Update
Le point

Articles in the ***Update*** *series give a concise, authoritative, and up-to-date survey of the present position in the selected fields, and, over a period of years, will cover many different aspects of the biomedical sciences and public health. Most of the articles will be written, by invitation, by acknowledged experts on the subject.*

Les articles de la rubrique ***Le point*** *fournissent un bilan concis et fiable de la situation actuelle dans le domaine considéré. Des experts couvriront ainsi successivement de nombreux aspects des sciences biomédicales et de la santé publique. La plupart de ces articles auront donc été rédigés sur demande par les spécialistes les plus autorisés.*

Bulletin of the World Health Organization, **57** (4): 499-512 (1979)

Behavioural aspects of the control of parasitic diseases *

FREDERICK L. DUNN[1]

Human behaviour has been largely neglected in research on the parasitic diseases, in part because of the long-standing separation of the behavioural disciplines from the physical and biomedical sciences. Some of the reasons for the persistence of this "intellectual discontinuity" are discussed. The paper is principally concerned with the prospects for greater use of the methods and orientations of the behavioural sciences in parasitic disease research and control programmes. Behavioural research tends to fall into two categories employing, on the one hand, survey research and epidemiological methods and, on the other, participant observation and interviewing in depth. These approaches are shown to be complementary—equally useful and necessary. Various categories of health-related behaviour and kinds of research objective are reviewed in the following sections. Special attention is given to psychosocial cost–benefit studies, to analyses of control sectors, and to the formulation of a control philosophy. Finally, some specific behavioural research needs are discussed for some of the parasitic diseases of priority in the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases—schistosomiasis, filariasis, American and African trypanosomiases, and malaria.

Research on the parasitic diseases, today as in the past, is predominantly a biological and biomedical endeavour. Although behavioural studies of parasites, vectors, and hosts other than man have been a part of this research tradition from the beginning, it must be said that the study of human behaviour, in this context, has been largely neglected.

This paper reviews the current status of human behavioural research in relationship to the epidemiology and control of parasitic diseases, with special reference to some of the diseases of greatest priority in the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). The work to be discussed represents some of those disciplines usually classified as behavioural or social sciences, especially the following: cultural and social anthropology, sociology, psychology and social psychology,

* Adapted from an assignment report prepared for the Division of Malaria and Other Parasitic Diseases and the Special Programme for Research and Training in Tropical Diseases, World Health Organization, Geneva, Switzerland, that was issued as an unpublished document (MPD/RCT September 1976). A French translation of this article will appear in a later issue of the *Bulletin*.

[1] Professor, Department of Epidemiology and International Health, School of Medicine, University of California, San Francisco, CA 94143, USA.

and medical geography. The review does not extend into the field of economics although some attention is given to psychological and social costs and benefits. The convenient term "behavioural" is used for the kinds of work under discussion in preference to several common alternative labels, e.g., psychosocial or socioeconomic.

The reader must appreciate that the paper is concerned not only with human behaviour but also with the cultural, social, and psychological determinants of that behaviour. It must also be noted that such research is not conducted exclusively by behavioural scientists. Epidemiologists, health educators, and other health scientists have undertaken behavioural research or might do so in the future. Thus this paper does not speak for a few disciplines: it reflects many theoretical and methodological positions within the behavioural sciences. It addresses those of whatever background who are or might be engaged in behavioural research and also those in planning and administration who may influence the initiation and course of research or control programmes.

AN INTELLECTUAL DISCONTINUITY

Only a few careful and comprehensive studies exist of relationships between human behaviour and parasitic diseases. The scarcity of such work reflects a long-standing separation of the behavioural disciplines from the physical and biomedical sciences. This gap has been aptly described by L.E. Hinkle as an "intellectual discontinuity".

Most biomedical investigators, inheritors of a scientific tradition quite different from that of behavioural scientists, have followed educational pathways that allow little time for exploration outside the premedical and basic medical sciences. Within medicine, the field of mental health has most often provided a common ground for behaviourally and biomedically oriented scientists. In a few institutions, however, units in social or preventive medicine, epidemiology, or health education have taken the lead, particularly in the past decade, in bridging the discontinuity.

As a bridging field, social epidemiology—with its sociological as well as epidemiological roots—has centred attention on health problems, such as the chronic noninfectious diseases, considered to be of greatest importance in developed societies. Until recently most sociological research has been conducted in such societies. Sociocultural anthropological research, on the other hand, has long been concentrated in developing countries, especially in the traditional sectors of those societies where evidence is always at hand of the impact of communicable disease and nutritional disorder. While many anthropologists are thus well aware of the significance of parasitic and infectious diseases, few have attempted research related to these problems for lack of training in relevant biomedical disciplines. Nor have social scientists received much collaborative support or encouragement to undertake such work from biomedical scientists or public health practitioners.

