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From the efficacy of disease control tools to community effectiveness

Case studies from the biomedical and health systems research activities of the Swiss Tropical Institute in Africa

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Abstract

Neither high theoretical efficacy of disease control tools, nor diagnostic accuracy, nor good compliance, nor adequate coverage can lead on its own to the final goal of community effectiveness. There is a complex relationship between these factors. The different steps in the process leading to effective health care in the community are discussed on the basis of biomedical and health systems research activities of the Swiss Tropical Institute. Schistosomiasis and malaria control provide the background to problems related to the efficacy of tools. In particular, information on the trial of a malaria vaccine candidate (SPf66) is given. Approaches to the rapid, accurate and economical diagnosis of communities at risk are discussed with reference to *Schistosoma haematobium* and *S. mansoni*. Health service support projects in Tanzania and Chad are presented to exemplify problems linked to the compliance of users/providers and coverage. Finally, it is shown that community effectiveness depends on the highest possible success rate for each step. This requires the co-operative efforts of all those involved: the scientist, the manager, the community health worker and, last but not least, the community itself.

Introduction

The year 2000 has been set as a benchmark for the completion—or near-completion—of the 'Health for All' agenda. Moving towards this goal involves regular assessment of the health development process, and of what has been achieved in research and direct health service support activities. Many important advances have indeed taken place in the diagnosis, prophylaxis and therapy of communicable diseases. New, safe and efficacious drugs such as praziquantel, ivermectin, benzimidazoles and mefloquine have offered new approaches in drug therapy at both the individual and community levels. Novel serological tests, the polymerase chain reaction technology with specific gene probes, and the establishment of simple field tests, have substantially facilitated clinical and community diagnosis. Vaccine development has helped to improve existing vaccines as well as to introduce new ones. For some diseases new tools have become available for national and regional control programmes; for example, insecticide impregnated bed nets to reduce malaria-related morbidity and mortality, and vector control strategies based on the long-term experience of the Onchocerciasis Control Project in West Africa.

Impressive advances have been made in the implementation of the primary health care (PHC) strategies and in the management of health services. However, although many countries have adopted the PHC concepts and established an implementation strategy, there still appear to be major problems in setting up a decentralized, health district management approach that considers the full spectrum of potential users and all providers (governmental, non-governmental, traditional, private) (WHO, 1988).

The ultimate aim of developing efficacious disease control tools and of tailoring health service management to a given socio-ecological setting is to reach community effectiveness. The thing that counts in terms of bringing real improvement in health is not the theoretical efficacy of the tool, but its effective application. It is the aim of this review to invite readers to take a walk from efficacy to community effectiveness, following the staircase illustrated in the Figure. We illustrate the steps of this path by examples from recent and continuing studies that are part of the health research and service support programmes undertaken by the Swiss Tropical Institute in Basel (STI), within a framework of national and international collaboration in both rural and urban settings in Tanzania and Chad.

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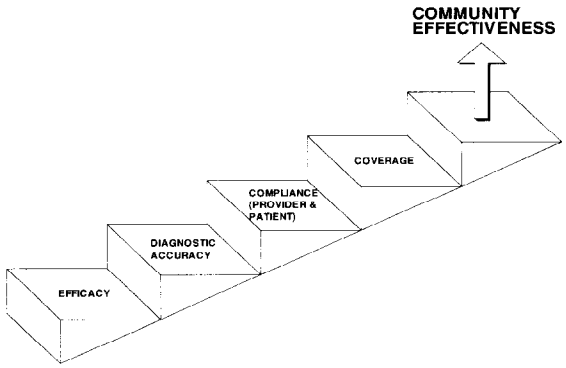

Figure. The path from the efficacy of a control tool to its community effectiveness. An efficacious tool must reach the target group (diagnostic accuracy needs to be high), users and providers should comply, and the whole action requires a high level of coverage in order to retain the efficacy of the tool at the level of a community (after VLASSOFF & TANNER, 1992).

Developing efficacious tools

The first step represents the availability of efficacious control tools. The development of such tools will be described with reference to work on schistosomiasis and malaria done by teams at the Ifakara Centre in Tanzania (formerly the Swiss Tropical Institute Field Laboratory).

