Review

UNDP/World Bank/WHO Special Programme for Research & Training in Tropical Diseases (TDR)

Prospective Thematic Review of TDR Research Capacity Strengthening

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PROSPECTIVE THEMATIC REVIEW: TDR RESEARCH CAPACITY STRENGTHENING

Executive Summary

A prospective thematic review (PTR) of the Research Capacity Strengthening (RCS) component of the Special Programme for Research and Training in Tropical Diseases (TDR) was initiated in response to the concerns expressed by the 22nd session of the Joint Coordinating Board (JCB-22) with regard to the strategy and impact of RCS investment in developing countries.

The objectives of the preliminary meeting were to:

1) define the strategic direction and plan of action for RCS

2) identify partnerships to optimize research capacity building

3) define the processes and formulate indicators of research capacity for evaluation and impact assessment.

The achievements of RCS in the long-term process of building research capacity in disease endemic countries (DECs) were recognized and the current mechanisms of support and proactive emphasis on least developed countries (LDCs) were ratified.

The importance of the continued RCS emphasis on doctoral level training of individuals with demonstrated leadership potential in DECs (LDCs in particular) was reiterated.

Increased effectiveness of RCS was considered achievable through comprehensive approaches to the requirements for national research capacity: human resources having competencies in critical areas; infrastructure; national commitment; and continuity between prevention and control needs, research priorities and policy.

Intra- and inter-agency cooperation in research capacity building is essential to ensure that responses to research capacity needs in developing countries are comprehensive. TDR, as a multilateral agency with research capacity building as its mission, has a comparative advantage in promoting and negotiating cooperative actions to optimize investments in capacity building.

The importance of the utilization of situation analysis and the iterative process to focus research on priority research needs was underscored and should be incorporated into the design of research capacity strengthening activities (courses, workshops, projects).

Greater utilization of existing capacities, such as human and institutional resources, in the DECs was recommended. Support of training within the region increasingly utilizes (and supports) regional research training capacity. These and other strategies based on utilization of existing capacities should be continued and enhanced.

Upgrading of regional medical journals to international, indexed status was recommended, so that they may serve as a forum for the iterative process of research, and stimulate the communication and availability of research findings by DEC scientists to the national, regional and international communities.

WHO Collaborating Centres are a diverse worldwide untapped resource that can, and should, be mobilized to participate in the RCS mission.

Alternative and innovative methods of training and continuing education that address constraints on the development of human resources for effective and sustainable research capacity (time, distance, costs, competing other roles) and take advantage of global information technology should be exploited to achieve the RCS mission.

Assessment of research capacity and evaluation of impact of investments in capacity building are limited by the lack of reliable indicators. The complexity of factors involved in research capacity, an enabling environment for research, national policy and, ultimately, the improvement of health, render the identification and weighting of indicators a formidable challenge. Difficulties notwithstanding, TDR RCS was asked to take up the challenge to develop a set of indicators that will serve as the basis for an instrument of evaluation.

A stepwise strategy to develop a set of indicators, pilot test and then validate an evaluation instrument was recommended. The in-depth plan to develop and analyse the indicators and evaluation instrument should be presented to STAC at its next meeting.

PROSPECTIVE THEMATIC REVIEW: TDR RESEARCH CAPACITY STRENGTHENING

Terms of Reference

The Prospective Thematic Review of the RCS activities of the TDR Special Programme was convened, at the request of the JCB, in order to:

- Review the strategies, outcomes and lessons of the most recent period of the RCS component of the Special Programme, especially in relation to least developed countries (LDCs).
- Consider RCS within the scope of the WHO and TDR reorganization and future direction.
- Address questions and concerns about optimization of RCS by members of JCB.
- Review the capacity building strategies and priorities of other international agencies supporting health research.
- Identify new opportunities and needs that have not been addressed in research capacity building in relation to the prevention and control of the TDR diseases where they are endemic.
- Propose strategies and a plan of action, including development of indicators for research capacity and its impact.