Health educators have faced similar problems. Many have worked toward the control of communicable diseases but usually with emphasis on practice rather than research. At the same time there has never been much communication between health educators and epidemiologists. Epidemiologists are usually not aware of the research needs of health education, and they are rarely called upon by educators to incorporate into their studies questions or investigations that could strengthen the educator's hand.

Clearly there is a need for better communication between disciplines within medicine and public health. If it is accepted that research on human behaviour is one of the

requisites for sound epidemiological understanding and more effective control of parasitic diseases, it is also certain that the research tasks are not the exclusive perogative of any particular discipline(s). The investigator who is to participate in medical behavioural research must draw on a store of interdisciplinary training and experience, and on some common theoretical premises, regardless of whether he identifies his activities as behavioural (or social) epidemiology, as health educational research, or as "medical ethnography".

FIELD METHODS IN MEDICAL BEHAVIOURAL RESEARCH

Orientations and methods in nonexperimental behavioural research fall into two clusters or sets. These sets are complementary; the methods reinforce each other and are equally valid, necessary, and useful. The orientation of the investigator will naturally reflect his or her personality, disciplinary background, training, and experience, although other considerations will also influence the design of a specific research project, e.g., the nature of the research problem, characteristics of the population proposed for study, ethical considerations, funding, and logistics.

With much variation in emphasis, and some overlap, these behavioural research categories have the following characteristics:

Survey research and epidemiological approaches. The methods are quantitative ("objective"); the number of variables or determinants examined is limited, usually to a few, sometimes to only one or two; thus, in respect to the small number of determinants, these studies are said to be horizontal or "shallow"; these determinants can be examined, however, in an unlimited number of social or demographic units, e.g., in one, several, or many groups, communities, or populations; structured and narrowly focused questionnaires or interview schedules are often used; and variance is usually of greater interest than the mode, mean, or type case.

Participant observation and interviewing in depth—the case study. Research is centred on "subjective" issues and the collecting of qualitative data; these investigations are unlimited in that they may encompass many to very many variables or possible determinants; as studies in depth they are often said to be "vertical"; usually only one social and demographic unit is singled out for study; sometimes, for comparative purposes, simultaneous studies may be undertaken in two or more such units; interviewing is characteristically unstructured and open-ended; special attention is given to the mode or type case, to that which is typical.

These clusters of characteristics do not take into consideration the dimension of time because in this respect there is no contrast. With either orientation studies may be undertaken cross-sectionally or longitudinally, and retrospectively as well as prospectively. Similarly, emic and/or etic studies are not limited to one of these categories. Any aspect of values, beliefs, attitudes, and forms of behaviour is open to investigation through the methods associated with either orientation.

Both approaches also allow for analytic as well as descriptive strategies. Descriptive epidemiology and sociological survey research have their counterparts, given the different orientations noted above, in the ethnographic accounts of anthropology. It is often forgotten, however, that the methods of analysis in these two categories are different indeed. Analytic epidemiology and ethnographic analysis, including ethnological comparisons, do not depend at all on the same procedures. This point has been

neglected or confused, particularly in some recent anthropological writing. Efforts to employ epidemiological and statistical procedures in the analysis of data collected by the traditional observational and unstructured interviewing methods of sociocultural anthropology are illogical and unrewarding. Attempts to quantify and apply statistical tests to such data merely deceive the investigator and those who subsequently read his reports. The behavioural scientist should strive for consistency in the collection and analysis of field data. This is not to say, however, that an anthropologist, for example, cannot and should not conduct survey research or epidemiological studies. Or that an epidemiologist should not undertake participant-observing or unstructured interviewing. In certain circumstances such supplementary studies may be useful, even essential; their use is clearly warranted if the investigator has received adequate training in the appropriate discipline and is in a position to employ the methods with understanding and sensitivity.

