership to promote functional genomics

TDR has played an important role in the generation of knowledge about the parasite genomes for African trypanosomiasis, Chagas disease, leishmaniasis, schistosomiasis, and lymphatic filariasis. Starting in 1994, TDR supported the establishment of five international parasite genome networks and opened the door for scientists from DECs to participate and collaborate in genome and post-genome projects.

In 2001, TDR initiated several partnerships for developing capacity in bioinformatics. The rationale behind the initiative was that bioinformatics – or computational biology – plays a key role in molecular biology, genome sciences, and post-genomics and functional genomics. Bioinformatics levels the playing field for developed and developing countries, and has a direct impact on basic research and on the development of new tools in biotechnology and for disease control.

The strategy is to build an integrated and sustainable network of centres in DECs utilizing existing and newly developed infrastructure including the World Bank’s Distance Learning Program, the US National Center for Biotechnology Information (NCBI), the South African National Bioinformatics Institute (SANBI), and the Organization for Nucleotide Sequencing and Analysis (ONSA) in Brazil. TDR’s activities started with a train-the-trainers workshop in bioinformatics and applied genomics. The next step was establishing regional training courses in Africa, Asia, Latin America.

In response to the Call for Application for Regional Training Centres in Bioinformatics, 18 applications were received, equally distributed between Asia, Latin America, and Africa. Four centres were selected to offer regional training courses as their first activity. These were: for Africa – SANBI, Cape Town, South Africa, course in February 2002; for South America – University San Paulo (USP), Sao Paulo, Brazil, course in March 2002; for Asia (in the WHO South-East Asia region) – the International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India, course in May 2002, and Mahidol University, Bangkok, Thailand, course in July 2002.

Therefore, while TDR’s bioinformatics initiative is in its early days, considerable progress has been made in a relatively short time. Through this initiative on bioinformatics, TDR is strengthening institutions and training researchers from disease endemic countries, helping them to reach self-reliance in this important area of modern biological research.

The objectives of the TDR initiative are, in the next five years, to: produce 20-30 DEC scientists with top level competence in bioinformatics (trainers) and the capability to conduct local training in Africa, Asia and Latin America; to further establish sustainable regional networks of centres and expertise for the promotion and integration of bioinformatics and DNA technology in basic research and management of tropical diseases in endemic countries; and to establish a distance learning programme for bioinformatics in disease endemic countries.

While TDR’s bioinformatics initiative is in its early days, considerable progress has been made.
In September 2000, the United Nations Secretary General launched a public-private initiative to bridge the digital divide in health. Spearheaded by the World Health Organization (WHO), the Health InterNetwork brings together international agencies, the private sector, foundations, non-governmental organizations and country partners under the principle of ensuring equitable access to health information. The focus of the Health InterNetwork is on improving the information environment of health personnel in developing countries: professionals, researchers and scientists, and policy-makers. The core elements of the project are content, Internet connectivity, and capacity building.

During the first year, the Health InterNetwork achieved a major breakthrough on provision of health content. The world’s major biomedical publishers agreed to provide access to more than 2000 of their scientific publications for free or at low cost to universities, medical schools, research institutions and government offices in low-income countries. The Health InterNetwork Access to Research Initiative (HINARI) will enable over 100 countries to benefit from access to the world’s health research.

TDR is assisting in this partnership as part of its commitment to capacity building. TDR support consists of infrastructure support to selected institutes, and provision of training programmes in how best to access, organize and manage the wealth of material available on the Internet, including HINARI.

In support of the second objective (training), TDR organized a workshop for librarians and/or information managers from seven countries (Cameroon, Ethiopia, Ghana, Kenya, Nigeria, Tanzania, Uganda) on electronic information management of HINARI and other web-based resources. The majority of the participants were employed at centres that are part of the Multilateral Initiative on Malaria Communications Network (MIMCom). MIMCom was created by NLM/NIH, working in partnership with organizations in Africa, the U.S., the United Kingdom and Europe, establishing the first electronic malaria research network in the world. The network provides full access to the Internet and the resources of the World Wide Web, as well as access to current medical literature, for scientists working in Africa.

The course was hosted by a long-time TDR partner, the National Institute for Medical Research (NIMR), Dar es Salaam, Tanzania, and was facilitated by the Cushing/Whitney Medical Library, Yale University, and the Library of Science and Instructional Technology, Southern Connecticut State University, with additional support from the WHO Library, Health Information Management and Dissemination unit.

In addition to the learning experience, participants also contributed to the evaluation and development of teaching materials for wider distribution. Following additional training courses to refine and finalize the materials, the
Partnerships and capacity building

In the new TDR strategy, partnerships for capacity building will be in two forms. For the least developed countries and low income, high disease burden countries, TDR will continue to support individual and institution driven capacity strengthening for tropical diseases research. This will include investment in infrastructure and the research environment, and improved access to scientific information and training opportunities for young scientists. Under this initiative, opportunities for collaborative research with more advanced country scientists and institutions are encouraged.