Background

The greatest burden of communicable disease is borne by the least developed countries of the world. Research capability strengthening by the WHO TDR programme as well as other international agencies seeks to assist disease endemic countries to be able to develop solutions to their health problems. TDR has targeted specific transmissible diseases; however, research capacity strengthening in these diseases also generates capacity to respond to other diseases and contributes to health research capacity in general. The ability to develop, understand and adapt, as opposed to purchase technologies, involves basic and applied research capacity. The production of new tools and products in disease endemic countries favours their availability in countries with developing economies. These three fundamental aspects of self-reliance in disease prevention and control are addressed in the new structure of the TDR programme, constituted of strategic research, product development, intervention development and evaluation, and research capacity strengthening, through the RCS component of the Special Programme.

During the JCB meeting (June 1999), several of the donors proposed that research capability strengthening be enhanced within TDR. This recommendation coincided with the reorganization of WHO and TDR, and with the modest amplification of the disease

portfolio of the TDR programme to include dengue and tuberculosis (TB). A meeting to conduct a prospective thematic review was proposed as an initial step to obtain the perspective of the different participants and stakeholders in the TDR effort and the research capacity building undertaken by other international agencies promoting health research. Since the building of research capacity is a long-term and permanent process, and no individual agency can address the enormous needs of disease endemic developing countries in this regard, concerted actions among agencies and national and regional institutions are required. Furthermore, inclusion of research capacity building within national development plans is likely to be strategic to the support of research by the governments of the affected societies and, ultimately, to the sustainability of the process of health research development.

A particular concern and obstacle to the promotion of investment in RCS is the lack of adequate indicators of research capacity and the impact of investments on its development. Optimization of the still limited resources for building research capability is closely tied to having means of assessing the outcome of investments. The strategic distribution of resources in the training of individuals, institutional strengthening, courses and workshops, etc., should be guided by, and opportunely adjusted based on, indicators of impact or return on investment. Furthermore, the identification of goals or milestones would provide standards of reference for all stakeholders.

Representatives of donor institutions of the TDR programme (JCB), other international agencies supporting the development of research capacity, DEC stakeholders and TDR managers and staff participated in the prospective thematic review of the RCS activities of the Special Programme. The objectives of the meeting were to: 1) define the strategic direction and plan of action for RCS; 2) identify partnerships to optimize research capacity building; and 3) define the processes and formulate indicators of research capacity for evaluation and impact assessment. These objectives were to be based upon consideration of current RCS strategies, the collective experience of the different participants in research capacity building, and new opportunities to address the challenges of achieving research capacity in developing nations.

TDR in the new millenium

The new strategic plan of TDR is based on a long-term perspective of developing capacity to respond to diseases that are major contributors to the global burden of diseases. The plan will include the whole research spectrum from biological to social, using basic and applied research strategies. This challenging agenda will be achieved through partnerships involving public and private sectors of academia, industry, and governments in developed and developing countries. The interaction between research and development (R&D) and disease control will be strengthened by the 'push' of new research findings and technological advances,
and the 'pull' of disease control needs. Likewise, the new cluster arrangement of TDR should facilitate close interaction between R&D and disease control.

The portfolio of TDR diseases will include diseases that constitute major global burden, and others that disproportionately affect the poorest populations in targeted geographic areas. The stratification of the TDR disease portfolio represents a significant development and enables the focus of TDR endeavours to be more dynamic than in the past. Group I diseases (malaria and TB) reflect WHO priorities; Group II diseases (African trypanosomiasis, dengue, leishmaniasis) are neglected or orphan diseases in which TDR has a special role to provide long-term research support and promote the development of tools for prevention and control; Group III diseases (Chagas disease, leprosy, lymphatic filariasis, onchocerciasis) are those for which control tools are available and which

are of increasing relevance to non-TDR agencies and the WHO/CDS cluster for activities related to control, prevention and eradication; and Group IV diseases are those which are not currently addressed by TDR but which may be considered for inclusion in the future.

Major changes in either the *modus operandi* or mandate of TDR within the WHO Communicable Diseases (CDS) cluster are not proposed at the present time, in recognition of the achievement and strengths of TDR as currently structured. CDS Executive Director, Dr D. Heymann, reiterated his confidence in the TDR leadership and concurrence with the vision of the research component of CDS.