CATEGORIES OF HEALTH-RELATED BEHAVIOUR

Many kinds of human behaviour can influence the epidemiology and control of parasitic diseases, probably many more kinds than we appreciate at present. Some forms of behaviour are highly disease-specific in their epidemiological impact; others can affect transmission of a considerable variety of parasitic and infectious agents. Buck[a] has stressed the need for an holistic trans-disease approach in field epidemiology that places emphasis on the community rather than on any single disease. He demonstrates that multiple parasitism is the rule in many parts of the tropics. Cost–benefit and cost–effectiveness calculations that fail to take this into account will substantially underestimate the impact of many parasitic and infectious disease control programmes. Accordingly, even in behavioural research that is focused on a single disease, the researcher should be alert to the total potential effect of the behaviour under study on transmission of pathogens and on community health in a broad sense.

In the early stages of planning for parasitic disease research it is helpful to draw up a preliminary list of behavioural categories and types considered to have health-related significance in the cultural-ecological setting where the work is to be undertaken. At an early stage in field work this list should be revised and expanded; further revision will probably be necessary at later stages in the work. This basic framework is essential in developing a good understanding of the array of possible behavioural determinants before proceeding to the identification of those that are of special epidemiological significance. These behavioural types must then be ranked in respect of their relative importance as determinants and some will have to be examined further to probe their origins and importance at the levels of values, value orientations, beliefs, and attitudes. Finally, these findings, taken in conjunction with other epidemiological data, may make it possible to plan more rationally for control and perhaps to draw up protocols for modification of behavioural patterns as a contribution to more effective control.

Several approaches to categorization of health-related human behaviour are feasible. The writer prefers to begin the analysis of behavioural types within four major divisions: (i) those deliberate, consciously health-related kinds of behaviour by individuals or groups that serve to promote or maintain health; (ii) deliberate behaviour that

[a] BUCK, A. A. *Epidemiological research on tropical diseases. General aspects and multiple infections.* Unpublished WHO document, TDR/WP/76.18 (1976).

contributes to ill-health or mortality; (iii) non-deliberate behaviour, i.e., behaviour not perceived to be health-related, that nevertheless influences the health of individuals, groups, or populations favourably, either by enhancing or maintaining the level of health; and (iv) non-deliberate behaviour that contributes to ill-health or mortality. Each of these divisions must be divided once more, however, to take account of: (*a*) behaviour of, and as defined by, those in the community or other population at risk; and (*b*) behaviour of, and as defined by, outsiders, including those concerned with control, prevention, health promotion, and treatment who are not themselves members of the community.

In this way eight areas of behavioural research can be defined, each of which requires attention for a comprehensive understanding of behaviour relevant to transmission and control of a parasitic disease. A moderately detailed but still preliminary classification of behavioural research topics, using the scheme described above, has recently been published for filariasis.[b]

To indicate the variety and complexity of behavioural topics that may have to be investigated let us consider human water contact, as one important element in the epidemiology of schistosomiasis. Any study of water contact must take into account at least the following: consumption of water (drinking, cooking, etc.); excretion and postexcretory ablutions in the water; bathing for hygienic reasons and laundering; swimming and other play in the water; ritual bathing; health educational efforts to minimize water contact through changes in behaviour; technical efforts to minimize water contact by providing alternatives, e.g., bridges, safe laundry sites, and latrines; fishing; agricultural practices involving water use and contact; washing and watering of domestic animals; and travel practices, especially stream-crossing and boating, that require contact with water.

A careful and quantitative study of all such behaviour is feasible. The final product is a detailed description of a behavioural pattern, ideally specifying the relative importance of each water contact practice. It is only with such a description at hand that a rational programme can be designed to minimize water contact in a specified cultural–ecological setting. However, in so far as the programme may require change in human behaviour it will not suffice to have only this detailed description. A further series of studies, essentially anthropological and psychological, will be needed in each situation to specify why people behave as they do, where and when. Although bridges, latrines, and laundry sites can indeed be built, without such studies there is no assurance that these facilities will be used (and much experience to show that they may not be). Any effort to change human behaviour must rest on such studies. Without them there is little point in proceeding with expensive manipulation of the physical environment.

OBJECTIVES IN BEHAVIOURAL RESEARCH

Four behavioural research objectives can be identified to meet basic needs in planning and execution of parasitic disease research and control programmes. These are as follows:

---

[b] DUNN, F. L. Human behavioural factors in the epidemiology and control of *Wuchereria* and *Brugia* infections. *Bulletin of the Public Health Society of Malaysia*, **10**: 34-44 (1976).

Pre-programme. To provide data to support administrative planning, especially to support decisions about priorities in the establishment of research and control programmes.

Programme planning. To provide data to support specific field research or control programme planning, in respect both of the population at risk and of those who will be engaged (as outsiders) in the conduct of the programme.