Through this initiative, support was provided to the University of Sana’a Faculty of Medicine in Yemen to study the epidemiology of severe malaria in two epidemiological zones. This grant allows for the establishment of research infrastructure at hospitals in Hodeidah and Taiz, and provides training for local staff in research skills. The Yemeni researchers are collaborating with scientists from the London School of Hygiene and Tropical Medicine and the University of Khartoum’s Institute for Endemic Diseases, both long time TDR partners. A programme grant was awarded to the Department of Medical Research (Lower Myanmar) to expand their TB research activities in collaboration with the National TB control programme. The research addresses issues of DOTS (the internationally-recommended TB control strategy) expansion, drug resistance, and the pharmacokinetics of four-drug fixed-dose combinations. A network for research in Asian schistosomiasis is being funded to support partnerships and collaboration between scientists from Cambodia, China, Indonesia, Laos, and the Philippines. They collaborate on issues and techniques for immunodiagnosis, the contribution of animal reservoirs to transmission, and standardization of the use of ultrasound to detect morbidity. In Tanzania, TDR supports the NIMR in evaluating the activity and toxicity of a natural product for treating malaria in a mouse model. Young Tanzanian investigators will gain skills in screening new therapeutic compounds and in testing the toxicity of such compounds. Recently approved grants will help elucidate the transmission of Chagas disease in Ecuador, map antimalarial drug resistance in the Republic of Congo, and strengthen capacity in Madagascar for screening plant products for antimalarial activity.

The HINARI initiative contributes to bridging the health information gap between rich and poor countries.
RCS-plus: Partnerships for capacity building driven by health R&D priorities

Investigators from all DECs, including the LDCs, are eligible to participate in capacity strengthening initiatives where the research priorities are determined by the TDR steering committees (RCS-plus). These initiatives take advantage of the strengths of DEC institutions to address major areas of research. With the introduction of four-drug fixed-dose combination (4FDC) treatments for TB, there was a knowledge gap concerning their efficacy and effectiveness in different endemic settings. A call for proposals was advertised and research groups in Ethiopia, Haiti and Nigeria were selected to conduct the research. Through proposal development and good clinical practice (GCP) workshops, these groups are finalizing a core protocol. In doing this research, the groups will build capacity for conducting clinical trials to address the diseases endemic in their countries. Similarly, having noted the limitations of praziquantel in the treatment of schistosomiasis in particular endemic settings, it was decided to examine how praziquantel treatment can be improved. Through a competitive process, protocols to investigate the safety and efficacy of an increased dose regimen in comparison to the recommended dose of praziquantel are being finalized by investigators in Brazil, Mali, Mauritania, the Philippines and Tanzania. As in the previous case, the investigators will increase their skills for conducting clinical trials. They will also increase their capacity for responding to research issues arising from control programmes with respect to the tools for control.
TRAINING: Partnerships for research training

People are the foundation of research and TDR continues to invest in developing the skilled human resources necessary to address the prevention, treatment and control of tropical diseases. TDR is continually looking to identify and implement new approaches for training and development while maintaining its programme for research training grants. In 2001-2002, 91 TDR-funded students completed their training including 68 PhDs and 21 Master’s degree programmes with the remainder participating in short-term or post-doctoral activities. During the same period, an almost equal number of new training grants were awarded including support to a dozen students attending the TDR-supported MSc degree programmes at Makerere University, Uganda, the Regional Institute for Public Health, Benin, and the University of Witwatersrand, South Africa.

To better target training funds to priority areas and to develop local resources that TDR can draw upon in the future, a number of new Career Development Fellowships were initiated. The goal is to train individuals in situ with relevant partners to develop specialized skills not readily taught in academic centres. To date, these include: fellowships in grants management with the WHO Eastern Mediterranean Office (EMRO) and WHO African Regional Office (AFRO); clinical research and development in partnership with GlaxoSmithKline Biologicals; clinical trials management with the Infectious Disease Research Institute, USA; Internet-based information management with the WHO library; and an upcoming fellowship on interactive learning production with the Wellcome Trust, UK. Other planned initiatives are foreseen with the WHO Regional Office for South-East Asia, the Pasteur Institute (France), and the WHO Mediterranean Centre, Tunisia. On completion of their fellowships, these individuals will return to their home institutes to add to the local capacity and become a valuable resource for TDR and their regions.