RCS within the TDR programme

Research capacity building in the disease endemic countries (DECs) and the development of tools for the prevention and control of the target diseases are the objectives of the Special Programme. The RCS mission is research based. Capacity building strategies are guided by a research philosophy, scientific methods, the conviction that learning is best achieved by doing, and that quality science can be conducted anywhere. Multiple mechanisms are utilized to address the challenge of research capacity building to prepare DECs to participate in R&D: workshops, training grants, re-entry grants, linkage grants, and technology transfer. The EMRO/TDR/CDS Small Grants Scheme, which has supported 10-12 low budget, control-oriented research projects annually in the Eastern Mediterranean Region since 1992, was cited as a capacity-building experience that could be replicated in other regions. Limited resources, the length of time required to achieve research capacity, and the lack of adequate tools or indicators for evaluation of research capacity and its impact were identified as major challenges for the RCS component of the TDR programme.

Emphasis on least developed countries is being achieved with 32% of current RCS investments being placed in LDCs and 60-80% of training grants being awarded for local or regional training. Partnering through linkages is inherent to RCS grants, and decisions are based on capacity building potential, scientific merit and relevance to the workplans of the different steering committees. Although the overall percentage of female trainees has increased over the last several years, from 27% in 1990 to 35% in 1999, females are still less represented than males, especially among the African trainees, yet are more often successful in obtaining training grant awards. This indicates a need to identify mechanisms to attract more women to undertake research training.

Intervention Development and Evaluation (IDE) is a newly constituted unit that bridges the basic research activities of the Product Research and Development (PRD) and Basic and Strategic Research (STR) units through applied multidisciplinary research. The mission is the development and testing of applicable, affordable policies, tools, and interventions. Since all community-based interventions are behaviourally based, using health education packages, the strengthening of social science research capacity and the participation of senior national social scientists, who are scarce in DECs, constitute RCS priorities. A novel strategy to address this need is being implemented by IDE and consists of the identification of young social scientists enrolled in M.Sc. programmes to conduct research within IDE projects and the involvement of senior social scientists in the countries where the studies are being undertaken as supervisors. Involvement of disease control personnel in RCS activities, especially in acquiring planning and management skills, was highlighted as a specific need that also provided an opportunity to increase the effectiveness of interventions as well as promote the utilization of research results.

Disparity in the capacity to develop proposals can result in good ideas losing out to better presented but less novel or relevant ideas. Furthermore, difficulty in preparing proposals very often is accompanied by limited experience and skill in project management and study conduct. Mechanisms to address these deficiencies are needed so that research funding can be obtained by DEC investigators and utilized effectively.

RCS activities within other R&D steering committees and task forces include project development grants, within-project training, workshops (good clinical practices - GCP, good laboratory practices - GLP, social and economic research, epidemiological data analysis, protocol development), and networks and courses (e.g. the annual and refresher WHO courses on 'Immunology, Vaccinology and Biotechnology Applied to Infectious Disease'). Tools for promoting quality control of research that will facilitate the institutionalization of good research practices have been, or are being, developed. These include guidelines for ethical review of biomedical research and GCP. In addition, the need for guidelines for research involving experimental animals (including toxicology), using standards achievable by DECs and meeting internationally acceptable principles, in the product development agenda were underscored by the participants in the meeting.

RCS actions targeted to the new diseases (TB and dengue) in the TDR portfolio have been initiated through calls for training grants. Other strategies will be tailored to the workplans and needs identified by the corresponding steering committees, which are currently being constituted.

Research capacity building in the social, behavioural and economic sciences since 1980 has ranged from short-term training through workshops, a regional small grants programme, training grants for M.Sc. and Ph.D. studies, and the establishment of M.Sc. courses in Asia and Africa. Some of these strategies will be intensified in accordance with the needs of the TDR mission, and new approaches to integrate social sciences into multidisciplinary health research capacity are being pursued.

Evaluation and Impact Assessment and determinants of the success of RCS

Evidence-based decisions for disease prevention and control, and availability of cost-effective tools, are expected outcomes of the TDR programme. However, impact is more easily determinable for operational than for basic research. Therefore, intermediate indicators are needed to monitor the progress towards the programme goals. The need to redefine or expand the definition of the 'end' of research in terms of the other sector clients of the 'product' was raised as a consideration in identifying indicators of impact. For example, situational analysis of any DEC will invariably generate compelling research questions relevant to national control authorities and to TDR and its constituent research community. Nevertheless, there often appears to be a gap between the direction of research and disease control that is reflected in the weakness of researchers to ask relevant questions. The ability to identify major issues and to establish an agenda to address them is a limiting factor in achieving impact. Research capacity evaluation and strategies to strengthen this capacity must pay attention to the 'pull' of prevention and control needs. The iterative process of research needs to be emphasized, as occurred in the Onchocerciasis Control Programme (OCP) in which a 'seamless' relationship was achieved between research results and work in the field. The crucial importance of responding to the question 'so what?' of both research hypotheses and results must be built into this iterative process.