Behavioural research–causal studies and control factors. To provide data that contribute to the identification of causal and other factors that may hinder or favour control efforts. Some specific research needs for several of the parasitic diseases of priority in the Special Programme (TDR) are discussed in the final section of this paper.

Support and evaluation of control programmes. To provide continuing support, including evaluation, of programmes in progress and to contribute to the final evaluation of terminated programmes. Once the work of control is underway a behavioural scientist would normally participate in the programme as a part-time consultant. If an educational component is included in the control effort it is likely that one or more health educators will be associated with the programme so long as it lasts. In the ideal case the educator would also serve as the behavioural consultant, conducting periodic studies, designing questionnaires or interview schedules as needed and evaluating any problems involving human factors.

Pre-programme support

Planning for disease prevention and control must begin with assessments of available resources (funds, personnel) and of priorities in respect to the disposition of these resources. This brings one immediately to questions of costs, benefits, and effectiveness. Intense interest has developed in recent years in economic cost–benefit analysis as a potential aid to programme planners. The results of such analyses can presumably be used, together with data on prevalence, intensity, mortality, and morbidity, to work out a scale of priorities for disease control. Thus economists have been drawn into health programmes in the hope—thus far largely unrealized—that they might be able to provide measures of the total economic impact of such diseases as schistosomiasis.

In these economic studies, however, little attention has been given to psychosocial costs and cost–benefits. These are set aside by many economists as "consumption" or "independent" benefits (or costs), but the economic definition of consumption is more restrictive than that to be understood in use here of the term psychosocial. Behavioural researchers can certainly make some contributions in this area that will be of value to those planners attempting to define priorities in parasitic disease programmes. These psychosocial studies should be made in parallel with those of economic ("investment" or "instrumental") cost–benefits.

The importance of these parallel studies lies in the possibility that they may produce paradoxical results to those developed through economic costing procedures. An example from Buck's work in Chad illustrates the point.[c] He noted that gross deformities and incapacitating conditions "undoubtedly reduce the work capacity of the persons afflicted; however, the people adapt to this state and find new and useful functions in the

[c] BUCK, A. A., ET AL. *Health and disease in Chad. Epidemiology, culture and environment in five villages.* Baltimore, The Johns Hopkins Press, 1970, pp. 215-217.

daily subsistence activities of their families. Only when new diseases or exacerbations interrupt their daily work routine do they complain about 'incapacitating illness'." In other words both psychological and social compensation come into play to minimize the impact of disorders which, if only considered "objectively" as measurable health limitations, would enter the negative side of the economic balance sheet. This example illustrates the need to exercise judgement, conditioned by understanding of values and attitudes, in any analysis of quantitative epidemiological data.

These paradoxical situations must be brought to the attention of disease programme planners so that, when tempted to establish priority rankings, they will be less inclined to do so solely on the basis of economic costing. The importance, in other words, of psychosocial cost–benefit studies may well lie in their influence in tempering judgements based on overly simplistic economic findings, e.g., as in the case of the studies until now of schistosomiasis. Even analyses of psychological and social costs or benefits based on qualitative data are useful, but quantitative studies may also be feasible, as Buck's experience in Chad suggests.

Programme planning and support of field research

Aside from choices of research methods, technical decisions, and logistic considerations, there is one area of planning for initiation of field research in which the assistance of a behavioural scientist—here specifically a sociocultural anthropologist—can be most important. I refer to the selection of research sites and study populations. An anthropologist familiar with the area, its people, and their culture can contribute in at least the following ways: by identifying culturally and ecologically typical communities; by assisting with entry into those communities intended as study sites; by identifying local leaders and others who may be able to facilitate the work; by identifying factions, local political problems, beliefs, attitudes, and other factors that may hinder the work; by assisting in the selection of local personnel—field assistants, collectors, etc.—who will be linguistically competent and culturally acceptable (in the case of outsiders) and noncontroversial (in the case of insiders) in the sense, for example, that they are not identified with a faction that could disrupt the work at some later stage. If it is not feasible to support an anthropologist or other behavioural scientist as a member of the research team for the duration of the research project, it would at least be desirable to retain one for periodic consultation in the kinds of issue noted above and others relating to "cooperation" that are bound to arise during the course of a longitudinal investigation.

Programme planning—control

A behavioural scientist can undertake useful studies and provide advice at several steps in the analytical and operational sequence of a control programme. The sequence begins with a series of questions: Is control of this disease (these diseases) essential? How great is the need for control? Can control be given sufficient priority to ensure funding and other support? For how long? Is a short campaign appropriate, or is a permanent control programme required? How many diseases will be affected by the programme in addition to the disease of primary concern?

