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Round Table

Homoeopathy today

At a time when Western medicine is frequently under attack for its excessive cost, high technology, and hospital-based approach, there is increasing interest in "alternative" forms of medicine.

Homoeopathy is one of the most widespread of these systems, notably in North America, Western Europe, and the Indian subcontinent. In many parts of the world it has a substantial following, in others it is hardly known, and in some actively discouraged. Homoeopaths believe that they have a system of healing that can be of great value, and it cannot be denied that their treatment has been reported to be of benefit in many cases in which conventional medicine has brought little or no relief.

World health forum has invited the participants in this Round Table to give a brief account of the subject from their different perspectives, in the hope that this may encourage an objective examination of homoeopathy and its claims, methods, and limitations.

George Vithoulkas

— *Homoeopathy: a therapy for the future?*

Homoeopathy is a therapeutic system developed by the German physician Samuel Hahnemann (1755-1843) in the early nineteenth century. It is still practised today and, in this age of science and technology, it is a telling testimony to its validity and effectiveness that growing numbers of doctors trained in orthodox Western medicine are taking up homoeopathy. Opponents of homoeopathy claim that, with the recent explosion of technological advances, it is ridiculous to believe that a system of medicine born 200 years ago could still be valid. On the other hand, proponents cite exactly this longevity as evidence of homoeopathy's effectiveness. Furthermore, they suggest that any physician who seriously investigates the system is likely to be converted to it.

Two main principles underlie the teaching and practice of homoeopathy. The first, "let like be treated by like" *(similia similibus curantur)*, is fundamental and the idea can be traced back to ancient times. Experimenting on himself, Hahnemann found in 1790 that cinchona bark induced the same kind of symptoms as were caused by malaria, the disease it was commonly used to treat. He inferred that the symptoms of malaria were an expression of the body's resistance and that cinchona bark acted by stimulating this resistance.

He pursued this idea and, with a group of friends, tried out a wide variety of substances, noting meticulously the effects they produced on healthy people. These experiments, which he described as "provings", revealed an astonishing fact: taken in sufficient quantity, these substances produced groups of symptoms which, more often than not, resembled those of particular human illnesses.

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This discovery revolutionized Hahnemann's entire thinking on the treatment of disease. It led him to the idea that one could stimulate and enhance the defensive reaction of an organism under stress with a drug that produced the same specific symptomatology in provings. By extensive and detailed provings on many drugs, Hahnemann began systematizing the "law of similars": a substance that can produce symptoms in a healthy person can cure the same combination of symptoms in a sick person.

The homoeopathic principle of enhancing the body's defence mechanism posed a difficult problem for Hahnemann: remedies matched to the symptoms tended to aggravate the suffering at first, sometimes to an intolerable degree, before improvement occurred. Such reactions were not surprising as the patient was taking a substance that could duplicate his existing symptomatology. Seeking to lessen the severity of these reactions he reduced progressively the doses given and discovered that infinitesimal quantities could still be curative with virtually no undesirable effects. He also discovered a strange fact: to be curative, a "similar" remedy had to be prepared by a combination of serial dilutions and succussions (vigorous shakings), and the higher the dilution the greater the potency of the remedy. Thus he established the second principle of homoeopathy, that of "potentization".

Homoeopathic treatment initially posed a difficult problem in that remedies matched to the symptoms tended to aggravate the suffering, sometimes to an intolerable degree, before improvement occurred.

Homoeopathic treatment proved to be highly effective in practice and its fame spread rapidly. In epidemics of scarlet fever, cholera, and typhoid, Hahnemann's treatment carried a far lower mortality than the other methods of his day.

In 1810, Hahnemann published his book, *Organon der rationellen Heilkunde,* bringing together the experience of the preceding 20 years and presenting a system of medicine that has survived until the present day, in many respects with little change. The greater part of his materia medica is still in use.

Homoeopathic remedies are made from a wide variety of organic and inorganic substances including medicinal plants, minerals, venoms, poisons, diseased tissue and, in recent times, drugs produced by the pharmaceutical industry and used in conventional Western medicine. Many of the best methods of using particular substances were described by Hahnemann himself.

In homoeopathy there are two main conventions used in designating the dilution of a substance—the decimal scale (x or DH), in which successive dilutions are made on the basis of 1:10, and the centesimal scale (c or CH), with successive dilutions of 1:100. After each dilution, the preparation is succussed 40–100 times.

Both dilution and succussion are important in producing the level of potency required clinically. Potencies in decimal and centesimal scales are not directly comparable, since at a given dilution the number of succussions will be different.

Certain potencies are used routinely; examples are given below. In general, the lower levels are used in acute illness and the higher ones in chronic conditions. Strong poisons are almost always used in very high dilution and this applies also to nosodes, which are prepared from diseased tissue. In the case of plant products that are not very toxic, the mother tincture (1 drop of active substance in 99 drops of alcohol) is frequently used.

DECIMAL

Potency	*Dilution*	*Succussions*
2x	$1:10^2$	200
6x	$1:10^6$	600
12x	$1:10^{12}$	1200

CENTESIMAL

Potency	*Dilution*	*Succussions*
6c	$1:10^{12}$	600
12c	$1:10^{24}$	1200
30c	$1:10^{60}$	3000

Many physicians trained in orthodox medicine would find little difficulty in agreeing that remedies chosen on the principle "let like be treated by like" might well be effective in certain conditions. The great stumbling block in their acceptance of homoeopathy is the question of potentization.

Homoeopathy and allopathy

Hahnemann himself coined the word "allopathy" and applied it to the conventional medicine of his time to distinguish it from his own "homoeopathy". The term is still used, incorrectly, to describe present-day Western medicine. Allopathy no longer has any meaning, except in a historical context. As reported by the Australian Committee of Inquiry in 1977: "there is in the minds of many practitioners confusion of terminology between allopathy and modern pharmacotherapeutics, and the meaning of these terms should be considered. Medicine in the 18th century lacked specific therapies for all but a very few conditions and treatments were based on the symptoms the patient presented. For the most part, the treatments were violent... To label modern therapeutics as allopathy is completely inappropriate."

There is a limit to how many serial dilutions can be made without losing the original substance altogether. This limit corresponds roughly to a dilution of $1:10^{24}$. Thus at any potency beyond 24x or 12c a preparation has virtually no chance of containing even one molecule of the original substance. One would think that further potentization would cease to be effective at this point, but in actual fact potencies ranging far beyond this limit continue to increase in power. Homoeopaths often successfully use potencies of over 100 000 c, or a dilution of $1:10^{200\,000}$.

How then can a remedy work when it does not contain even a single molecule of active substance? There is no available explanation in modern physics or chemistry for this phenomenon. Homoeopaths believe that some new form of energy is released by this technique of dilution and succussion. The energy, which is contained in a restrained form in the original substance, is somehow released and transmitted to the molecules of the solvent, in which it can be enhanced *ad infinitum*.

Whatever the mechanism may be, homoeopathy works. That it can be extremely effective, even in conditions that respond poorly to orthodox medicine, is amply documented and not seriously open to doubt. A common and facile explanation is that the results are merely a placebo effect, which may be defined as "that part of the efficacy of any treatment attributable to the confidence of the patient in the treatment and the healer" (*1*). The following observations, seen every day in homoeopathic practice, should be sufficient to refute this argument.

- Homoeopathy is specially effective in infants.
- Homoeopathy is very effective in animals.
- Young physicians, lacking reputation or charisma, attain very respectable results, often when the patient has had no relief with orthodox medicine.
- When a correct prescription has been given, one does not observe an immediate amelioration but, on the contrary, an aggravation which may last for several days. When such aggravation occurs, it is followed by recovery.
- When the patient returns and reports that he has been feeling better without an initial aggravation, the homoeopathic physician recognizes this to be a placebo effect and searches for another remedy.
- The placebo effect usually persists for only a few days or weeks; homoeopathic cure is lasting.
- Homoeopathic remedies have been given without the knowledge of the patient, and cure has taken place.

The homoeopathic consultation does not just consist of the recitation of a few main symptoms, a quick physical examination, and a prescription, as is so often the case in general medical practice. On the contrary, once the detailed physical symptomatology has been obtained, sufficient rapport should be established with the patient to permit further inquiry into mental and emotional factors. For the homoeopath, this is often the most important part of the consultation, particularly for patients with chronic conditions. It is only when hidden feelings and fears are brought to the surface that the homoeopath can select a remedy that will stimulate the defence mechanism and bring about a cure.

It is one of the great strengths of homoeopathy that it always views the patient as a whole and avoids the narrow specialization that characterizes much of Western medicine. □

1. RASKOVA, H. & ELIS, J. *Impact of science on society*, **28**: 58 (1978).

Hamish Boyd

— *Homoeopathy in general medical practice*

In spite of the tremendous advances in scientific knowledge, and their application to our understanding of the workings of the human body in health and disease, there are many who feel that the art of medicine has largely disappeared. Suppressing or removing symptoms does not necessarily constitute cure. Cure of a patient involves restoring him to a sense of physical, emotional, and mental wellbeing, which allows him to contribute to the full in his own life and that of the community in which he lives.

Homoeopathic medicine is attracting more and more attention from patients and doctors alike, because they see in it a safe and effective form of treatment and one that studies the person as a whole, with particular emphasis on him as an individual. It is not a substitute for conventional medicine but a system of therapeutics that enlarges and broadens the physician's outlook and in many situations provides a cure that would not be possible with our usual drugs. It is, of course, perfectly possible to combine homoeopathy with conventional medicine in many situations, but with increasing experience the doctor will find himself using fewer of the palliative drugs and more homoeopathy, with the satisfaction of curing his patients in the true sense. A good homoeopathic doctor should be a good physician first, and then a knowledgeable homoeopath.