The changing global scenario has had an impact on the research capacity needs, opportunities, and incentives of DECs, especially in the least developed countries. Globalization has increased the need for multicountry studies, and the complexity of issues has obliged multi- and inter-disciplinary approaches. Health services reform and the communications revolution open or widen gaps, as well as provide new windows of opportunity. Research capacity strengthening should enable research, empower researchers and contribute to R&D success and sustainability. Factors that contribute to successful research capacity building include the development of competencies in areas critical to solving priority problems and effective communication of research results so that they are translated into policy and programmes. Capacity building should create an enabling environment. Project planning, design and monitoring should take these factors of success into consideration as well as the individual and institutional competencies needed to achieve specific research results. In consequence, research capacity strengthening may require:

- Large programme grants
- Research grants with non-research components
- Effective partnerships including other programmes
- Commitment to long-term sustainable approaches

Steps in developing an evaluation methodology and introducing it into the mindset of all stakeholders include the definition of a limited number of indicators that address the impact sought by research capacity building, the incorporation of indicators from the outset of capacity strengthening endeavours, and assignment of responsibility to the research community to help promote incorporation of research findings into policies and programmes, i.e. to become advocates. Indicators will need to be scaled to individual, project, programme, and institution over time, and take into account the heterogeneity of countries with respect to the level of economic wealth, the existence of policy and budgetary allotment for research, and the institutional and career structures for research. Several measures could enhance the effectiveness of research capacity investments in the short term. These include partnering more effectively among donors, appropriate use of linkages within WHO, and identification and enlistment of developing country expertise and institutions to provide capacity strengthening. Awareness of the potential bias of a technocratic approach to problem solving as opposed to science-based research will be needed in designing evaluation tools. Evaluation is in fact a learning tool that can not only provide information on what works best in different circumstances, but can also be used to identify sound investments in research capacity strengthening. Evaluation is essential to convincingly document that research capacity building is indeed a good investment.

The view of specific capacity building experiences by scientists from DECs highlighted some of the factors that contributed to success and others that represented constraints. The role of the TDR programme in sustaining DEC research through critical moments in the development of research capacity was clear and demonstrable. The importance of RCS interventions in enhancing research support from other agencies was also emphasized. Vulnerabilities of DEC research capacity at the different stages of development were identified and may serve to stimulate the development of RCS strategies that address these common threats to the long-term process of achieving sustainable research capacity. 'Critical mass' was a recurrent concern of both donors and DEC stakeholders. Rather than a particular number or profile of human resources, this refers to a minimal productively sustainable unit of researchers. Vision and ability to identify important research questions and leadership potential were decisive qualitative aspects of achieving critical mass. Rigorous scientific standards, international scientific interaction and track record were considered predictive of success.

The presence or absence of career pathways for investigators in the national agenda was identified as a crucial determinant of sustainable research capacity. Entities such as national research councils, ministries of science and technology development and mechanisms of support for career investigators are both a fundamental necessity for capacity building and an indicator of the level of recognition of research as a national priority. Attrition in the ranks of investigators in developing countries, who are compelled by the adverse environment for conduct of research to pursue alternative career options, is a major threat not only to achieving critical mass but also to sustaining research capacity.

Social scientists face particular challenges in biomedical research institutions and in developing countries. First, social scientists are scarce in these settings. Second, they are perceived as service providers to prepare questionnaires for biomedical researchers, or to conduct specific activities rather than fully participate in multidisciplinary research. As the role of social scientists in designing and implementing interventions becomes recognized, these obstacles are likely to diminish. Nevertheless, the need to train social scientists in DECs is urgent.

Opportunities for cooperation and synergy amongst agencies

The Council on Health Research for Development (COHRED) has established networks with national stakeholders in essential health research. The advocacy capability with national stakeholders and knowledge of countries having mechanisms in place for implementing health research are potential assets in partnerships for RCS. The organization's capacity to mobilize resources and provide technical support could enhance RCS initiatives.