Assuming that answers to these questions favour initiation of a programme, the analysis must proceed to a review of feasible control methods, to technical considerations affecting choice of methods and at length to a final selection of methods. It is at this point that medical behavioural consultation can be particularly important. Final choice of control methods should not depend only on technical considerations and the operational analysis. Two other elements ought to be brought into the decision process (often, in the past, they have not been): a sound knowledge of the cultural–ecological setting (the *control sector*) in which control is presumed to be needed; and conscious formulation of a *control philosophy*.

The following list classifies control methods according to the relationships that may exist between methods, persons who act as agents of control, and the control sector itself (which comprises the cultural–ecological setting including not only the human population but relevant vector and reservoir host populations).

A. *Independent methods* are those that must be carried out by technical personnel, normally "outsiders", who usually proceed without much interaction with members of the community. Use of these methods usually implies that control is in the hands of independent outsiders.

B. In this category are methods that require interaction with, and cooperation or participation by members of the community.

(*a*) *Dependent methods* are those that can normally be employed only by technical workers from outside, who are nevertheless dependent upon passive community cooperation. Control is in the hands of dependent outsiders.

(*b*) Other measures can only be implemented (except on a short-term demonstration basis) by members of the community. In some circumstances, if all members of the community were to assume full responsibility, control would be achieved by community participation (= voluntary active cooperation). In other circumstances control might be carried out only through enforced active cooperation. A third alternative would be community-based control achieved through a blend of voluntary and enforced active cooperation.

(*c*) Some control measures can be employed by outsiders, by members of the community, or by both. Control is carried on by various combinations of outsider-community effort.

A philosophy of control must rest on an appreciation of the preceding and a synthesis that acknowledges the values of those initiating the control programme and of the people at risk in the community. Although other issues need to be weighed the most important is certainly that concerning "responsibility". Two possible extremes are outlined as follows:

Local responsibility:

(*a*) implies active, voluntary, cooperative participation in control by some or all individuals in the community;

(*b*) implies a commitment by at least some individuals to maintain a health educational programme within the community, directed to all age groups but especially to children;

(*c*) implies a view of control as a continuing process;

(*d*) carries with it a tendency to insulate the community from outside influences, a tendency that can be counteracted by deliberate efforts to maintain a flow of information and ideas between the community and its neighbours.

Outside responsibility:

(*a*) implies that passive (or enforced) cooperation will be required of those in the control sector;

(*b*) implies that the best control method is that which is most "independent" because it requires the least cooperation;

(*c*) too often implies that health education will be seen as a purely professional function—and as a package of facts and ideas to be delivered to passive recipients in the community;

(*d*) usually carries the implication that control is something to be delivered sporadically, or at least at intervals, rather than continuously.

How can the behavioural scientist contribute to all of this? First, and this would be especially an anthropological contribution, through the provision of descriptive data for the cultural component of the control sector, including relevant information on values, attitudes, beliefs, and behaviour that may affect control methods and, most importantly, the issue of control responsibility. These data may have to be gathered rapidly (and incompletely) by reconnaissance shortly before the proposed beginning of control; some significant information may already be available in ethnographic accounts. As a complement to these studies it would be desirable to include interviews with "outsider" members of the proposed control team.

The utility of the data derived from this work may not be immediately apparent to others concerned with planning for the programme. Therefore, the next step for the behavioural researcher will be to present to the staff his own interpretation of the constraints and favourable prospects that may affect choice of methods and the philosophical position of the team. Even if his advice is not fully accepted, the discussion and stimulation of thinking along perhaps unaccustomed lines may have a beneficial influence on the outcome of the programme.

SOME MAJOR PARASITIC DISEASES: PRIORITIES FOR BEHAVIOURAL RESEARCH

Schistosomiasis

Behavioural research relating to schistosomiasis has advanced farther than that for the other mass parasitic diseases, with the possible exception of malaria. Water contact studies have been undertaken or are in progress in a few countries with endemic schistosomiasis—including Egypt, Ethiopia, Ghana, Puerto Rico, Southern Rhodesia, and St Lucia—and these studies have become increasingly sophisticated. However, the ideal, comprehensive study has not yet been undertaken. In such a study behavioural patterns would be described quantitatively in relation to age-group, sex, and any appropriate ethnic, linguistic, occupational, residential, religious, or other social divisions. These data would also be linked to snail survey findings, measurements of cercarial densities, and other physical and biological observations for the same localities, taking into account any diurnal, seasonal, or annual fluctuations. Finally, in addition to these quantitative data, studies of beliefs and attitudes would give meaning to the observed behaviour and provide a rationale for planning programmes of behavioural change or environmental modification.