With the increased access in DECs to information and communication technologies, TDR is developing CD-based and eventual on-line learning material for use by DEC scientists. Working with partner groups, teaching packages have been developed or are under development in research epidemiology (with the Pan American Health Organization – PAHO), project management (with MIM), cultural epidemiology (with the Swiss Tropical Institute), and electronic information management (with the WHO and Yale University libraries). These products are expected to be released in the next biennium. In a related area, TDR is also exploring with other networks and partners a longer-term vision to develop distance learning degree programmes, initially at Master’s level. Discussions are currently under way and include the International Clinical Epidemiology Network (INCLLEN), the Partnership for Social Sciences for Malaria Control in Africa (PSSMC), and the International Network of Field Sites with Continuous Demographic Evaluation of Populations and their Health in developing countries (INDEPTH).
MIM: Partnership against malaria

The Multilateral Initiative on Malaria in Africa (MIM) is an international partnership in scientific research against malaria. Under this initiative, TDR set up the MIM/TDR Research Capacity Strengthening Task Force in 1997. This task force promotes capacity strengthening in Africa through R&D of new tools for malaria control, and through promoting partnerships and collaborations, technology transfer and training opportunities.

The fourth and fifth meetings of the MIM/TDR Task Force were held during the biennium, in Zimbabwe and Uganda respectively. In 2002, the funding cycles for 20 of the 23 projects supported since the setting up of the task force were completed, while 3 were eligible for one more year of funding, and 13 new projects representing research partnerships between 13 African countries, 6 European countries and the United States, were approved and supported.

Two networks were set up during the biennium, both evolving from research projects supported by MIM/TDR between 1998 and 2001. The immunology and pathogenesis of malaria network consists of investigators from six African institutions. The goal is to make better use of research infrastructure across Africa to better understand the immunology and pathogenesis of malaria. Network members answer research questions pertinent to the pathogenesis of severe malaria in Africans, promote common use of expensive equipment, and emphasize training through workshops and short-term training attachments in collaborating laboratories in Africa, and through formal postgraduate training. Five new proposals from the network, including one articulating the plan for training activities, were recommended for funding by the Task Force in March 2002.

The second network is the antimalarial drug resistance network, which is comprised of five study sites in Africa (in Mali, Ghana, Nigeria, Tanzania, Uganda). The goal is to gain a better understanding of antimalarial drug resistance in Africa through establishing the role of known and new markers of drug resistance. Common protocols for tracking antimalarial drug resistance are being established in the sites and one of the intentions is to provide local data to support malaria control policy in countries. Targeted research is used as a vehicle for capacity building, and TDR partnership with other components of MIM (MR4 – the Malaria Research and Reference Reagent Resource Center, and MIMCom – the MIM Communications Network) is facilitating availability of research reagents and communication in the African institutions. In October 2001, a part-time manager based in Africa was selected to assist TDR staff in managing the network. The impact of the network in fostering closer collaboration with malaria control programmes, identifying priorities, and providing information useful to control programmes, is already evident. For example, network investigators are already working closely with national malaria control personnel in several countries while, in Ghana, a principal investigator is chairing a national malaria control programme...
task force on evaluation of research data in order to advise the Ministry of Health on appropriate treatment for uncomplicated malaria. A workshop on communication and team building (jointly organized by TDR and the US National Library of Medicine/National Institutes of Health) was held in May 2002. Principal investigators and data managers from the five research groups constituting the network participated in the workshop to help address the need for a robust mechanism and for tools for data acquisition and storage, and monitoring progress of the project.

RSG: Institution-based capacity building

Capacity building at institution level helps develop research groups in specific areas. This sort of capacity building includes support for MSc and PhD trainees, short-term training in research methodologies, and upgrading of research facilities. Often strong links are made between the research group and the relevant control programme, and research papers are published in peer-reviewed international journals. In the examples below from 2001-2002, the TDR input was between US$ 40 000 and US$ 200 000, often enhanced with additional funding generated through competitive processes from other sources. Research groups developed included:

■ A malaria vaccine R&D group at the Institute of Medical Biotechnology, 2nd Military College, Shanghai, which has produced GLP candidate vaccines, scaled-up GMP, and a patent for a chimeric protein for a malaria vaccine.15

■ A filariasis epidemiology group at the Ministry of Health, Phnom Penh, Cambodia, which developed and validated a morbidity survey questionnaire to evaluate risk factors for infection and disease.18

■ A visceral leishmaniasis group at the Institute of Medicine, Tribhuvan University, Kathmandu, Nepal, focusing on ecological perspectives of vector infection and disease in districts with high prevalence.17

16 In the latter part of the 1990s, reports from several northern provinces indicated an increasing number of new cases of filariasis. In the context of the global initiative for elimination of filariasis, a research project was launched to determine the magnitude of morbidity by validating and using a rapid questionnaire approach to evaluate risk factors for infection and disease.18
17 In Nepal, the number of cases of visceral leishmaniasis (kala-azar) has increased every year since its emergence in the 1980s. Since 1980, well over 17 000 cases and 254 deaths have been reported. An investigation found that the disease is persisting, with sporadic outbreaks. It affects the poorest groups, those with little access to health care, and shows no sign of declining. The findings from this study will help policy-makers prioritize and the health services improve the impact of future control programmes.