The Fogarty International Center of the US National Institutes of Health offers a broad spectrum of programmes to support health research through linkages between US institutions and developing countries. These programmes serve to maintain US competence and to promote the development of global capacity to respond to infectious and non-infectious diseases through research and collaborative networks. Experience in health research capacity building in the ecology of infectious disease, emerging infections (especially malaria and tuberculosis), drug discovery, bioethics and social science applied to the prevention and control of HIV and reproductive health, and the development of medical informatics, could provide opportunities for partnerships with the RCS component of the TDR programme.

The Global Forum for Health Research (GFHR) has developed a framework for establishing priorities for health research from a global perspective that could be applied to the current portfolio of diseases. The GFHR is an advocate for research on diseases that constitute the greatest global burdens and for the importance of health education and behavioural research in the prevention and control of communicable diseases. Both emphases are relevant to TDR.

USAID is a development agency and as such considers that research, and the support of research capacity, are crucial for sustainable development. Current emphasis on RCS is through the conduct of applied research by developing country researchers, rather than academic training and infrastructure development. A broad spectrum of research is supported including biomedical, epidemiological, socioeconomic and operations research. National stakeholders are identified and involved in research and capacity building from

the outset of project development. The development of evaluation criteria and indicators for research capacity are relevant to the USAID mission, and initial efforts made in collaboration with colleagues at Harvard Institute for International Development and TDR RCS staff to define such indicators, could provide insight into, and a starting point for, this complex task.

The Wellcome Trust is the major private international financial supporter of scientific research. The international programme links science in the UK with the rest of the world. Research capacity strengthening is science-driven and focused on individuals and groups rather than direct institutional support. Long-term support is collaborative and based in national institutions, e.g. overseas units at Kenya Medical Research Institute (KEMRI), and Mahidol University, Thailand. Real costs including personnel salary supplements, rather than cost sharing of research, is the modality of support. Research excellence and international competitiveness are requisites. Partnership arrangements with other funding agencies to support research capacity would require full cost support of the research, which is the policy of the Trust.

The Danish International Development Agency (DANIDA) has experience in enhancement of research capacity through its 'ENRICA' partnership arrangements between Danish and developing country institutions and investigators. Current emphasis is placed on institutional strengthening in order to assure return and productivity of trained scientists.

The Swedish International Development Agency (Sida) is supporting research capacity through the strengthening of universities in developing countries. Since most research in developing countries takes place in institutions of higher education, the strengthening of the universities broadly contributes to an enabling environment for research. Opportunities for integration of these and other bilateral investments in development with national and international strategies for research capacity strengthening should be explored.

The Netherlands provides health sector support as a priority for development. Least developed countries are the beneficiaries and define the areas to be developed with the support. A first evaluation of the new bilateral approach through which 17 countries are being supported shows none has indicated research as a priority. Using R&D funds, the Netherlands intends to continue research capability strengthening in developing countries. These experiences highlight the low value placed on research as a factor in national development by the poorest countries.

The European Commission (EC) supports research capacity building within the framework of research projects. Partnership ventures between the TDR and the EC have not previously been possible but could again be explored with the International Cooperation Program (INCO) and other programmes conducted with developing countries.

World Bank loans to the governments of developing countries provide opportunities for research capacity building, but require early negotiation to achieve the assignment of a portion of the funds for capacity building, e.g. schistosomiasis control programme in China. This strategy has the advantage of obtaining a commitment of national resources to research capacity building.

The era of 'carte blanche' non-programme-/project-based institutional strengthening by various agencies has clearly ended. The balance between training and research support for individual scientists on the one hand and institutional support based on programmes (including regional networks and both South-South and South-North linkages) on the

other, varies across agencies and is subject to change in one or the other direction over time. These shifts in priority and strategy contribute to the 'pendular swing' in funding of research capacity building.

Working Groups

To address the specific objectives of the meeting, two working groups were formed by the participants. One dealt with the definition of new strategies and a plan of action for RCS, the other with evaluation and identification of indicators of research capacity. The outcomes of these two working groups follow.

Working group on future strategic direction of RCS

(Chairperson, Dr R. Lane; Rapporteur, Dr L. Hviid)

The discussions of this working group focused on the two fundamental capacity building modalities: individual training and institutional strengthening. It was noted that the definition of 'institution' was a group of researchers as opposed to a physical structure. The group was pleased with the existing RCS funding mechanisms as had been previously presented by Dr Modabber. The range of grants was seen as appropriate for supporting the RCS mission of TDR.