Very little behavioural research on schistosomiasis (or its potential for dispersal) has been undertaken *prior* to the initiation of large-scale water development projects. A few studies, notably in Africa, of completed projects or of those in progress have, however, considered the behaviour of developers, as manifest in the design and construction of the project and in the subsequent dispersal of vector snails and schistosomes. Large-scale projects in the future should be supported by studies at the early planning stage of the behaviour (sanitary, water contact, subsistence, medical, housing, etc.) of those to be affected. The results of these studies, with appropriate interpretation, should be made immediately available to the developers.

Systematic studies of sanitary behaviour—especially of excretion and of excreta disposal—scarcely exist for schistosomiasis, although incidental observations are scattered through the literature. A model for the kind of intensive quantitative work that is needed on excretory behaviour is that provided by Kochar's study of hookworm transmission in rural Bengal.[d] He employed direct observation and interviewing in a detailed investigation of this behavioural pattern. A few such studies in selected endemic areas would strengthen our undertanding of schistosomiasis epidemiology and provide quantitative data for those concerned with modelling. Also to be noted is Weir's early study of defaecation habits in Egyptian villages.[e] Weir's is the kind of study that should be considered for inclusion in a pre-project survey when time is a constraint.

Excretory behaviour interacts with environmental and sociocultural variables to produce different sanitary conditions. These variables include: population density and crowding, land availability, community mobility, agricultural and other subsistence practices, housing styles, domestic animals (that may ingest refuse and faecal matter), and environmental factors that affect viability of helminth eggs. Even this partial list demonstrates that a comprehensive, behaviourally-oriented sanitary study cannot be conducted without the collaboration of specialists in epidemiology, environmental hygiene, and perhaps other disciplines.

These behavioural and nonbehavioural variables are discussed and fitted into a semiquantitative assessment of sanitary conditions in a study of intestinal parasitism in Malaysia.[f] A scoring system was employed for the community and its environs, making it possible to compare scores for sanitation and sanitary behaviour between communities. Weir and his colleagues, in the study noted above, employed a more focused approach. Weighted scores for 12 variables, behavioural and environmental, were accumulated to provide an overall sanitary score for each village house and its immediate surroundings. These preliminary approaches to sanitary scoring can certainly be, and should be, improved on, to permit reasonably comparable quantitative statements to be made about sanitation in home and community in various parts of the world.

Other neglected but important areas of research relating to schistosomiasis include: traditional beliefs about the disease(s); traditional therapy, prevention, and disease-related ritual; and in general those cultural, social, and psychological factors that might enhance or restrict the efforts of health educators to introduce innovations in behaviour to minimize transmission.

---

[d] KOCHAR, V. *Human factors in the ecology and epidemiology of hookworm infection in rural West Bengal.* Doctoral dissertation, Johns Hopkins University, 1964.

[e] WEIR, J. M. ET AL. An evaluation of health and sanitation in Egyptian villages. *Journal of the Egyptian Public Health Association,* **27**: 55-122 (1952).

[f] DUNN, F. L. Intestinal parasitism in Malayan aborigines (Orang Asli). *Bulletin of the World Health Organization,* **46**: 99-113 (1972).

Filariasis

The behavioural sciences have contributed almost nothing as yet to filariasis research and control. The needs for basic descriptive research are considerable and for at least one epidemiological type, urban filariasis, are of some urgency. These needs have been reviewed elsewhere for Brugian and Bancroftian filariasis.[g] It will suffice to direct attention to several areas of behavioural research that require special emphasis and priority.

Man's actions in creating vector breeding sites have been noted and discussed frequently in the filariasis literature but virtually no systematic studies of these forms of behaviour have been undertaken. Even inventories of manmade and natural breeding sites are scarce. Inventories, human behavioural observations, and inquiries into values and attitudes affecting behaviour that inhibits or promotes vector breeding are essential if any progress is to be made in developing self-help programmes of vector control.

Personal protective behaviour against biting mosquitos, some of which may be vectors of filarial parasites and other agents, is a complex field covering not only individual but also family, household, and local community protective efforts. This very significant aspect of life, particularly for residents of the humid tropics, has also received almost no systematic research attention to date.