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Where does homoeopathy have its greatest field of action? Undoubtedly in the field of primary care. In hospital practice, as a young doctor or student, we often get the impression that we can cure many illnesses, and achieve some dramatic things. It is only when we get out into the field of general practice that we realize that many conditions are still very difficult to treat: allergies, skin conditions, rheumatism and arthritis, asthma, migraine, and of course the wide range of psychosomatic illnesses, and the feeling of simply being unwell.

There is great concern on the part of both lay and medical people at the amount of illness caused by overprescribing, side effects, and reactions occurring in sensitive individuals. In general practice, only a small percentage of patients suffer from clear-cut diseases or conditions that can be treated successfully with drugs. Doctors who come to study homoeopathy are very often individualists, concerned about the quantity of sedatives, tranquillizers, antispasmodics, and antibiotics they are prescribing and seeking safer and more effective ways of helping their patients. Homoeopathy is not a panacea, but it is of immense value in treating many common ailments.

There are a number of useful homoeopathic first-aid remedies that can be given equally well by a doctor or a lay person in the home or at work, the common ones being Aconite, Arnica, Rhus toxicodendron, Calendula, Hypericum, and Ledum.

Homoeopathic remedies will clear up many sore throats, fevers, coughs, and septic lesions without the use of an antibiotic, by helping to stimulate the body's natural defence mechanisms to overcome the infection. They are particularly useful in children with recurring chest infections or tonsillitis, where an antibiotic would clear up the acute phase but with a relapse within a week or two. As doctors and also as parents, we are often worried at the amount of antibiotics given to children. They may develop chronic catarrh, secretory otitis media, deafness, or discharging ears; their adenoids, tonsils, and glands may become enlarged, and sometimes an operation becomes necessary. Homoeopathic remedies can often reduce catarrh, greatly improve the child's health, and avoid these complications.

Influenza and certain associated viral diseases, which are virtually unaffected by orthodox drugs, have responded over the years to homoeopathic preparations. Similarly, pneumonia was successfully treated by homoeopathy long before the advent of antibiotics. Homoeopathic remedies are still

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effective, although sometimes an antibiotic is used in addition, in a feeble patient or for a severe infection.

For acute asthmatic attacks, there are several valuable homoeopathic remedies. Even more important, the patient should be treated between attacks with a constitutional remedy, which will improve his health and reduce the incidence and severity of the attacks, and in many cases completely abolish them.

Homoeopathic treatment will often cure or alleviate acute diarrhoea and vomiting, dyspepsia, peptic ulcer, haemorrhoids, and colitis (particularly irritable bowel syndrome and even some cases of ulcerative colitis).

Rheumatism and arthritis are major causes of disability and loss of working hours. Many patients with these conditions have no obvious pathological change, and merely complain of pain and stiffness, sometimes related to the weather. Homoeopathic remedies will cure these conditions. Where there is advanced bony change and joint damage, the best that one can hope for is some alleviation of pain and improvement in mobility. Here again homoeopathy can do a great deal. It can reduce the amount of analgesics and antirheumatic drugs needed, and can often help where the patient is unable to tolerate these drugs because of side effects and allergic reactions.

Eczema, dermatitis, and psoriasis are often manifestations of a general underlying problem, linked either to heredity, allergy, or emotional stress. Here the homoeopath will try to treat the patient rather than the skin, and will use a minimum of local ointments, especially steroids.

There are many valuable remedies in homoeopathy for angina and heart failure, such as Crataegus, Cactus, Carbo vegetabilis, and Lachesis. Patients with hypertension should always be given constitutional treatment and tinctures before resorting to diuretics, beta-blocking drugs, or other antihypertensive agents. This is particularly true if the patients are elderly.

In general practice, a large proportion of patients present with illness resulting from stress, emotional upset, or environmental situations, which may cause nervous symptoms or even physical signs. While discussion of the patient's problems and an attempt to solve the causal factors can undoubtedly help, a suitable homoeopathic constitutional remedy can also be of value. The homoeopathic method of case-taking, with its detail and emphasis on temperamental symptoms, may well play a valuable role in aiding recovery, although this should be part of all medical history-taking if time allows.

Many people think of homoeopathic treatment as a last resort for difficult or resistant chronic illnesses for which many other forms of treatment have already been tried. While some dramatic cures can be achieved on occasion with homoeopathy, many cases of advanced chronic illness can also be modified. I am thinking here of conditions such as severe rheumatoid arthritis or osteoarthritis, motor neurone disease, multiple sclerosis, muscular dystrophy, leukaemias, and certain forms of cancer and severe mental illness. It is still well worth treating these conditions with homoeopathic remedies, selected on an individual basis, and taking into account the patient's total symptom picture and mental and physical characteristics rather than purely the local symptoms with which the patient presents. In this way the disease can be modified and occasionally stopped, and above all, the patient's wellbeing and quality of life can be improved. In cases of cancer, the amount of sedation and analgesia can often be greatly reduced and the patient kept alert and comfortable, even if the ultimate result cannot be changed.

What are the limits to homoeopathy? Which conditions would a medical homoeopath not attempt to treat by homoeopathy? Most medical homoeopaths would recommend conventional treatment in severe infections, septicaemia, meningitis, tuberculosis, and venereal disease. Surgery is required for appendicitis, obstructions, hernias, stones and, of course, orthopaedic conditions. Many would also prescribe supplementary homoeopathic treatment in addition to surgery and in cases of injury. Replacement of deficiencies such as iron, vitamin B_{12}, thyroxine, insulin, and hormones requires orthodox drugs.

It is difficult for a conventionally trained physician to think of a remedy or drug as having a symptom picture. We think of a drug as having a certain chemical composition, as causing particular effects on body physiology or pathology, and as being used for a specific purpose or disease. However, every drug produces side effects or toxic reactions, and it is these that the homoeopathic doctor takes note of and uses as part of his materia medica. Most of the remedies used in homoeopathy are derived from naturally occurring substances—plants, minerals, and salts—and not from single extracts or refined synthetic products. This does not mean that a pure synthetic drug cannot be used homoeopathically, but a fresh proving would have to be carried out to find its symptom picture.

Doctors using homoeopathy have compiled dictionaries or repertories of the symptoms characteristic of different remedies. The best known are:

Repertory of homoeopathic materia medica, by J.T. Kent;

Boenninghausen's characteristics and repertory, translated by C.M. Boger;

Clinical repertory, by J.H. Clarke;

Practical repertory, by R. Flury;

Synthetic repertory, by H. Barthel & W. Klunker.

Card repertories are now in use, and much of the information is being put on computer tape and disk, with a view to simplifying remedy selection.

The basis of homoeopathy is that the most successful remedy for any given illness will be the one with a symptomatology presenting the clearest and closest resemblance to the symptom complex of the sick person. To select a remedy, we therefore need a "drug picture" compiled from the symptoms and signs produced by the substance and from observations of the clinical response of patients to it. We also need a "symptom picture" for the patient, derived from careful case-taking and observation. It is not sufficient to make a pathological diagnosis, although this is certainly important. We must also build up a detailed picture of the patient as an individual—how he reacts to his environment, his likes and dislikes, his temperament, his symptoms (pain, cough, diarrhoea), and what makes these better or worse. Once the symptom picture of the patient has been determined, it can be matched with a drug picture and the "similar" remedy found.

The single-remedy method of prescribing is the one mainly used in India, South America, the United Kingdom, and the USA. In many other countries, notably France and the Federal Republic of Germany, a system of polypharmacy is used by many doctors and lay practitioners. With this method, several remedies are combined in the one preparation, which is prescribed mainly on pathological indications, apparently with considerable success.

Can homoeopathic remedies be tested in clinical trials? We are often accused of failing to produce double-blind statistics of clinical results, but are these as reliable as some would have us believe? Are control cases really identical to those receiving medication, in terms of age, sex, build, temperament, or individual sensitivity? Many drugs are tested for their short-term relief of local symptoms, without any evidence that they cure the patient.

The double-blind technique is not easily adapted to homoeopathic prescribing for several reasons. Only rarely does a homoeopathic physician prescribe the same remedy for a specific illness, even a sore throat or pneumonia. The remedy must be selected for each individual patient, even though the bacteriology may be the same.

In trials of antirheumatic drugs or analgesics, the effects are assessed according to the relief of symptoms over a short period, in comparison with

Evaluation

Homoeopathy has never been evaluated objectively. None of its practitioners understand how their sometimes dramatic results are achieved. Outside observers see only the insubstantial overlay of mystery and quasi-science which, not surprisingly, leads them to reject it. This smoke-screen must be dispersed and strict objective examination made of the one therapeutic system which takes into account differences between one person and another.

Were homoeopathy to be substantiated in terms acceptable to conventional medicine, the clinical investigation of its application would be very much a matter for general practice. Homoeopathic medicine depends on close and accurate observation in the kind of doctor/patient contact found in the consulting room rather than in the hospital ward. The doctor can watch, over long periods, the effects of orthodox and homoeopathic treatment administered together—for there need be no incompatibility between them—or of homoeopathic treatment alone. Because orthodox clinical trial procedures cannot be applied to homoeopathy, new methods of evaluation, carrying equal objectivity, are being devised and tested. These will be used in general practice.