In schistosomiasis, a safe drug, praziquantel, is available. It has been used widely and successfully in many

endemic settings over the past 10 years. The question of its efficacy may therefore not appear to be crucial. However, recent reports on unexpected possible failures of praziquantel and high side-effect rates in a large-scale project in northern Senegal (WHO, 1992) point to the need to assess efficacy in a broad range of different endemic and socio-ecological situations. In order to provide more information for inter-site comparisons, studies in Tanzania attempted to investigate the efficacy of 2 doses of praziquantel (20 vs. 40 mg/kg, single oral dose), not only in clearing *Schistosoma haematobium* parasite loads but also in reducing morbidity among children (HATZ *et al.*, 1990). These studies showed that, at the given level of *S. haematobium* endemicity, the lower dose of 20 mg/kg was equally efficacious in gradually reducing bladder and kidney morbidity, as assessed by sonography, within 6 to 12 months after treatment. This finding clearly leads to substantially lower treatment costs for this endemic setting, as the drug costs are crucial in any morbidity control strategy (GUYATT *et al.*, in press).

Another line of research in the development of tools for schistosomiasis control was the assessment of the feasibility of using plant molluscicides in snail control. Synthetic molluscicides that need to be imported are too costly for Tanzania, given the low level of resources allocated to health per caput (about US$ 1.20; 1991/92 budget and exchange rate). The first step included identifying local plants known to have molluscicidal properties and looking at their distribution. This knowledge came firstly from members of the local population, who indicated the plants commonly used for fishing, and secondly—to a much smaller extent—from the scientific literature (HAERDI, 1964). *Swartzia madagascariensis* (Desvaux) (Leguminosae) was identified as the most suitable candidate, and a series of laboratory and field tests was carried out, including toxicity and mutagenicity assays (SUTER *et al.*, 1986; BOREL & HOSTETTMANN, 1987). The most interesting results were not only the identification of the saponin responsible for the molluscicidal activity (oleanolic acid: 3-o-β-D-glucuronopyranosyl (1–3)-α-L-rhamnopyranoside) and the measurement of its toxicity (100% lethal concentration=3 mg/L for *Bulinus* spp. and *Biomphalaria* spp.), but also the fact that field trials established the conditions and determinants for efficacious use in the various communities (TANNER, 1989a).

With malaria, the problem of finding efficacious methods for control has by no means been solved. In Tanzania, there are few areas in which there is little or no malaria, and most of the country experiences intense transmission resulting in substantial morbidity and mortality (KILAMA & KIHAMIA, 1991). In general, the situation has deteriorated since CLYDE (1967) mapped the distribution of endemicity. Most of the populated areas at low altitude are holoendemic, with transmission for more than 6 months of the year. This is also the situation in the Kilombero valley, where the Ifakara Centre has been doing research on malaria for many years. An analysis of the endemic situation was undertaken, and potential tools such as insecticide impregnated bed nets and a vaccine candidate are now being evaluated at community level.

The major vectors belong to the *Anopheles gambiae* complex and the *A. funestus* group. *Plasmodium falciparum* is the predominant parasite species, and is acquired by about 80% of infants by the age of 6–8 months. Parasite prevalences then remain above 80% throughout childhood, but are somewhat lower in adults (SMITH *et al.*, in press). This study also showed that, although mosquito densities are seasonal, transmission occurs all the year round, and neither the parasite prevalence nor the infant conversion rate show any marked seasonality. Finally, morbidity surveillance in the community indicates that the prevalence of measured fever (axillary temperature ≥37·5°C) is greatest towards the end of the first year of life. Among children aged 1–5 years the prevalence of fever is around 5%, with about 30% of this morbidity being attributable to raised *P. falciparum* parasitaemia (SMITH *et al.*, in press).

The Ifakara Centre started research on malaria transmission and control in the 1960s (FREYVOGEL & KIHAULE, 1968). This initial research was later followed by longitudinal studies on the development of resistance to antimalarial drugs (KOELLA *et al.*, 1990) and on the development of the immune response to different epitopes of the *P. falciparum* circumsporozoite protein (TANNER *et al.*, 1986b; DEL GIUDICE *et al.*, 1987, 1990). Later the Ifakara Centre became the base for the Kilombero Malaria Project (KMP); a collaboration between the Ifakara Centre, the STI, the Universities of Wageningen and Nijmegen in the Netherlands, and the Immunology Research and Training Laboratories of the World Health Organization (WHO), Geneva. This project aims to define and validate operationally useful indicators of transmission and morbidity, in order to monitor and evaluate intervention studies and the impact of disease control at the community or health facility level.