With respect to training, it was recommended to continue with the **focus on formal degree training (M.Sc. and Ph.D.)**, although diploma and certification courses may be utilized to address specific capacity needs (such as research administration and project management capacities) in some circumstances. For selection of individuals, it was recommended that applications be considered as part of an institutional package rather than on an individual basis. In addition, leadership capacity/potential of applicants to generate a research group was considered a priority selection criterion, especially for investments in doctoral training outside the home country. Any training that occurs should fit within a strategic plan for the applicant's home institution. One advantage of this approach would be increased likelihood of achieving a critical mass of researchers in an institution able to sustain research activities. It was further recommended that RCS continue its approach of training individuals within their own country or region, allowing for an attachment abroad, since the 'sandwich' training programme was seen as the preferred means of training. This capacity building strategy does not remove the trainee from their environment for any great length of time, and does not deplete the home institution's human resources.

The concept of an '**institutional package'** was reiterated in relation with institutional strengthening (or research group development). Training within major research groups in DECs, to more effectively utilize existing research capacities, was recommended. The comprehensive approach to research capacity building would be attractive to some bilateral agencies for collaboration and joint funding at the country level. The plan for research capacity strengthening might also include joint funding between TDR and other agencies, the participation of WHO Collaborating Centres, and the establishment of links with other related national programmes. Any group applying for support should have a clear plan for its research needs and development, and a clear commitment for its research programme downstream. The pitfalls of planning in isolation by individual investigators, or even institutions, when preparing capacity strengthening research projects can be avoided by requiring a long-term perspective of the endeavour (training, research) being proposed. Hence, the institutional package would ideally include a medium- to long-term plan that defines the group development needs consistent with the

development of a critical mass of independent investigators. These requirements could occur concurrently or sequentially depending on the needs of the institution and the resources available from TDR and other sources. It was clear that this approach would require a proactive effort by the RCS secretariat and the working group endorsed this.

However, the group also supported the annual competitive 'Call for Applications' and recommended that a balance be made between these individually or institutionally initiated and targeted proactive approaches. This decision is to be expressed to the members of the Research Strengthening Group.

The **strengthening of key regional journals** was recommended as a means of creating a regional forum with international recognition in which DEC scientists and international scientists would contribute to knowledge of regional as well as international concern. These media would also serve to bridge research findings with disease prevention and control. Impact on local and regional health policy would be favoured by strong, universally recognized journals addressing issues of regional priority. Likewise, the promotion of national, regional and ultimately global epidemiologic reporting systems would strengthen the iterative process of problem solving driven by prevention and control needs and innovation through research.

The group noted that one of TDR's strengths is the promotion of **South-South collaborations.** TDR, as a multilateral agency, in many cases is better positioned to promote such collaborations than bilateral agencies, which may have specific national restrictions or requirements. This should be continued. In addition to the local and regional training, RCS should also continue its efforts in **developing training capacities in the South**. The working group noted the ongoing development of three M.Sc. programmes in clinical epidemiology in Africa, and the RCS previous achievement in developing regional training capacities in health economics in Thailand and South Africa. These efforts could be extended to promoting research within other university curricula that feed into the RCS training programmes. Utilization of alternative approaches to training that take advantage of excellent **distance learning programmes** developed by some of the most experienced institutions in a given field, and rapidly evolving communication technologies, should also be included in the portfolio of training options. The development of self-teaching tools such as menu driven computer-based programmes should also be explored. Specific needs such as attracting more women into training programmes and outreach to countries that lack the tradition and faculty to address priority training areas including epidemiology, health economics, social sciences, and research planning and management, could be addressed by such alternative training strategies. Furthermore, certificate, diploma, and M.Sc. training could be provided through innovative training in non-traditional formats without diminishing rigour or the quality of instruction.

A clear priority for RCS is to continue its efforts to develop research capacities in **countries with less developed research capacities (LDRC**).

The working group acknowledged that these countries might exceed the economic definition of Least Developed Countries (LDC). It was noted that funding awarded to these countries had grown from 15% of the RCS budget in the early 1990s to the current level of over 30%. The group recommended that RCS continue its efforts to increase the proportion of RCS resources allocated to LDCs and suggested a long-term goal of 50%. It was reiterated that RCS does not need to act in isolation but should actively look for concurrent or back-to-back funding with other agencies.