— R.J.F.H. Pinsent, former Research Adviser, Royal College of General Practitioners, in: *Journal of the Royal College of General Practitioners,* **30**: 372 (1980).

another drug or a placebo, in a crossover trial. In homoeopathic treatment, the relief of pain is not necessarily the criterion of success. The patient's overall wellbeing and his emotional reactions, as well as local symptoms, must be assessed in deciding the effectiveness of a remedy. However, a recent double-blind trial conducted by Gibson et al. (*1*, *2*) has demonstrated that homoeopathic remedies, selected on an individual basis, and compared with aspirin and placebo, had a definite clinical effect. The usual parameters for assessing response in rheumatoid arthritis were used, and a good percentage of patients showed significant clinical improvement, even when other forms of therapy were stopped or reduced.

Why have medical schools and research institutes shown so little interest in homoeopathy? It is because of the lack of so-called scientific evidence of potency actions and of clinical trials. Such evidence as has been produced has so far made little impact on most medical schools and research institutes. However, it may be that this attitude is beginning to change.

Although no satisfactory explanation of potency action is as yet available, many experiments performed in laboratory situations have demonstrated an observable action (*3–5*). Research departments, particularly in France and the Federal Republic of Germany, are continuing to produce experimental evidence of the effectiveness of homoeopathy, but what is really required is a determined effort by several laboratories with trained personnel and financial support to investigate what happens when solutions are serially diluted and succussed and to demonstrate that activity of some kind is present in these solutions.

Clinicians using homoeopathy have no doubt whatever that their remedies have an action other than a placebo effect. Somehow this must be investigated further, not just for the sake of homoeopathy but because the phenomenon of potentization could have relevance in many fields of medicine, physiology, and physics. □

1. GIBSON, R.G. ET AL. *British journal of clinical pharmacology*, **6**: 391 (1978).
2. GIBSON, R.G. ET AL. *British journal of clinical pharmacology*, **9**: 453 (1980).
3. BOYD, W.E. *British homoeopathic journal*, **44**: 6 (1954).
4. HEINTZ, E. *Experimentia*, **14**: 155 (1958).
5. CIER, A. ET AL. *British homoeopathic journal*, **56**: 51 (1967).

Jugal Kishore

— *Homoeopathy: the Indian experience*

Homoeopathy came to India as early as 1810, about the time of publication of the first edition of Hahnemann's *Organon der rationellen Heilkunde*, when Dr Honigberger, a German physician, came to India and began treating people in Bengal with his homoeopathic medicines. In 1839 Dr Honigberger treated the ruler of Punjab, the Maharaja Ranjit Singh, who was suffering from oedema, with a few doses of Dulcamara. The Maharaja was so happy with the results that he gave Dr Honigberger suitable awards and appointed him officer-in-charge of a homoeopathic hospital. Honigberger later started a practice in Calcutta, where he was known as the "cholera doctor". A large number of missionaries and members of the Indian Civil Service subsequently practised as amateur homoeopaths in Bengal and parts of southern India.

Medicine, ultimately, has one aim, and its division into various rival systems is neither logical nor beneficial.

Homoeopathy continued to spread and the Indian people took to it as if it were part of their national heritage for, unlike scientific medicine, homoeopathy was never regarded as a system imposed by an alien power, despite its European origin. Indians found in its philosophy and principles a reflection of their own culture and beliefs. The ancient Hindu physicians had, in fact, recognized the "law of similars" as one of the principles of treatment. In the *Bhagwat purana*, written hundreds of years ago, a Sanskrit couplet asks "Is it not true that when a substance taken by a living being causes an ailment the same substance when

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prescribed in a special manner removes a similar ailment?"

Homoeopathy took root in India and flourished. Obviously it fulfilled a need or it would never have spread so widely. Supply created demand and as more practitioners took up homoeopathy so public interest increased. The treatment was relatively inexpensive, often successful, and at least did no harm. Another factor of importance may have been that, for patient and practitioner alike, treatment did not have to be exclusively homoeopathic. Other systems might be used depending on circumstances, just as the followers of these systems might also employ homoeopathic remedies.

After independence, efforts were made to give official recognition to homoeopathy, and in 1948 the government set up a homoeopathic inquiry committee, which submitted its report the following year, making strong recommendations for accepting homoeopathy as a national system. The committee, which included some eminent physicians, also recommended that homoeopathic medicine should be taught in separate schools. This was debated hotly in both government and professional circles but ultimately the government decided in favour of homoeopathic education being provided in separate institutions so that its students might be oriented properly to the philosophy and practice of the system right from the beginning. Homoeopathy was not to be treated as a form of postgraduate instruction to be taken after finishing medical

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school, as was being done in some countries. But though the homoeopathic institutions developed as separate schools of medicine, they included the study of basic and allied subjects which are absolutely necessary for understanding the general management of disease. The difference lay in the study of the special philosophy of homoeopathy and its particular and vast materia medica.

The government accepted homoeopathy as one of the national systems of medicine and started releasing funds for its development during its second five-year plan (1956-61). Some of the States also made their own contributions to homoeopathic education and the employment of homoeopathic practitioners in their health services.

The homoeopathic system became so popular that both the public and the profession demanded proper regulation and registration of homoeopaths. Many State governments had already set up boards or councils of homoeopathy and had affiliated some teaching institutions, but there was no nationwide register, and there were wide variations in the standards of education in different States. A homoeopath registered in one State could not practise in another.

In response to public demand, the government appointed a select committee composed of 42 members from both Houses of Parliament to draw up a Bill for the formation of a Central Council of Homoeopathy. This parliamentary committee did an admirable job, touring the country, interviewing hundreds of homoeopathic practitioners and members of the professional organizations, and visiting teaching institutions. The Bill became law in 1973.

This was a landmark in the history of homoeopathy in India. The Act of Parliament finally recognized homoeopathy as a system of medicine, granted its practitioners equal status with orthodox practitioners and enabled the government to establish the Central Council of Homoeopathy, which controls registration and the standard of homoeopathic medical education. It has already formulated minimum standards, syllabuses and curricula for teaching institutions. The duration of courses has been standardized—4 years for a diploma and 5½ years for a degree—and the practice of homoeopathy restricted to those who have undergone specified training in recognized homoeopathic medical colleges. The Council makes periodical inspections of the institutions and examination centres to ensure that the specified standards are maintained, failing which recognition may be withdrawn.

The demand for qualified homoeopaths has risen sharply, with the result that there are now 122 homoeopathic medical colleges with an intake of some 7500 students a year. These include 19 colleges maintained by various States, mostly affiliated to universities. In 1975, the government set up the National Institute of Homoeopathy, for graduate and postgraduate training, to meet the requirements for teachers in the various colleges and to conduct research. It is proposed to make it a uni-

versity of homoeopathic medicine with statutory powers to grant its own diploma and degrees.

Where, then, do we stand today? The 30 000 qualified homoeopaths and the 75 000 registered medical practitioners using homoeopathy represent a significant proportion of the available health manpower in India, while the 80 homoeopathic hospitals and 2000 dispensaries provide additional medical facilities that help to improve the coverage of the health services. Generally speaking, the main concentration of homoeopathic practitioners is in urban rather than rural areas, notably in the Indo-Gangetic plain, the eastern States, and the eastern and southern seaboard. An exception is Delhi, which acquired many homoeopaths following population movement after independence.

The Central Council of Research in Homoeopathy runs two central research institutes, in Calcutta and Kottayam (Kerala), and three regional institutes, in New Delhi, in Andhra Pradesh, and in Kerala. Apart from these, it is responsible for 22 research units specifically for drug-proving, clinical research, or drug standardization. There is immense scope for research in this field. India has a wealth of herbal medicines, and some of the new drugs that have been proved have become valuable additions to the homoeopathic materia medica.

Has the official recognition of homoeopathy and its promotion as a system of medicine had any effect on the state of health of the population? This all-important question unfortunately cannot be answered since there are no data available on which to base any conclusion. It is true, however, that homoeopathic medical education is now more uniform, comprehensive, and of a higher standard than before. In the long run, improving the training of the practitioner will lead to improvement in the quality of care of the individual patient, and this in itself is much needed in India. But, as with conventional medicine, it is much easier to measure changes in the level of service than in the state of health.

Homoeopathy in India enjoys government support along with three systems of traditional medicine—ayurveda, siddha, and unani. Sometimes one wonders if it is not a curse to have so many systems of treatment, but there is another side to the picture: the presence of these alternative systems offers a much wider spectrum of curative medicine than is available in any other country.

Homoeopathic treatment seems well suited for use in rural areas where the infrastructure, equipment, and drugs needed for conventional medicine cannot be provided. It could form a valuable component of primary health care as the first line of treatment. For example, in hepatitis A, acute upper respiratory tract infections, and gastroenteritis, simple homoeopathic medicines can effectively modify the course of the disease and prevent complications.

Homoeopathic medicine is essentially clinical and highly individual in nature. This has been both its strength and its weakness: its strength because every patient is treated as unique; its weakness because this approach complicates treatment and prevents generalization. Some move towards simplification and standardization of treatment would be beneficial and would facilitate the objective appraisal of the value of homoeopathy and the comparison of its results with those obtained by conventional medicine. In chronic illness individual treatment is essential if a cure is to be achieved, but in acute illness the choice of remedy is not difficult.

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In the homoeopathic research unit established in the All India Institute of Medical Sciences, New Delhi, clinical research is being undertaken in collaboration with the departments of conventional Western medicine and using jointly agreed criteria. Further collaboration of this sort with other medical schools is highly desirable.