After a series of baseline studies in 1989 and 1990, a randomized trial was started in 2 villages to evaluate the use for personal protection against malaria of bed nets and various locally-available fabrics (e.g., curtains made of fertilizer bag material) impregnated with insecticides. The primary outcome of interest is morbidity, detected through household surveys undertaken every 2 weeks. This study, together with the many other bed net trials at different sites supported by WHO/Tropical Disease Research (TDR), the UK Overseas Development Administration (ODA) and the International Research and Development Corporation of Canada, is seen as a contribution to the question of whether insecticide-treated bed nets will be effective in areas of Africa where the pressure of malaria infection is continuous and very high.

Parallel to this set of intervention studies, in 1992 the Ifakara Centre also became the site for the double-blind, randomized placebo-controlled phase III trial of SPf66, a candidate malaria vaccine (PATARROYO *et al.*, 1988). SPf66, a synthetic polymer that contains sequences from several parasite antigens, has undergone extensive preclinical and clinical tests in South America, which have shown it to be safe and immunogenic in humans (AMADOR *et al.*, 1992; PATARROYO *et al.*, 1992). Based on a WHO/Pan-American Health Organization commission report in 1990, and in view of the need to establish the efficacy of SPf66 in areas of very high and continuous transmission, a double-blind randomized placebo-controlled trial was planned. It aims to determine whether SPf66 is effective in reducing the prevalence and intensity of parasitaemia and the incidence of clinical attacks of malaria in young Tanzanian children. This phase III trial represents a collaboration between the National Institute for Medical Research of Tanzania, the STI, the Consejo Superior de Investigaciones Cientificas (CSIC) of Spain, and the London School of Hygiene and Tropical Medicine, and receives financial support from CSIC, WHO/TDR and STI.

The trial was launched in August 1992 after all the necessary technical and ethical clearances had been obtained. A preliminary randomized double-blind placebo-controlled study of the safety and immunogenicity of SPf66 was conducted in 12 adult Caucasians and 30 adult male volunteers from the endemic area, followed by a similar study among 50 children aged 1–5 years. These studies allow close monitoring of any side-effects of the vaccine in a group similar to the target group of the main trial.

Providing the results of these preliminary studies are considered satisfactory by the monitors, a double-blind randomized placebo-controlled trial of vaccine safety and efficacy will be undertaken in 600 children aged 1–5 years in Idete village, 20 km west of Ifakara. This main part of the trial could start in March 1993. Children will be individually allocated at random to receive 3 doses of

Table. Health development projects for which the Swiss Tropical Institute acts as executing agency on behalf of the Swiss Development Co-operation

Project/Programme	Country	Content
Moyen Chari	Chad	Rural district support
Chari Baguirmi	Chad	Rural/semi-urban district support
Central Hospital, Medical Department, N'djamena	Chad	Hospital management as a part of a district referral system support
National Public Health School, N'djamena	Chad	Training and manpower management
Co-ordination, N'djamena	Chad	Ministry of Health support and programme co-ordination
Urban health, N'djamena	Chad	Urban district support
Urban health, Dar es Salaam	Tanzania	Urban district support
Kilombero Health Research and Support Programme, Ifakara	Tanzania	Research and rural district support

SPf66 or of placebo over a period of 6 months. The follow-up will last for 12 months after the third dose, and will consist of active and passive (at the village dispensary) case detection. Outcome measures include infection, level of parasitaemia, and number of malaria episodes. As additional measures, the packed cell volume and the exposure to mosquito bites will be monitored and chloroquine consumption determined. Sera will be collected at regular intervals. A detailed description of the trial will be given by P. Alonso, M. Tanner and T. Teuscher*.