In filariasis control work, personal and community resistance to mass drug administration has been a problem in some countries. The difficulties have been described, however, only anecdotally and in incidental notes. Again, the actions of filariasis control teams—of the controllers themselves—have received virtually no scientific attention. Nor has there been any work of substance on the economic impact of filariasis.

American trypanosomiasis

The current consensus on prospects for control of Chagas' disease is strikingly different from that for most of the other mass parasitic diseases. Disillusionment with present insecticides because of their cost and the labour required in application, together with problems of severe limitations in diagnosis and therapy, have led to general recognition that control must be approached primarily through education and improvement of housing. This theme is conspicuous in the recently published proceedings of an international Chagas' disease symposium sponsored by PAHO.[h] Many of the conference papers refer to the need for community participation in any control programme. Culturally appropriate housing improvement also received considerable attention in the symposium, with stress on improvement of existing traditional homes by inexpensive and simple means to reduce harbourage for insects.

This conference represents something of a breakthrough in planning for parasitic disease research and control, first because of its truly trans-disciplinary perspective, second because of its emphasis on placing much of the responsibility for control in the community, and third in its strong undercurrent of awareness of the need for behavioural research.

---

[g] DUNN, F. L. Human behavioural factors in the epidemiology and control of *Wuchereria* and *Brugia* infections. *Bulletin of the Public Health Society of Malaysia*, **10**: 34-44 (1976).

[h] *New approaches in American trypanosomiasis research. Proceedings of an International Symposium, Belo Horizonte, Brazil, 1975*. Washington, DC, Pan American Health Organization, 1976 (Scientific Publication No. 318).

African trypansomiasis

Although in 1969 a WHO report on African trypansomiasis encouraged studies of the ecology and behaviour of the human population, it must be said that research and control has not as yet given much attention to these points, with three exceptions. The first of these is represented by Prothero's work,[i] as a geographer, on human mobility and trypanosomiasis in Africa. Prothero was not the first, of course, to study this human factor in relation to trypanosomiasis, but he did contribute for the first time a classification of types of mobility, past and present, together with indications of their relevance to transmission. His study also stimulated a few other workers to examine mobility in their field studies. The second exception is in the area of economic costing and cost–benefit in relation to cattle trypanosomiasis. A substantial amount of time and energy has been devoted to this problem, which is one that is fairly accessible to measurement. The third exception is the whole subject of land use and settlement/resettlement and its interaction with human and livestock trypanosomiases.

Economic or psychosocial cost–benefit studies have not really begun for human trypanosomiasis and there is some question whether such studies are even feasible. Other potential areas of human behavioural research relating to trypanosomiasis have scarcely been explored. Among these are: (*a*) systematic (and partially quantitative) studies of uses of water sources and mobility in relation to surface waters, especially streams, in *Trypanosoma gambiense* areas; (*b*) comprehensive culture-specific studies of cattle rearing, maintenance, and migration, and the social as well as economic significance of those animals; (*c*) traditional uses of fire in large-scale burning of vegetation; (*d*) behavioural studies of diagnostic–treatment teams in *T. gambiense* areas, especially of those psychological and social factors that hold teams together, in good morale and with good motivation to work effectively, as opposed to those that lead to poor work, to collapse of morale and even to break-up of the team; (*e*) tourist behaviour, especially in hazardous areas.

For some of the preceding topics there is nothing in the literature; for others (e.g., cattle studies) there is a little but it is chiefly work of academic interest, contributing to anthropological theory. The greatest need, across the whole field, is for coordination and integration of behavioural studies with epidemiological research. It is only in a trans-disciplinary context that the results of behavioural observations, interviews, surveys, and analyses can be incorporated into the design and operation of control programmes.

Of the research topics noted above the most critical appears to be new human settlement in potentially hazardous areas. Much work is certainly needed on this problem, especially on the cognitive and emotional factors that lead people to move, for example, from drought areas of the Sahel into areas of high disease hazard. Voluntary unplanned settlement usually permits only retrospective research, but planned settlement offers an opportunity to introduce programmes for disease control before it is too late. These plans cannot focus only on a single disease such as Gambian trypanosomiasis; other hazards, perhaps onchocerciasis or malaria, must be evaluated at the same time. Any behavioural research on settlement should have a trans-disease perspective and should, of course, be conducted as part of a trans-disciplinary effort, or at least in conjunction with basic epidemiological and census surveys.

---

[i] PROTHERO, R. M. Population mobility and trypanosomiasis in Africa. *Bulletin of the World Health Organization*, **28**: 615-626 (1963).