Medicine, ultimately, has one aim, and its division into various rival systems, each with its limitations, is neither logical nor beneficial. There is a need, not for confrontation, but for an open-minded approach to the different medical systems and a proper understanding of their value so that the best aspects of each may be applied for the common good. It is, perhaps, the chief lesson of the Indian experience that there is strength in diversity, that the different systems all fill a need, and that official recognition and support are essential in raising standards and in allowing a valid appraisal of their value and contribution to society. □

Jan Stepan

— *Homoeopathy and the law*

In most legislative texts dealing with the issue of homoeopathy a definition (or the delimitation of homoeopathic treatment from orthodox medicine) is not given. The concept of homoeopathy is usually presupposed as known, or is referred to in broad terms such as "treatment with potentized or herbal remedies dispensed in accordance with the principles of homoeopathy" or simply "the system of medicine established by Dr Hahnemann".

There are considerable differences in the legal and professional status of practitioners of homoeopathy in the developed countries, the Indian subcontinent, and the countries of southern Africa.

From the point of view of legislative regulation of homoeopathy two basic questions arise.

- Has this system been recognized as a method that may be lawfully used in the country?
- Should persons other than university-educated physicians be authorized to practise homoeopathic treatment, and under what conditions?

Another important consideration is the regulation of homoeopathic drugs.

In most Western countries there are seldom any legal rules that certain methods of medical treatment are admissible or inadmissible. Exceptionally, a certain method, or more often the use of certain drugs, may be prohibited by law, but as a rule the admissibility of a given method of treatment is determined by *lex artis*—the accepted state of medical science. Even the self-evident duty of physicians to practise according to the accepted state of medical science, though generally accepted, is seldom explicitly laid down by law. When necessary, the courts will obtain expert opinion from individuals or scientific bodies on *lex artis*.

It is generally recognized that physicians are obliged to keep themselves informed on the development of medical science but it is left to their own judgment to decide which treatment should be used in each individual case. Despite widely differing opinions on the medical value of homoeopathy, ranging from the statement that "the allopathic and homoeopathic methods confront each other with equal rights" (*1*) to the conclusion of the 1977 Australian Parliamentary Commission that "the practice of homoeopathy cannot be supported by any scientific evidence" (*2*), physicians in the Western world are generally permitted to use homoeopathic treatment.

There are several hundred homoeopathic physicians in some of the large countries of Western Europe, with as many as 1000 in the Federal Republic of Germany, where homoeopathy originated. According to a recommendation by a convention of physicians of the Federal Republic of Germany in 1976, the additional description *"Homoeopathie"* may be used by physicians who undergo special training. This involves either:

- theoretical or practical study of homoeopathic treatment for a minimum of 1½ years under the direction of a recognized homoeopathic physician, or
- six months' work in an officially recognized homoeopathic hospital, or
- taking part in three official courses of further education, or three months' schooling *(Lehrgang)*, in homoeopathic therapy.

There exists a faculty of homoeopathy in the United Kingdom, established by law in 1950. In France there is a university course in homoeopathy for medical students but no homoeopathic specialization title.

A certain kind of statutory recognition of homoeopathic treatment is expressed by legislative authorization of the homoeopathic pharmacopoeias in a number of countries.

A more sceptical attitude towards homoeopathic medicine can be seen in the regulation of health care in the socialist countries of Eastern Europe. The duty of physicians to proceed in the treatment of their patient *lege artis* is, more often than in the Western world, expressly imposed by law. In the USSR, in addition, article 34 of the Fundamental Principles of Health Legislation provides that "physicians shall use diagnostic, preventive and curative methods and prescribe medicines authorized by the Ministry of Health of the USSR". A similar provision exists in the health code of Bulgaria.

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Neither homoeopathic methods of treatment nor homoeopathic medicines have been authorized. In Hungary the freedom of a physician to decide on treatment is, as a rule, recognized; however, homoeopathic methods are considered non-scientific. Similarly in Czechoslovakia, where the basic health law provides that medical treatment shall be delivered "according to the present state of medical science", it is significant that the use of chiropractic and acupuncture by specialized physicians has been regulated by the ministry but a similar provision does not exist for homoeopathic treatment. The instruction on prescription and dispensation of medicines provides that homoeopathic medicines may not be prescribed or dispensed free, though nearly all other medication is free in Czechoslovakia.

The situation in the German Democratic Republic is somewhat complicated by traditions surviving from the past. Again, the question of whether or not homoeopathy can be considered a scientific method is not answered directly or indirectly by a provision of law. It is indicative of the views prevailing in the country that a leading representative of forensic medicine concludes: "On the basis of scientific knowledge homoeopathy cannot be used as a treatment of serious illnesses, especially organic ones" (*3*).

The possibility of non-physicians' administering homoeopathic treatment in the "tolerant" countries of Western Europe follows from what has been written above. In the United Kingdom and in some countries of Scandinavia any citizen may practise healing, except for the prescription of drugs and the treatment of certain illnesses. In the Federal Republic of Germany (and in a small measure also in the German Democratic Republic) only those lay practitioners who have a permit—the *Heilpraktiker*—may treat patients as non-graduated homoeopathic healers.

Two quite specific legislative trends can be seen in the Indian subcontinent and in Africa.

In India homoeopathic physicians—together with the Western style physicians and with the ayurvedic and unani medical practitioners—have become part of the medical establishment. The Homoeopathy Central Council Act of 1973 (*4*) established state registers of practitioners of homoeopathy and constituted a Central Council of Homoeopathy. Medical institutions, including universities having a faculty of homoeopathy or providing teaching in homoeopathy, are empowered to grant degrees, diplomas, or licences. The Central Council prescribes standards of professional conduct and a code of ethics for practitioners of homoeopathy. It may also prescribe the minimum standards of education required for the granting of recognized medical qualifications by universities and medical institutions. This legislation corrected a situation in which homoeopathic qualifications were often acquired through correspondence courses that thinly disguised the selling of credentials.

In Pakistan an ordinance of 1962 (*5*) prohibited "persons pursuing the homoeopathic system of medicine" from using the title of doctor, unless they were registered medical practitioners. Only a few years later, in 1965, the Unani, Ayurvedic and Homoeopathic Practitioners Act (*6*) introduced the title "homoeopathic doctor" for registered homoeopaths, although the use of analogous titles was forbidden to the practitioners of the ayurvedic and unani systems.

In most Western countries there are seldom any legal rules that certain methods of medical treatment are admissible or inadmissible.

Under this act, the courses in homoeopathy at recognized institutions have to be of four years' duration and to be terminated by a qualifying examination. Persons who have passed this examination, as well as persons who hold qualifications from an approved institution of homoeopathy, and some practitioners of long standing "possessing the requisite knowledge and skill" are eligible for registration as homoeopathic doctors. A Board of Homoeopathic Systems of Medicine was established to ensure, among other things, the maintenance of adequate standards and to make arrangements for the registration of duly qualified persons.

In Sri Lanka a Homoeopathy Act was passed in 1970 (*7*). It established a Homoeopathic Council to regulate and control the practice of homoeopathy and to maintain a Homoeopathic Medical College. The council is authorized to register homoeopathic medical practitioners, to recognize homoeopathic institutions, to hold examinations and award degrees in homoeopathic medicine, and to arrange for postgraduate study in homoeopathy.

The council also maintains a register of homoeopathic practitioners. With some exceptions, qualification following a course of study of not less than

four years is a prerequisite for registration. Only registered practitioners may practise homoeopathy for gain and use the title "registered homoeopathic practitioner". Such practitioners are also entitled, *inter alia,* to issue certificates or other similar documents, and to hold appointments as medical officers in public medical institutions.

To summarize, in the "inclusive" health care systems of the Indian subcontinent the legal position of the practitioners of homoeopathy has been elevated—at least in theory—to a professional level similar to that of a medical practitioner qualified by study at university level.

In the Indian subcontinent the legal position of the practitioners of homoeopathy has been elevated to a professional level similar to that of a medical practitioner.

During recent years legislation has been enacted in four countries of southern Africa to legalize the occupation of homoeopath, but in a manner and at a level not comparable to that in the Indian subcontinent. The four countries are Lesotho (1976), the Republic of South Africa (1974), Swaziland (1978), and Zimbabwe (1981).

Generally only registered homoeopaths are authorized to practise (or, in South Africa and Zimbabwe, "practise for gain"). The requirements for registration are vague. In South Africa or Lesotho it is sufficient if the applicant proves that he was practising homoeopathy before a certain date and if he is recommended by an association. In Zimbabwe, the applicant must establish to the satisfaction of the registrar or the Natural Therapists Council that he "holds a prescribed qualification or has had such training and experience as to qualify him to practise as a homoeopath"; registration may be cancelled if the council considers that a homoeopath is grossly incompetent. To practise without being registered is an offence.

The laws of Lesotho, South Africa, and Swaziland include nearly identical lists of acts that registered homoeopaths may *not* perform. The lists prohibit the performance of surgery or midwifery or "internal examination", the administration of intravenous injections, and the treatment of cancer. Furthermore a homoeopath is prohibited from purporting to be a medical practitioner or from "leading persons to infer that he possesses the qualification of a medical practitioner". He is also expressly forbidden to influence anyone to abstain from treatment by a physician or other health professional.