If the trial goes well, the codes will be broken by August 1994, allowing the assessment of vaccine efficacy as well as further studies on the immunological profiles in this study population. The study will have sufficient power to detect a 50% reduction in the incidence and prevalence of overall and high intensity parasitaemia, and to detect a 50% reduction in the incidence of clinical malaria. Hopefully, this trial will not only provide us with a scientifically sound assessment of the efficacy of the SPf66 vaccine, but also equip us with a valuable new tool for malaria control.

Diagnosing communities at risk

Once an efficacious control tool has become available, the next step involves developing a strategy to deliver it to the people who need it, either whole communities or groups within the community. In countries where tropical diseases are endemic the delivery of control tools within a PHC approach faces the constraint of limited financial, material and human resources, and also the difficulty of the satisfactory deployment of those resources that are available. This can be illustrated in the case of malaria or schistosomiasis by the inability to deliver efficacious drugs to defined target groups, even though the drug and enough trained staff are available (BRADLEY, 1991). These problems could be partly overcome with more use of the potential of community participation, which includes the key issue of addressing the community or the groups within it that are in need.

The potential for community participation is not unlimited, since people are confronted with a multiplicity of problems in their daily lives. Health is only one among a vast range of issues and is in itself a broad and diverse area with potentially conflicting priorities. If communities are to participate in a programme, prioritizing health or community development problems cannot only be based on normative needs, but should include the perceived needs, if a disease control programme is to be successful and truly based on PHC principles (TANNER *et al.*, 1986a; TANNER, 1989a; VLASSOFF, 1992).

Communities which bear a large burden of morbidity or mortality, or both, are likely to be more concerned and therefore likely to participate. Furthermore, identification of these target groups can substantially improve the cost-effectiveness of an intervention (JAMISON & MOSLEY, 1992). Target groups may be defined geographically, in the case of focal diseases, as 'high-risk communities', or they may be defined as a particular segment of the community, according to age, occupation or other relevant criteria.

Whatever the target group(s), the key issues in implementing a targeted control strategy of proven efficacy are coverage and diagnostic accuracy, at both the group and the individual level. The intervention has to reach the target group(s) and be delivered to them as widely as possible. Thus, one tries to avoid the group(s) not in need of the particular intervention, with the aim of achieving high coverage efficiency (TANNER, 1989b). The concept of coverage efficiency, as proposed by ROSSI & FREEMAN (1985), is expressed as follows:

$$\frac{\text{No. in need served}}{\text{Total no. in need}} - \frac{\text{No. not in need served}}{\text{Total no. served}} \times 100$$

An increasing positive number (towards 100) indicates appropriate targeting, while negative numbers indicate that inappropriate targets are being served.

The concepts of diagnostic accuracy and coverage can be illustrated by work on urinary schistosomiasis done by the Ifakara Centre over the past 8 years. Particular reference will be made to the experience in the Kilombero and Kilosa Districts of the Morogoro region in central Tanzania (TANNER, 1989a; LENGELER *et al.*, 1991a, 1991b).

The distribution of infection and morbidity of schistosomiasis is highly focal (JORDAN & WEBBE, 1982). The disease is chronic and its impact on people's well-being, working efficiency and productivity is measurable only above a (community-specific) prevalence and intensity threshold. Consequently, schistosomiasis control aiming primarily at morbidity control and facing resource constraints inevitably requires identification of high-risk communities and—within these communities—the identification of high-risk individuals, i.e. those with morbidity or at risk of developing it.

The Ifakara Centre was approached in 1988 by the Regional Medical Officer, who requested an investigation of the schistosomiasis situation in the Kilosa district (14 000 km^2, 370 000 inhabitants), adjacent to the Kilombero district where the Ifakara Centre is located. The aim was to identify the areas of high risk which would be targets for control measures. Earlier studies in the area had revealed the potential of school-based questionnaires (LENGELER *et al.*, 1991a), so we chose to work entirely through the 168 primary schools, as they provided good coverage of the area. Simple questionnaires were sent by the district education office to all primary schools in the district. A first form, investigating the ranking of the most common diseases and symptoms in this area, was completed by all headteachers. A second form was administered by the teachers to 100 of the children in each school. It contained 3 questions about the ranking of recent experience of diseases, symptoms and signs. The complete description of the approach and the structure of the questionnaires are given by LENGELER *et al.* (1991a, 1991b, 1992).