In general, the **balance between approaches** (individual and institutional) and disciplines (laboratory and non-laboratory science) were seen as acceptable. The group recommended that, while strengthening capacities in the social sciences (including health economics) required special attention, RCS should not abandon its support to the basic or laboratory sciences. Laboratory-based research should continue as part of the RCS agenda but, where possible, should be driven by the TDR R&D agenda. Further, basic research should be supported where there is lack of effective interventions. Applied research should look to identify **emerging topics of importance**, for example bioinformatics (computational biology) and post-genome subjects, and gaps that may require intensified support. These gaps include clinical epidemiology, especially the capacity to design and conduct clinical trials of new products, social sciences, biostatistics, and communication and informatics skills. It was also noted that the new diseases (tuberculosis and dengue) recently added to the TDR portfolio may bring with them new needs and opportunities.

RCS activities should not occur in isolation within institutions; rather, activities should be developed in a broader national context. Therefore, RCS should also promote a **research culture** in ministries of health and other relevant national or governmental organizations. One suggested indicator of government commitment to research would be the existence, and magnitude, of the budget line for research. Innovative mechanisms and incentives to obtain (and to recognize) national counterpart support for TDR and other RCS grants should be introduced into the future RCS agenda. To effect this broader approach, it was noted that RCS would need to strengthen collaborations with other groups in WHO, including the Advisory Committee on Health Research.

Working group on evaluation and impact assessment

(Chairperson, Dr D. Jegathesan, Rapporteur, N. Saravia)

Since RCS is only part (albeit a very important part) of TDR, the evaluation and impact assessment of the effectiveness of RCS is especially challenging. Although disease prevention and control are the ultimate goals of the programme, at the capacity building level, the impact is multifactorial. Attribution of diminished disease to a specific intervention or measure is practically impossible; nevertheless, direction of the research capacity strengthening process is towards this end. To assist the definition of criteria and indicators for evaluation, a matrix approach of analysis was adopted (Figure 1).

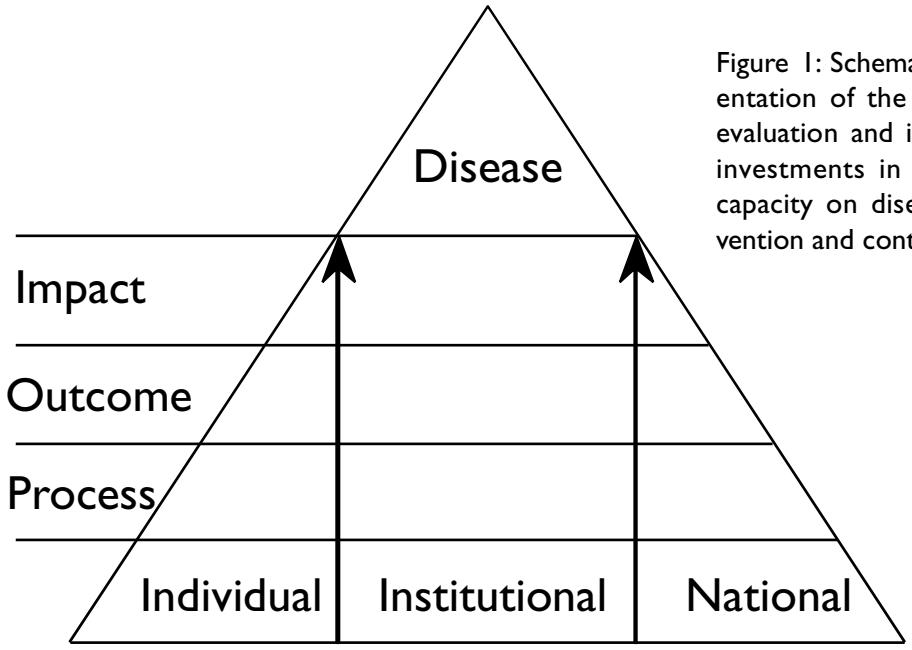

Figure 1: Schematic presentation of the levels of evaluation and impact of investments in research capacity on disease prevention and control

The matrix allows investments in individuals, institutions and countries to be considered with respect to process, outcomes and impact towards the ultimate goal of diminished disease.