From the above summary it is clear that homoeopaths, as conceived by the legislatures of the four southern African countries, are considerably less qualified than homoeopathic practitioners in the Indian subcontinent. Except perhaps in Zimbabwe, the only formal safeguard of the competence of a candidate is, in some cases, just the recommendation of a body of his peers. The list of acts that are specifically prohibited demonstrates that in the opinion of the legislators there is a great gap between the professional level of a physician or a dentist and that of a homoeopath. □

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J. Lecomte

— *Homoeopathy: science or dogma?*

Homoeopathy is based on four major concepts: the "law of similars", the uniqueness of each patient and his condition, the matching of the remedy to the symptoms, and the potentization of remedies used in extremely dilute form. However, each of these principles, advanced by Hahnemann, must be seen in the context of the state of knowledge prevailing at the end of the eighteenth century. Understanding of internal diseases was rudimentary in Hahnemann's time, and progress in the understanding of anatomical, clinical, and pathological relationships began only in the early nineteenth century. One must also be very wary of interpreting some of the terms and concepts employed by Hahnemann at that time, since they may no longer have the same meaning—for example, fever, constitution, and even medicament.

Hahnemann thought that "medicines can cure only illnesses similar to those that they themselves have the ability to produce, and they cause only morbid effects that they have the power to cure in illness" (*1*). In applying this principle, the physician must know both the symptoms of the illness and those that are associated, in a healthy person, with the various substances considered as medicines. According to this approach, symptoms are not ascribed to any sort of pathological condition for which a specific cause can be demonstrated, and Hahnemann himself stated that there is "no need to get bogged down in metaphysical or scholastic arguments about the unfathomable first cause of illness, that hobby-horse of the rationalist" (*1*). The properties of drugs are determined by observation of the symptoms they cause in a healthy person, with no reference whatsoever to the discipline of pharmacology. It is by recourse to elementary observation and on the basis of a purely formal analysis, then, that the patient is classified and treated. The notion of analogy is paramount in homoeopathy.

Nowadays we look beyond symptoms because we are aware that they are only the manifestations of disease, not the cause. It is because of our present understanding of cause and effect in medicine that the assumptions underlying homoeopathy appear most unacceptable, and a critical examination of the "law of similars" and the principles that stem from it will show why.

Hahnemann observed in himself and in healthy subjects the consequences of swallowing substances from the pharmacopoeia of the day, and made detailed records of the effects. However, we now know that such toxic effects bear no relationship to the therapeutic properties of the substances concerned. The whole science of pharmacology lies precisely in determining the curative power and side effects of medicinal agents. Moreover, in many cases, therapeutic effects manifest themselves only in specific illnesses. For instance, antibiotics will reduce fever only in a person suffering from an infection caused by susceptible microorganisms. What, then, can be learnt from testing such substances in a healthy person, apart from the degree to which they are tolerated and their toxicity, which do not necessarily bear any relationship to their therapeutic effects? Pharmacology today is no longer merely descriptive; it calls in biochemistry and physiology to explain the mode of action and side effects of therapeutic agents.

Medicine has changed radically since the eighteenth century. We now speak of infectious processes due to specific microorganisms, of changes in the "internal environment", of impairment of regulation, etc., and to identify them we employ a differential diagnosis vastly more complex than the straightforward observation practised by Hahnemann. His proposition *"similia similibus curantur"* lost all meaning when the causes of disease and the mechanisms of specific forms of therapy became better understood.

It is because of our present understanding of cause and effect in medicine that the assumptions underlying homoeopathy appear most unacceptable.

It can legitimately be claimed, therefore, that there is nothing to justify the principle of "similars" in the medical knowledge of today, which looks for the causes of disease in deciding how best to treat them.

It is, of course, obvious that every patient is unique physically and psychologically. None of us reacts to adversity or pathological stimuli in exactly the same way. But it must also be accepted that

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specific diseases have recognizable general patterns and affect individuals in a broadly similar manner. In addition, different diseases may produce almost identical symptoms; for example, asthenia may be due to incipient tuberculosis, early Addison's disease, or neurosis. To treat only the symptoms would be disastrous in the first two cases.

Symptoms and syndromes must always be seen in the context of the patient's psychological and physical make-up, but one should consider not only the nature of the individual patient but also the nature of the disease. Diseases can now be identified using technical means unknown in the eighteenth century and, more importantly, by a thorough reasoning process in which the linking of cause and effect is not restricted to one of simplistic analogies.

Our scientific training teaches us that therapy must always be directed at the cause of disease, and that in anything but self-limiting conditions alleviating the symptoms is not enough. Organic disease is not cured by remedies that imitate its symptoms, and the choice of medicine and dosage used depend on specific pharmacological properties.

Let us start our consideration of potentization with a quote from the Joint Committee of the Belgian Academies of Medicine (*2*): "The therapeutic efficacy of homoeopathic procedures has no scientific basis. No findings from logically conducted experimental or clinical pharmacology can be advanced in support of the effectiveness of homoeopathic treatments. The placebo effect, well known to anyone conducting trials on human subjects, is perfectly adequate to explain the few favourable observations published by homoeopathic physicians. After 150 years, therefore, no scientific evidence has been provided as to the real effectiveness of homoeopathic medicines. Just as important as, if not more important than, the absence of any objective evidence of the efficacy of homoeopathy is the real danger that lies in advising a patient to have homoeopathic treatment instead of a conventional drug schedule whose effectiveness has been scientifically demonstrated, for example in infections, diabetes, or cardiac insufficiency."

Between homoeopathy and scientific medicine there is nothing whatsoever in common.

Dilutions

In the case of dilutions of the order of 20x, or 10c, there will be on the average, *only one molecule* of the postulated active principle in each litre of the preparation, and higher dilutions, or "more potent" preparations in the homoeopathic jargon, will not contain the active principle at all. Although the concept of the microdose is acceptable to science without any difficulty, potentiation by dilution is not. . . The pharmacologist recognises that the more specifically a drug is structured for its purpose or site of action, the smaller is likely to be the dose required.

There is not one example in the whole area of pharmacology in which simple dilution of a drug enhances the response it produces any more than diluting a dye can produce a deeper hue, or adding less sugar can make food sweeter.

— From the report of the Committee of Inquiry to the Parliament of The Commonwealth of Australia, April 1977. Parliamentary Paper No. 102/1977.

There is no need to take up again the debate about the enhancement of the power of drugs by dilution and succussion. No scientific evidence for it has been produced.

Of course, some patients say they have been cured by homoeopathic treatment, just as others feel better when given some fetish whose curative power lies solely in the charisma of the "therapist" and the faith of the patient in his remedy. But who are these patients? The victims of proven metabolic disorders? Persons in whom the functioning of the major organs or systems is impaired by a well-defined lesion? Those suffering from a recognized neoplasm? Emphatically not. Homoeopathy displays its power in the patient whose ill health is psychosomatic and whose complaints have not been taken seriously by physicians; in the patient who is functioning below par and is feeling anxious and threatened but in whom the orthodox physician is not interested. Such a patient will naturally turn to someone who will listen to his complaints, reassure him and sometimes, precisely by so doing, cure him. Homoeopathy is the last resort of the sufferer who has not got what he expected from

conventional medicine. Doctors often have themselves to blame, for it is primarily because of their neglect and tactlessness that patients turn to homoeopathy. Sometimes they are too busy, too uninterested, or even lacking in expertise to take much time over functional disorders that they regard as minor.

This is short-sighted because cure does not just mean the disappearance of the morbid process; it also means a sense of well-being, a positive outlook, and the ability to cope with life, which anxiolytic and psychotropic drugs of every description often fail to achieve. Where one symptomatic drug treatment fails, another—even a placebo—may succeed, because where the affective side is in command anything is possible. The pathology of emotional states is nonetheless subject to the laws of cause and effect, if the physician would take pains to apply them.

Our analysis ends on an unequivocal note: between homoeopathy and scientific medicine there is nothing whatsoever in common. The former is based on dogma: the "law of similars" is itself a description of superficial symptoms, which Hahnemann at the end of the eighteenth century could neither measure nor interpret correctly. The scientific medicine that took wing a few decades later was based first on pathological anatomy and then on physiology. Furthermore, it was equipped with a method for verifying facts and hypotheses—the experimental method, which determines the links between cause and effect.

Admittedly, Hahnemann was among the first to realize that the way to an understanding of internal diseases lay through experimentation, but from the outset he equated the limits of his own intelligence with the boundaries of knowledge. He believed he had established facts, and, according to his disciples, these are still fully valid today. Yet even the Encyclopaedists, publishing a generation earlier than Hahnemann, knew that rigorously conducted scientific experiments can yield only provisional findings. These in turn lead on to new experiments that refute or confirm hypotheses in a dynamic process of discovery.

Once the idea that disease symptoms are governed by the strict laws of cause and effect had emerged, once the trend towards deeper and deeper analysis of the causes of illness had been launched, once specific therapy was properly established, Hahnemann's doctrine was doomed, the prisoner of its own formalism. □

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Reciprocal health care

Thus far, nine European countries are parties to an agreement that provides for medical care to each other's citizens. Those with health coverage in their native lands will also be covered during temporary residence abroad, under the European Medical Care Pact worked out by the International Labour Organisation.

The countries agreeing to reciprocity are Finland, the Federal Republic of Germany, the German Democratic Republic, Hungary, the Netherlands, Norway, Sweden, Switzerland, and Turkey.

— *World health*, June 1983, p. 31.

Primary Health Care

William A. Reinke & Mark Wolff

The Lampang health development project: the road to health for all?

A primary health care project was initiated in Thailand four years before Alma-Ata. Many of its features proved successful. Yet management training was inadequate and evaluation of the data acquired has been less than satisfactory. What are the problems to be solved when evaluating a health project, and to what extent is repetition of such a project possible elsewhere?

The Lampang health development project in Thailand began in 1974 before the Declaration of Alma-Ata. But its chief motive was also primary health care.