The interviews were carried out without any major operational problem, and 164 of 168 schools returned the completed forms within 4 weeks (97·6%). Over 15 000 children were interviewed by their teachers. The results of the questionnaires were subsequently validated by reagent stick testing for haematuria in 73 schools, in order to define the diagnostic accuracy of the questionnaire

*Paper entitled 'A trial of SPf66, a candidate malaria vaccine,' in preparation for *Vaccine*.

method in them, i.e. to assess the performance of the questionnaires in detecting the communities with high *S. haematobium*-related morbidity. The correlation between the questionnaire results and the biomedical testing were excellent ($r>0{\cdot}55$ for the teacher's responses, $P<0{\cdot}0001$; $r>0{\cdot}84$ for the children's answers, $P<0{\cdot}0001$). The calculated performance of the test was impressive. Sensitivity was 90% and specificity 91%; the positive predictive value reached 88%, and the negative predictive value was as high as 93%. The approach in the Kilosa district included the testing of haematuria by the teachers themselves, following a one-day training seminar. A validation of this school-based testing in 18 schools confirmed that teachers can perform this diagnostic step in a most satisfactory manner.

Since the whole of the two-step approach—questionnaires followed by reagent-strip haematuria testing—was carried out through the school administrative system, the cost was only US$19 per school (treatment excluded). This is at least 8 times cheaper than a vertical control approach involving a specialized team touring the same district and performing urine analyses. For reagent stick testing alone, done by the teachers, the cost was US$0·42 per child (treatment excluded).

In addition to the information the questionnaires provided about schistosomiasis, important knowledge about community priorities and demands for control could be gained from the teachers' answers. The results showed that, at low and medium prevalences of morbidity (<40%), schistosomiasis was not a disease that was considered a problem at community level. However, once the level of haematuria reached 40% among children, there was a demand for control action, and schistosomiasis was consistently cited among the top 3 diseases, often ahead of malaria. This information was not only valuable for planning community-based control, but will also allow control strategies to be better targeted in the future.

The experience from the Kilombero and Kilosa districts confirmed the value of disease perception for the cost-efficient community diagnosis of schistosomiasis and the planning of control activities. It prompted the Social and Economic Research component of TDR/WHO to launch a multi-country study based on the design of the Kilosa study, with the aim of replicating and validating the approach in different socio-ecological settings in Africa where schistosomiasis is endemic. This study was conducted by teams of biomedical and social scientists (at least one of each discipline per country), named the 'Red Urine Study Group'. They worked in Cameroon, Congo, Ethiopia, Malawi, Zaire, Zambia and Zimbabwe from April 1990 to April 1992. As a major addition, in one country (Zaire) the value of the questionnaire approach was also assessed for *S. mansoni* infections.

Totals of 67 000 children and 1004 teachers were interviewed by questionnaires (overall return rate: 89%), and 36 000 children in 358 schools were tested by a biomedical test ('Red Urine Study Group', paper in preparation). Preliminary results showed that the approach worked well in 5 of 7 countries by reaching a diagnostic performance comparable to that in the Tanzanian study. In all countries, return rates were over 80%, and the questionnaire approach showed a median sensitivity of 88%, a median specificity of 71%, a median positive predictive value of 74%, and a median negative predictive value of 85%. The multi-country study also indicated the potential of this questionnaire approach for intestinal schistosomiasis. Reasons for success or failure were investigated by a thorough qualitative follow-up in each area ('Red Urine Study Group', paper in preparation).

After the extensive validation, this rapid assessment approach will clearly find its position within future strategies for morbidity control in schistosomiasis, since it provides an entry point by mapping high risk sites or communities, making it possible to target the interventions. It becomes particularly interesting in any situation when resources for control are limited and/or compete with other disease control priorities. A recent analysis of cost-effective strategies in the morbidity control of schistosomiasis revealed the potential of the questionnaire approach as a first step in stratifying an area (district, region) into low-risk and high-risk communities, so that each area can subsequently be covered by the most cost-effective treatment strategy, i.e. treatment through existing services or special programmes (GUYATT *et al.*, in press).