Table 1 (overleaf) summarizes several potential indicators for each level and target of capacity strengthening.

A global perspective of evaluation and impact was considered necessary and approachable through the stepwise development of indicators and identification of processes for institutional, national and regional research capacity strengthening. For example, issues such as consensus building on research ethics, and guidelines and policy for patenting, inevitably have global implications and require consideration at each and every level. Although not included in the matrix drafted by the working group, global processes and indicators are to be considered in the development of the framework for the evaluation and impact assessment of research capacity.

The working group recognized that the definition of indicators, and their qualitative and quantitative assessment, will require more in-depth analysis by a team with appropriate expertise, but it believed that the matrix provided a framework for this task. A stepwise strategy to develop an evaluation instrument was recommended. The working group and plenary discussions led to the proposal that an initial screening and pilot testing of the extensive indicators listed in the resource paper *'Health research capacity strengthening: framework and indicators for assessment'* be conducted in the short term among representative recipients of RCS support and existing databases for trainees and institutions. This screening would provide a basis and institutions. This screening would provide a basis for identifying the most useful indicators, which could be used in the development of an evaluation instrument. The putative evaluation instrument would require validation in different circumstances of research capacity and periodic reassessment in the light of new information and changing needs.

Table 1: Evaluation criteria and potential indicator areas of impact for Research Capability Strengthening in disease-endemic developing countries

	Individual	Institutional	National	Global
Impact of RCS	• Incorporation of research results in policy documents and country programmes • Incorporation of the individual into policy-making bodies at national/regional/global level	• Cumulative (individual) involvement in national, regional, global level policy-making bodies • Incorporation of institutional representatives into national policy-making bodies (consultations)	• Implementation of policy at national level • Budget allocation for research and continuity over time (% GNP)	• Implementation of evidence-based policy at regional/global level
Outcome of RCS	• Publications: national, international • Citation index • Grants: number, magnitude, diversity of source • Trainees, undergraduate, postgraduate, % of women • Collaboration with established international groups • Awards • Tools/patents • Collaborative projects	• Total number of publications and citation frequency over time • Number of national, regional, international trainees • International grants: number, diversity, magnitude and over time • Participation in inter-institutional networks • Proportion of projects that are inter- or trans- disciplinary • Denominator of total funding from TDR • Number of, and role in, collaborative projects; proportion of projects that are collaborative	• Product • Policies • Tools • Introduction of health improving instruments • Evidence (research results) for policy development • Institutionalization of guidelines	• Product • Policies • Tools • Introduction of health improving instruments • Evidence (research results) for policy development
Process	• Success in training • Reintegration to home country over time • Promotion record	• Number of funded activities and level of funding 1. Local (state) 2. National 3. Regional 4. International • Number of functional research groups • Number of principal investigators within supported centre (conducting independent externally funded research) • TDR total support over time	• National commitment to research • Existence of a medical research council • Research included as line item in national budget • Contribution to TDR diseases	• Regional networks to achieve TDR research goals

Recommendations

The group presented the following recommendations for the RCS evaluation and impact assessment:

- Establish an independent working group to develop a questionnaire-based instrument to be pilot tested as an evaluation tool for indicators of impact. This working group may require the participation of a consultant to develop the pilot instrument and coordinate the development of the evaluation strategy.

- Use the extended questionnaire developed in the paper by Simon et al as a means of testing the utility of the information and as a basis to develop a shorter format incorporating the most relevant indicators of RCS. A limited number of institutions that received RCS support, and institutions not strengthened by TDR, should be asked to assist in the process by filling out the questionnaire. This is a short-term objective that would provide an initial screening of indicators for the pilot evaluation instrument.

- Re-analyse data available on trainees and institutions using the indicators selected on the basis of the screening conducted in relation to the above point. This should be accomplished in the short term (two months).

- In addition to the evaluation instrument to assess impact of RCS investments, explore the feasibility of developing a 'rapid diagnostic' instrument for prospective application in RCS activities. The goal of this instrument would be to determine the existing level of research capacity and potential for development of sustainable research capacity

- Include indicators of research capacity in future RCS project applications and reporting forms to, *inter alia*, show in advance to the applicant the criteria that will be used in subsequent evaluation.

- Consider the long-term nature of the RCS process and need to conduct periodic long-term follow-up in evaluating impact of capacity strengthening endeavours.

Annex

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