High mortality, morbidity, and malnutrition chiefly affected mothers and young children in rural areas, as did excessive fertility; all these conditions were exemplified in Lampang province. Out of a population of 650 000, fewer than 50 000 lived in the provincial capital, which was the only city of importance. The single hospital was small and overburdened; ancillary health services were insufficiently utilized. Less than 20% of the population, it was estimated, received even minimally adequate maternal and child health care. What medical care there was was mostly provided by druggists and traditional healers.

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Since the conditions prevailing in Lampang are paralleled elsewhere, it was natural that the project should attract attention.

Project Background

Efforts in the 1960s to link family planning with hospital-based obstetrical practice had produced favorable results, capitalizing on women's receptivity to family planning during and immediately following pregnancy. The general applicability of documented benefits was limited, of course, as long as hospital deliveries represented only a small fraction of the total. It was assumed, however, that if maternal and child health services could be extended in an appropriate way to rural areas, the combined impact on health and fertility would be comparable to that observed in urban hospitals.

The United States Agency for International Development proposed funding a series of projects for the development and evaluation of integrated health delivery systems aimed at demonstrating these presumed benefits. The projects were to be undertaken through the American Public Health Association in approximately four countries, with technical sup-

port provided by selected American universities.

The Lampang project in Thailand, proposed in 1973 and funded in 1974, was assisted by the University of Hawaii and became the only project actually implemented. This is another reason for the special attention Lampang has received.

The underlying purpose of the project was stated to be to expand health coverage to at least two-thirds of the rural population, particularly to women of childbearing age and preschool children, with emphasis on family planning, nutrition and other maternal and child health services.

Achievement of improved coverage was interpreted to mean increased utilization of services provided by an expanded network of trained personnel. It was hoped that the services utilized would bring about measurable improvements in health and nutrition and a reduction in fertility. Equally important was the demonstration that benefits could be achieved at reasonable cost; this, it was hoped, would lead to adoption of the Lampang approach as national policy.

Health services organization and delivery in Thailand take place at provincial, district, subdistrict and community levels. Although the project affected all four levels, primary emphasis was placed upon the expansion and restructuring of subdistrict and village services. Community health functions of provincial and district hospitals were strengthened in an effort to provide effective links with the up-graded subdistrict health centers and with the villages themselves.

The restructuring of subdistrict and village services was accomplished through the training of four categories of workers. Certain nurses, nurse aides, midwives and health workers were given twelve months' training to become auxiliaries. The training was designed to improve curative, preventive and management skills, so that auxiliaries returned to health centers to provide primary care and supervise village health volunteers.

The village health volunteer, usually without previous health experience, received 10 days of training to enable him to provide simple medical relief, distribute oral contraceptives, and refer cases appropriately. Health communicators were selected within villages to look after approximately 10 families each. After two days of training communicators were expected to provide health, nutrition, and family planning education and to guide their neighbors to appropriate service points for satisfaction of needs.

Finally, traditional birth attendants were offered 10 days of training intended to promote acceptable practice in normal deliveries and to expand their activities in maternal and child health care.

Project Design and Organization

Project operations extended over a five-year period beginning in October 1974, and involved five geographical areas. Services were first introduced into a single pilot district adjacent to the provincial capital. Beginning in 1976 seven additional districts were added. In order to make service coverage province-wide, the remaining four districts were added during the final year of project operations. One of the final four districts was retained as a control until the very end. One district in the neighboring province of Lampoon was used as a second control, assumed to be less at risk of contamination from project services.

Data analysis and evaluation activities continued through 1981, two years after introduction of the services and data collection had been completed. Follow-up data were not collected in the four districts last included, because interventions had taken place in them only in the final year of the project's operational life. Since the first area consisted of a single district, the bulk of project analysis had to be applied to the seven additional districts, where an average of approximately two years of

Less than 20% of the population, it was estimated, received even minimally adequate maternal and child health care.

experience had accumulated. Although the project was staffed from 1974 to 1981 and is generally considered to have been a long-term effort, it is important to recognize that the opportunity to achieve measurable results in health, nutrition, or fertility was in fact limited.

One of the most interesting features of the project was the organizational setting in which the project design was carried out. Certain earlier projects such as those at Narangwal (India) and Danfa (Ghana) had produced well-documented comparative findings from various experimentally controlled service packages. Skeptics, however, have questioned whether such small-area research results can be applied to large populations under routine Ministry of Health administrative jurisdiction. On the other hand, innovative government programs carried out under more routine operational conditions have often failed to produce definitive results because of inadequate controls over program inputs and unsatisfactory documentation and evaluation of results.

In many respects the Lampang project was a blend of the best features of the two projects just cited. The experimental nature of the project ensured that substantial resources were devoted to documentation and evaluation, yet the interventions could be applied through the existing administrative apparatus. The project director was a senior official in the Ministry of Public Health; the project field director was chief medical officer of Lampang province.

Much of the increase in medical care and nearly all of that in family planning is attributable to the work of the new village health volunteers.

The apparent advantages were not unchallenged, however. The first challenge concerned the large, competent project staff that was assembled apart from the regular bureaucracy. The staff was organized into four divisions: (1) to plan and implement training programs, (2) to organize health service delivery activities, (3) to handle all fiscal and administrative matters, and (4) to monitor and evaluate project activities. Thus, some of the project initiative that came from outside the normal administrative structure would be difficult to duplicate, quantitatively or qualitatively, elsewhere.

Table 1. Rural health personnel and facilities development in Lampang province, 1974–79

	1974	1979
Personnel		
Physicians	17	41
Auxiliaries	0	92
Nurses	51	97
Nurse aides	37	179
Government midwives	76	110
Trained traditional birth attendants	0	352
Health workers	59	63
Village health volunteers	0	918
Health communicators	0	5359
Facilities		
Community health department and mobile medical unit	0	1
District hospitals	4	7
Subdistrict health centers	36	70
Midwifery centers	37	30
Village child nutrition centers	11	100
Village health centers	0	918

Information and evaluation efforts also encountered difficulties in practice. For assessing utilization of services, the most important criterion of success, the project relied heavily on routine statistics, which turned out to be incomplete, inaccurate, and not entirely compatible with the project's functional format. The evaluation team should have devoted more attention to the careful abstracting and supplementation of government statistics.

The special data gathering undertaken by the project team, e.g., the community survey, was not entirely successful either. Because the initial survey was long and sample sizes large, the compilation of findings was delayed. Modification of procedures for sample selection in the follow-up made it difficult to compare these with samples taken initially. Much of the analysis was performed by an outside agency so that accuracy, relevance, and timeliness were sacrificed.

Improved Service

Project accomplishments in training were impressive, as shown in Table 1. More than 90 auxiliaries, over 900 village health volunteers, and over 5000 health communicators were available in 1979 where none had existed in 1974.

The volunteers staffed newly created health posts. In addition, 89 child nutrition centers at village level were added. While the project was running, the number of health centers nearly doubled and three new district hospitals were added. The capacity of the provincial hospital was increased dramatically. Of particular interest was a highly effective mobile unit, organized to perform vasectomies and hold medical clinics in the villages. The unit was operated through the hospital's newly formed Department of Community Health, the first such unit in Thailand.

As often happens, the project concentrated on tangible augmentation of resources, largely ignoring the more difficult but more important task of measuring qualitative changes in service capacity. For example, deliveries by qualified birth attendants after the project started were compared with those carried out before. It was assumed that the 352 traditional birth attendants who received 10 days of training were thereby qualified. Although project performance concerning obstetrical care is consequently encouraging, no attempt was made to undertake the difficult, logistically complicated, and thereby expensive task of assessing the extent to which obstetrical practice of traditional birth attendants improved following training.

Shortcomings in qualitative evaluation especially limited the assessment of auxiliary training. The links were never fully established between competence imparted through training, specific skills needed, and skills actually utilized. As a result, the view expressed by some outside the project that a full year of training was excessive could not be countered definitively.

Of 432 hours of teaching included in the curriculum for auxiliaries, only 18 were devoted to administration, organization, and supervision. Yet the graduate auxiliary typically served as the best qualified of three or four health center staff members and the supervisor of about 10 village health volunteers. In 39 weeks of practical training, 29 were spent in the hospital working under physician preceptors. Nurses, midwives, and health workers were trained together and then assigned to health units as disparate as midwifery centers and the provincial hospital. These practices and emphases might be questioned but have not been tested. Performance statistics, however, indicate a definite bias in allocation of effort favoring curative care, along with family planning services. Auxiliaries devote little time as a rule to health protection and promotion or to ancillary activities, including supervision.

The Lampang information and evaluation staff was inadequate in size and lacked experience. It was forced to rely upon an outside unit for data processing, and this caused delays and misunderstandings.

Improved peripheral service coverage, stressed in Lampang and in primary health care generally, attaches special importance to the often neglected issues of field supervision, logistical support, and continuing education. Unfortunately, the Lampang project has contributed relatively little that can be considered definitive on the subject of effective management. In fact, a survey of auxiliaries revealed that their largest felt needs concerned adequacy of supervision, provision of regular opportunities for continuing education, and assured availability of supplies. Difficulties in providing health volunteers with supplies were largely overcome through arrangements with private distributors in the area, but volunteers found it difficult to travel so as to procure the supplies and the arrangements further reduced the amount of contact between volunteers and their supervisors. One-week workshops on management organized by project staff provided some interesting training materials, but the need to develop management skills remained pressing. Largely because of ministry regulations and reporting procedures, an

original project aim that remained unfulfilled was the development of a streamlined management information system for routine use throughout the province. Project data gathering and processing procedures for evaluation proved to be slow and cumbersome. Key management indicators were not established, and the information system in operation did not signal needs for remedial action as they arose.