As the questionnaire approach is designed to be integrated into a country's normal administrative structures in health and education, it is not bound to any vertical or special programme, but can run within the existing health and education services at low cost. It also has potential as a diagnostic tool for many other chronic diseases, such as onchocerciasis and Bancroftian filariasis, in which either the disease entity or its symptoms and signs are perceived by the community (LENGELER *et al.*, 1992). Currently, a number of studies are exploring the further potential of this questionnaire approach in Africa and Asia.

Once efficacious tools have been developed, and the target groups have been identified, the problem that remains is how the different components of the control strategy can actually be delivered. Delivery is partly a question of the availability of resources, but it is also a question of managing those resources.

Managing the health system at District level

In the earlier years of the Ifakara Centre, the main emphasis was on fundamental research. But the Centre was always very closely linked to the district, and in 1987 the STI decided to become involved in direct project implementation. One main argument in favour of this far-reaching decision was that it would provide the opportunity, not only to generate research results within a health programme, but to translate them more directly into action.

The decision did, of course, also bring additional responsibilities. Today, the STI is the executing agency for 8 major health projects, not only in Tanzania but also in Chad. These projects are either based on bilateral agreements or on contracts with the partner countries.

The focus of these projects is on the district, the natural meeting point of 'bottom-up' planning and organization and 'top-down' planning and support; the place where community needs and national priorities can be reconciled (TARIMO, 1991).

The emphasis of all STI projects involving health service support activities is on the implementation of operational plans, which are established with the partners. The district health plans cover both infrastructural and functional rehabilitation, and the strengthening of district and regional health authorities. Each project includes 2 important components: audit and research—though the borderline between the two is not always clear. Audit has recently been defined as the need to prove 'that things are done right' (EDITORIAL, 1992). This is an important element, not only for the constant evaluation of the project itself, but because of the necessity of justifying our expenses to our donor agencies. However, all the projects also have a strong commitment towards research, which includes the development of new and innovative approaches to the multiple problems of district health systems.

As a preparation for the Dar es Salaam Urban Health Project, a major household study was undertaken in 1990 to identify user and provider patterns (MBURU, 1990). It identified and partly quantified some of the shortcomings of the Dar es Salaam health system.

An important finding was the serious overcrowding of central health facilities. The people interviewed expressed their wish to use health facilities which were easy to reach, and a common complaint was about the high transportation cost to centrally located health facilities.

However, despite the cost of reaching these central facilities, they remained attractive to patients when drugs could not always be found in peripheral facilities.

The lack of drugs in peripheral units was not a surprising finding, but its extent was unexpected. In most of these health facilities even the simplest and most basic items, such as chloroquine and basic medical equipment, were not available.

On the basis of these results, the project was concentrated on peripheral units in terms of physical rehabilitation and the provision of drugs. One of the working hypotheses was that the existence of rehabilitated peripheral health units, where drugs were available, would reduce the pressure on the centrally located health centres, some of which saw up to 2000 patients a day.

A major activity at the initial stage of the project was the establishment of an inventory of health providers in Dar es Salaam and the scope of their activities. It gave a clear view of health care provision in the city, and provided detailed information on almost 200 health care facilities, governmental and non-governmental. The latter group includes facilities provided by missions and other voluntary agencies and by industrial corporations and profit-oriented private services.

Though there are considerable differences between the 2 groups of providers, the study revealed that governmental facilities are actually better than their reputation. Governmental facilities provide most of the emergency care. Furthermore, they have almost a monopoly on preventive activities. These are, of course, linked to vertical, mainly externally-supported programmes, such as the Extended Programme of Immunization. The fact that the non-governmental sector carries out so little preventive activity demonstrates that prevention is economically not interesting.

An exercise complementary to the inventory of health facilities was the determination of the catchment area for each of them. This approach has been a valuable instrument to clarify user patterns and identify the areas of underutilization.

Continuing this line of identifying determinants of health care provision, a fruitful collaboration with the Urban Health Programme of the London School of Hygiene and Tropical Medicine has been established. A comparative study (KANJI *et al.*, 1992) was undertaken to determine the quality of care, as defined by professionals and users, in governmental and voluntary/missionary health facilities. A locally-defined quality score was worked out, in which 100% was the optimum value.