Malaria

As the concept of extended control replaces that of eradication in many national programmes a reordering of priorities in the selection of control methods for each circumstance must occur. These changes in emphasis were considered in some detail in 1974 in a report on the sixteenth meeting of the WHO Expert Committee on Malaria and in a report on a WHO Interregional Conference on malaria control. In the former report, it is suggested that priorities in malaria control be based upon epidemiological factors, adverse effects on health and the economy, the level of priority among other health problems, technical feasibility, cost–effectiveness, financial resources, human resources (here meaning staff for malaria control operations "organized as a routine activity of the general health services under the direction and supervision of a special antimalaria unit"), and "the level of effectiveness of the health services with which malaria control must be integrated or coordinated".

This list omits one important criterion for establishment of priorities, namely, the extent to which the method(s) in a given circumstance can be adopted and employed as a local (community) responsibility. The principle of community self-help involvement in control is noted at several points in the Expert Committee report, but with little stress and no suggestion that this might be given explicit recognition as a criterion for establishing priority among methods. In some countries, for the control of other diseases as well as malaria, this has already become a major criterion, i.e., that high priority and substantial budgetary support be given to the method or combination of methods that is least complicated, least expensive, offers the greatest prospect of community acceptance (because of cultural coherence) and, if adopted, the best chance that administration and operations can be undertaken largely by local people within their own communities. At present this approach seems to offer the best prospects of circumventing at least some of the constraints on control of malaria.

It is in this area of community responsibility that the medical–behavioural sciences may have the greatest impact in the future of malaria control. Until now, in the era of large-scale antimalaria programmes, this has been a neglected theme, given little recognition even within the health education profession. The concept of malaria eradication, calling by definition for an intensive short-term effort, is based upon a philosophy that places responsibility for action in the hands of outsiders. Cooperation of the people is required in the sense that they should not hinder or interfere with the control effort. On the other hand, neither active nor passive participation in the control work is expected. With the recent acceptance that control without limit in time may be needed in many areas for the foreseeable future it is certainly appropriate to reexamine the philosophical foundations of malaria programmes. The values that underlie eradication should not necessarily be carried over into extended control.

Besides the basic pro-eradication values that have prevailed in malariology for two decades, what other factors have hindered greater community participation in, and assumption by the community of, some share of the responsibility for malaria programmes? First, a striking neglect of intracommunity human factors in all phases of malaria research; second, with some notable exceptions (e.g., Barnes[/]), a lack of emphasis by health educators on research, except in the area of educational methodology; and third, seemingly limited recognition in the health education profession that

[/] BARNES, S. Malaria eradication in Surinam: prospects of success after five years of health education. *International journal of health education*, **11**: 20-31 (1968).

education itself should not be primarily a professional activity but instead a responsibility of the community.[k]

It appears that the following steps are necessary if community participation in malaria control is to be expanded: (*a*) relevant behavioural research must be conducted prior to and during the planning stage of new malaria control programmes—this research can be undertaken by behavioural scientists (sociologists, anthropologists) or by health educators if trained and motivated, preferably in close coordination with epidemiological surveys or other planning research; (*b*) these studies will provide a basis for final decisions on choice of control method(s); (*c*) the behavioural research will also provide the essential behavioural and attitudinal data for initiation of a programme of health education.

For community-supported malaria control, the methods of choice would include: personal protective measures and mosquito proofing; environmental measures to eliminate vector breeding sites; and continuing community-based health education to ensure that other measures, once initiated, are continued. In some situations a programme of larviciding or of chemoprophylaxis might also be operated by members of the community.

Following the preliminary studies and final decisions about control methods, the next and most critical step is the selection of local people for training in techniques or to work as educators. In this the behavioural investigator can take a central role, drawing on knowledge of the community and its people acquired during the preliminary studies. Once the control programme is underway, it is essential that a continuing technical and health educational consultation service be available to the people on request. A mechanism must also be set up for regular epidemiological (and behavioural) monitoring of the programme.

ACKNOWLEDGEMENTS

The report upon which this abridged version is based was prepared with the much appreciated assistance and advice of many persons at WHO, Geneva—too many to recognize here individually. I wish to give my particular thanks, however, to Dr A. A. Buck and Mrs J. Sotiroff-Junker, of the Division of Malaria and Other Parasitic Diseases, WHO, for their support, suggestions, and good counsel.

---

[k] DJUKANOVIC, V. & MACH, E. P. ed. *Alternative approaches to meeting basic health needs in developing countries. A joint UNICEF/WHO study*. Geneva, World Health Organization, 1975, pp. 22-23.