Although the project is generally considered to have been a long-term effort the opportunity to achieve measurable results in health, nutrition, or fertility was in fact limited.

The project was able to provide, mostly on schedule, impressive numbers of personnel and physical facilities. Effective management of them remained elusive, however. Despite the substantial time and effort devoted to evaluative data gathering and processing, more could have been learned about the qualitative capabilities of the resources generated.

Utilization and Impact of the Services

The introduction of community health workers and improvements in services at health centers and district hospitals were expected to expand and redistribute the volume of health care provided. The anticipated pattern of redistribution was unclear, however. A shifting of services toward the periphery would result in reduced patient loads at more sophisticated centers. On the other hand, these loads could increase if public confidence in the services were to grow. Analysis of the effects of contrary influences was therefore of interest, as was an assessment of overall changes in coverage.

Table 2A shows a substantial increase after the project started in the use of medical care and family planning services and slight changes in other services. Much of the increase in medical care and nearly all of that in family planning is attributable to the work of the new village health volunteers, as shown in Table 2B. Moreover, increases in utilization of conventional facilities were mostly due to the addition of services, not to increased activity. Table 2C shows that modest increases in medical care were more than offset by reductions in other categories of services provided.

To summarize, much of the training of auxiliaries and volunteers stressed treatment of illness, and these workers managed to increase the volume of government-supported curative care. But preventive services did not expand as the number of centers increased. As a result, workloads in each facility remained low. A work study carried out before the project began had shown that health center workers were engaged in productive activity 53% of the time. A similar study, carried out after the project was under way, found that the productivity level had reached only 54%, with less than 6% being devoted to ancillary activities.

Table 2. Service volumes compared, before and after the project

A. Service contacts at all district hospitals, health centers, midwifery centers, and village health and child nutrition centers

	Before project	After project	% change
Medical care	132 490	368 108	+ 178
Communicable disease control/Sanitation	65 272	45 494	− 30
Maternal and child health	40 068	51 557	+ 29
Family planning	78 286	171 608	+ 119
Nutrition	6 886	5 711	− 17

B. Percentage change in total service volume after the project; by type of facility

	District hospital	Health center	Midwifery center	All three types
Medical care	+ 96	+ 112	− 15	+ 72
Family planning	− 5	+ 59	− 45	+ 2
Other	+ 18	− 13	− 9	− 8

C. Percentage change in service volume *per facility* after the project; by type of facility

	District hospital	Health center	Midwifery center
Medical care	+ 12	+ 40	+ 5
Family planning	− 46	+ 5	− 33
Other	− 33	− 43	+ 12
All services	− 17	− 2	− 7

Initial and follow-up surveys indicated that the increase in government-supported medical care was achieved at the expense of druggists and traditional healers. Those two categories accounted for 65% of treatment given before the project began. After it had begun, the rate had dropped to 55% but this was still the major fraction of health care in the province.

Increases in the volume of services were intended, of course, to improve coverage. Considerable success was achieved in the case of preschool children. In the course of project implementation, the percentage of children receiving government-supported services increased from 37 to 62. Changes were most dramatic in care of healthy children. Coverage for women at the beginning of the project was roughly similar to that for children, about one-third, and improved only to 45% subsequently. The proportion of couples in the pilot district practicing contraception rose from 56% to 71%, but comparable increases were noted in the control areas as well.

We recall that although the Lampang project extended over seven years, services had been available for only two years when measurements were made. The modest increases in service utilization should be considered in this light. Whatever the reason for the disappointing results in coverage, evidence of improved health was even more difficult to discern.

An area of great interest was nutrition. Initial surveys had shown that there was widespread malnutrition, though of moderate degree, among preschool children. Mainly during the final two years of the project the number of child nutrition centers increased ninefold. Not surprisingly, community health survey data collected at about the same time failed to reveal notable changes in nutritional state.

As a result of delays, noted earlier, in the collection and processing of initial data, the magnitude of the malnutrition problem was documented only after training and service programs were well under way. The action program did not produce a prompt, tightly supervised response closely targeted at high-risk children, even though village health volunteers and health communicators were present and seemed eager to take on added responsibilities. This emphasizes the importance in primary health care of clearly defined community-based services delivered under conditions of close surveillance to a population that is also clearly defined.

Cost and Cost Effectiveness of the Services

The Lampang project measured personnel time and monetary outlay with the greatest care. Useful comparisons emerge as a result. For example, we find that a visit to the district hospital cost an average of $2.62, whereas a visit to the health center cost $0.43. While the two contacts differed in quality, the data indicate that the ancillary services were cheap.

More sophisticated analysis proved to be difficult. Inflation made comparison of costs before and after the beginning of the project meaningless. Analysts calculated costs of services after the project began as being the same as they had been before the project, but this approach assumed that additional services could be provided without additional resources. Even though subsequent comparisons between unit service costs were labelled a form of cost analysis, they only reflected changes in volume, since costs were held constant.

More meaningful comparisons before and after the project began would have examined changes in service load in comparison with changes in personnel time allocation, which represented the largest single cost component. The value of this analysis would be limited, however, in view of the large amount of costly idle time that existed and had to be allocated in a necessarily arbitrary way.

More than 90 auxiliaries, over 900 village health volunteers, and over 5000 health communicators were available in 1979 where none had existed in 1974.

The principal message from analysis of the cost and activity data is that a large volume of much-needed preventive ancillary services could have been provided at only a small addi-

tional cost. The implications for project training, service monitoring, and management are considerably more complex.

Generalizations and Extension of the Services

As the Lampang project was evaluated, it became clear that it would be desirable to repeat it throughout the whole country. Policy decisions seldom rely fully on objective criteria, however, and the present case is no exception. The political climate and charismatic leadership were moving the country toward primary health care years before quantitative analysis at Lampang was complete.

Furthermore, the term "repeat" is a misnomer. Successful pilot projects are seldom reproduced without change. Certain successful features are applied elsewhere; others are adapted to different local conditions, and unsuccessful or extraneous features are discarded.

Thus the issue is not whether a project is to be repeated, but rather how services are to be extended. Whereas a simple *post facto* evaluation of results may suffice if we are thinking only of repeating a project, continuous monitoring is needed if we are aiming to adapt it—a more realistic notion. Projects seldom allow of mechanical repetition, and the Lampang project was no exception, as two illustrations may show.

As the Lampang project unfolded, the role and value of the health communicator came into question though admittedly on subjective grounds. Nevertheless, the training of over 200 000 communicators nationwide proceeded according to the provisions of the new five-year national health plan then being formulated. Simple monitoring of Lampang experience could have contributed directly to the formulation of the national program, thereby minimizing the risk of costly failures.

National policymakers approved of the notion of auxiliaries, but questioned whether twelve months' training was necessary. Data for evaluating the training of auxiliaries were inadequate to resolve the issue. As a result, the period of training for medical assistants was reduced in other provinces on a purely arbitrary basis.

The need is clear for a carefully devised information system providing prompt compilations of data and rapid feedback for purposes of internal management and periodic reporting of progress to external agencies. The Lampang information and evaluation staff was inadequate in size and lacked experience. It was forced to rely upon an outside unit for data processing, and this caused delays and misunderstandings. The specification of indicators for monitoring and evaluation proved to be unexpectedly difficult. The time needed for data processing and analysis was invariably underestimated.

These shortcomings are familiar indeed. In view of the widespread interest in Lampang, however, the information deficit was especially apparent. It became clear that, if the decision to repeat a project is taken prematurely, monitoring and evaluation become even more important so that small errors can be isolated and eliminated before they become big ones. It is unfortunate that Lampang has not remained a primary health care laboratory for the national program. The process of adaptation is evolutionary and requires a trial and demonstration area. □

R. A. Weale

Screening children's eyesight: guide for schoolteachers

1. Why is screening desirable?
2. What do I need to know about eyes?
3. How do I do the screening?
4. What do I do with the result?
5. What happens after that?

The object of this guide is to provide schoolteachers with answers to these questions. It is not designed to turn teachers into health workers but to help them to be better and more successful in their job.

1. Why is screening desirable?

Teaching is done by communication between the teacher and the pupil by means of the senses. Pupils hear what the teacher says and see what the teacher is drawing, writing, or otherwise demonstrating. Conversely, the teacher hears and sees whether the pupils have taken in what they have been taught.

Suppose there is a pupil who has not taken in, say, that 2 + 3 = 5. Suppose further that he or she persistently writes 2 + 3 = 6. The teacher's first and understandable reaction may be that the child is lacking in understanding. If this sort of thing occurs repeatedly, it will determine the teacher's attitude towards the child and correspondingly affect mutual relations.

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But suppose the child's mental powers are normal, that what is wrong is his eyesight: he simply cannot *see* the difference between 5 and 6. It follows that the teacher ought to know whether the child's response is due to his mental powers or to a remediable defect in eyesight. For the sake of his or her own job satisfaction, the teacher will therefore wish to determine at the very start of the child's schooling whether or not specialist attention is needed. This can be achieved for a large proportion of children by the test described in section 3.

2. What do I need to know about eyes?

There is obviously a great deal to know about eyes, but we are concerned with only one aspect, namely, how well they form an image of the world before them.