One of the striking results for overall quality was not that it was low, but that it was rated similarly (60%) in the governmental and in the voluntary/missionary health facilities. On the other hand, the rating for interpersonal qualities, e.g. the quality of attention as perceived by the users, was generally better in the non-governmental sector. The 1992 study, like that by MBURU in 1990, showed that the major criterion for the users was the availability or non-availability of drugs.

One complementary measure carried out by the project was the provision of essential drugs. The arrival of drugs in governmental facilities provided a quasi-natural experiment, in which the impact of this measure could be assessed. A randomized study was able to show that the overall utilization of governmental health facilities increased by approximately 10%, and that a large majority of the patients actually received the prescribed drugs. An interesting result is that the utilization of centrally located governmental facilities has gone down significantly. This result validates the hypothesis that the concentration of effort on the improvement of peripheral units would reduce the workload at the central units.

In order to monitor the impact of the project, a demographic surveillance system has been established jointly with a study group from the Muhimbili Medical Centre, which is supported by the ODA and by scientific expertise from Newcastle University, UK. Three distinct areas of Dar es Salaam have been selected, with approximately 15 000 households comprising 60 000 individuals.

The potential applications of this demographic surveillance system are very wide-ranging. Besides sentinel monitoring of activities, it will provide a basis for health systems research, as it provides a reliable denominator. Particular fields of interest for the next stages are behavioural and ethnographic aspects of health, including gender issues and the potential for stimulating community participation, with a view to creating a platform where the community and the providers of health care can meet and discuss their respective needs and demands. Another series of studies will look at the effects of the improved governmental health facilities on health-seeking behaviour.

Finally, health expenditure issues will also be an important topic, because user charges are about to be introduced in Tanzania. The modalities of this introduction have not yet been decided upon by the Tanzanian government, though a proposal has been elaborated (ABEL-SMITH & RAWAL, 1992). This proposal is based on levying a fee per drug item. The project is exploring operationally easier alternatives, such as 'flat' fees. The alternatives for cost-recovery in governmental health facilities will be tested and compared. The users' views at household level, and the requirements of the providers, will be taken into account.

In Chad, some of the problems in urban health are similar. In N'djamena, the project teams have just started a large scale, randomly sampled household study, which will determine the health-seeking behaviour of approximately 600 households with an estimated population of 3000. This quantitative approach will be complemented by focus group discussions to obtain an understanding in depth of the perception of providers and users of specific aspects of health care services, including the nutritional rehabilitation centres.

The results of these continuing studies, as part of the health programmes in both countries, should make it possible for health service managers to tailor services for a given socio-ecological setting, and to make the programmes responsive to the needs and demands of the potential users. In addition, these studies also provide key information which could be used to increase the compliance of users and providers, and for achieving high coverage levels.

Conclusions

Having walked the path to community effectiveness not only makes us realize what a long and laborious journey it is, but also the potential of exploring each step. Maximal community effectiveness represents the probability that each step has the highest possible success rate. Thus, we must aim at investing our resources in each step, which means that we require the laboratory studies to generate the high success rates for efficacious tools, and we need the field work to strengthen the application of the efficacious tools. In this context, field work does not mean only epidemiological, operational or health systems research studies. It includes the linking of these research activities with the health and development sector and its routine tasks, the management of health services and health promotion.

This finally shows us very clearly that the walk towards community effectiveness is not a lonely journey for the scientists or the community health workers; right from the beginning, it is a joint venture. In our various health service support and research projects we aim to put this concept into practice, and to follow the words of DONABEDIAN (1986) '...the world of ideas and the world of action are not separate..., but inseparable parts of each other. Ideas in particular, are truly pointed forces that shape the tangible world. The man and woman of action have no less responsibility to know and understand than does the scholar...'.

Acknowledgements

This paper summarizes a wealth of data and studies that were and are being undertaken in Tanzania and Chad. It reflects the great efforts of the various project teams, particularly the team of the Ifakara Centre, Ifakara, Tanzania (co-ordinator: Dr T. Teuscher), the Dar es Salaam Urban Health Project, Tanzania (co-ordinators: Drs M. Wolff & P. Kilima) and the Tchasan Project in Chad (co-ordinator: Dr D. Laporte). Their untiring efforts and their commitment, together with the co-operation of the communities and their leaders, provide the backbone of all the studies.

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