In order for an image to be formed, a lens is needed. The eye specialist has a number of them, and will demonstrate that the window over there can be imaged on a sheet of paper. Note that the plane of the lens is held parallel to the window, and to the sheet of paper. The image is, in reality, much smaller than the window, and it is inverted: the broken window-pane in the bottom left is imaged top right (Fig. 1). If the lens is held at a fixed distance from the window, then there is only one distance between lens and paper for a sharp image to be formed. If the paper is moved towards the lens or away from it, the image turns fuzzy. If either a "stronger" or a "weaker" lens is put in the same position as

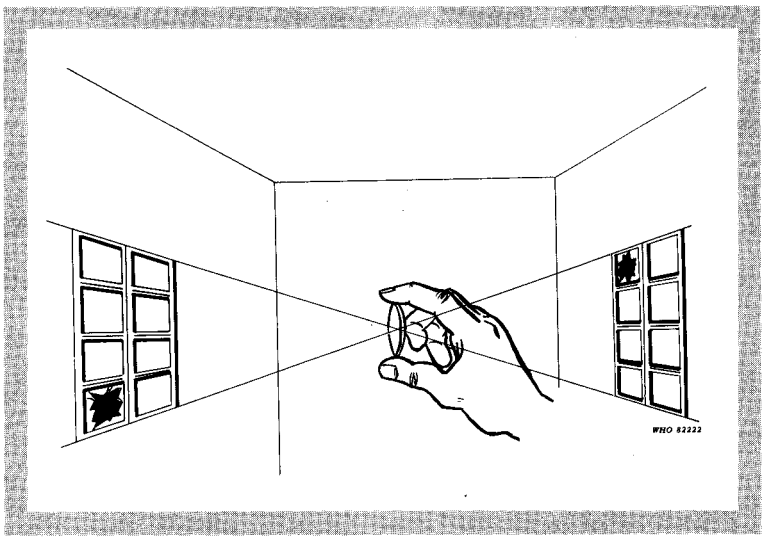

Fig. 1. Inverted image of window formed by lens.

that from which the original lens produced a sharp image, only a fuzzy, out-of-focus image will be produced. This shows that, for fixed distances, there is only one type of lens that can produce a sharp image. Even if the critical distance is observed but the paper is replaced with a clean but crumpled-up handkerchief or loosely threaded scarf, again only a fuzzy image is obtained.

These experiments illustrate what we need to know about the eye. Its glassy outside surface and a lens hidden behind the coloured iris act together like the lens in the experiment above. They form an image of the window on the retina, at the back of the eyeball, which optically replaces the sheet of paper (Fig. 2). If the image is sharp, then the child has no optical problem. If the image is formed in front of the retina and would become sharp only if the retina could be pushed forward, the eye is myopic; if the image is formed behind the retina, it is hypermetropic. The former case is illustrated in the paper experiment with the

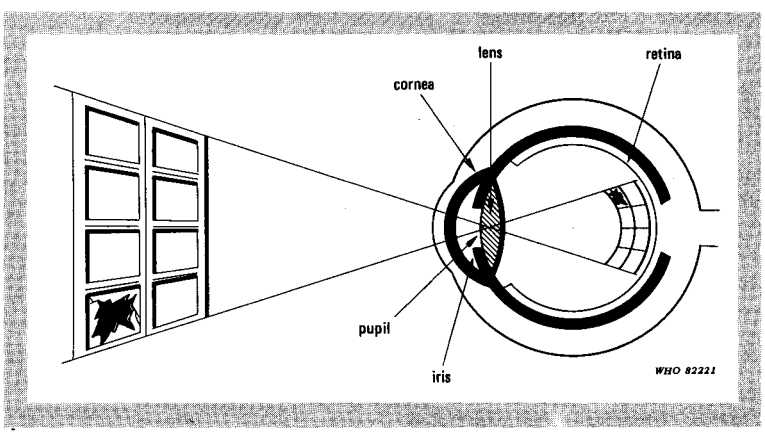

Fig. 2. The parts of the eye.

"strong" lens held in the same position as before; the latter is imitated with a lens that is "too weak".

Sometimes no amount of optical adjustment can make it possible for a sharp image to be formed on the retina; in a sense, the eyesight system can be considered "crumpled up" like the handkerchief mentioned above.

The fact that we see the world "correctly" although it is imaged upside down on our two retinas is due to a process learned early in life. The brain learns to turn the visual spatial relations upside down so as to make them agree with tactile messages. A chair is felt to be near the floor rather than near the ceiling; hence, we learn to see it there.

One more point needs stressing. The quality of the retina is not uniform all over. In most parts it is like crumpled-up paper, and no matter how sharp the image, the nervous system will not send a sharp image to the brain. But there is one part that acts as very good paper. Whenever we wish to see something well or to examine some detail, we turn our eyes in such a way that the image is formed on the central part of the retina, called the fovea. In all normal cases, directing the gaze at something means that the finest possible detail is conveyed to the brain. If we wish to screen vision, we have to ensure that the child uses the fovea, i.e., the best part of the eye.

3. How do I do the screening?

If screening is to be successful, it has to be simple. It seems reasonable to divide children into three classes: (*a*) those whose vision is normal and who therefore do not need any special attention; (*b*) those whose vision is defective but who can be helped by the specialist; and (*c*) those whose vision is defective but who in all probability cannot be helped and who therefore need special sympathy and understanding. The grouping can be achieved with the test chart shown in Fig. 3. In a stylized way, it represents the three major fingers of a hand. The sizes of the large, medium, and small symbols are 85, 36, and 6 mm respectively.

The test is carried out as follows. The chart is placed in sunlight in a vertical position at a distance of 6 m or 20 ft (240 in) from the pupil being tested. The latter must not stand in the sun but in the shade. The teacher will need an assistant, *who has to wash his or her hands scrupulously before each pupil is tested.* The assistant's task is to cover with his or her washed hands first the pupil's left eye and then the right one, the test being done for each eye in turn. The teacher points at each symbol without touching it, and the pupil indicates its direction with three of his fingers as shown. The teacher records the row with the highest number marked on the side (i.e., 0.1, 0.3 or 0.7) that the pupil has managed to imitate without making a single mistake for each eye separately. Thus, if the pupil has correctly imitated line 0.1 with the right eye, but no more, and line 0.7 with the left eye, then the teacher will record R 0.1, L 0.7.

In order to minimize the chances of memorizing and deception, the screen should be turned frequently to any one of the four possible positions and the pupils asked to read horizontal or vertical rows as appropriate.

It has to be emphasized that this is a rough-and-ready test and that it is likely that some mistakes will occur, no matter how conscientiously it is carried out. But many more mistakes will certainly occur if the test is performed badly; and, clearly, much unnecessary suffering will result if it is not carried out at all. On this basis, the following rules are recommended.

(i) Any child having a score of 0.7 in both eyes can be considered normal.

(ii) Any child having a score of 0.7 in one eye and 0.3 in the other should receive attention but, until such time as this can be provided relatively easily, should be able to make good progress at school.

(iii) Any child having a score of 0.3 in both eyes is bound to have difficulties. The child should be placed in the front row and receive attention at the earliest possible moment.

(iv) Any child having a score of 0.3 in one eye and 0.1 in the other will have more difficulties than those in group (iii) (e.g. with sewing and some crafts), and also needs urgent attention.

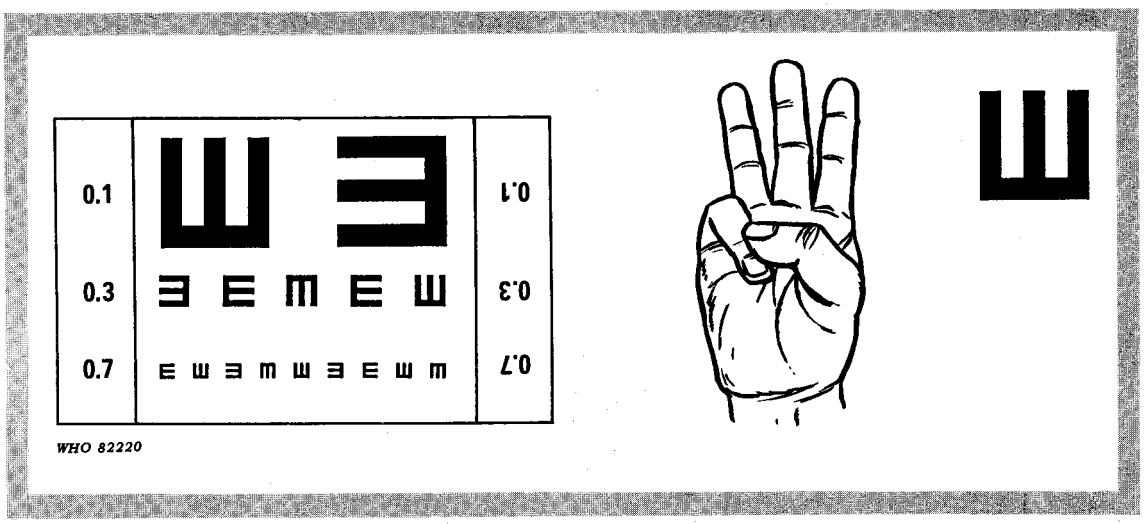

Fig. 3. Simple test for screening children's eyesight.

(v) Any child having a score of 0.1 in both eyes should be seen by a specialist. The few children who cannot be helped with glasses will need much help and attention from the teacher.

4. What do I do with the result?

The result has to be entered on the child's health record, with the date on which the test was made and the name of the teacher. Depending on local arrangements, the teacher will send a list of names of children in need of attention to the health community worker or to the nearest eye health unit. No results should be sent with the names because the specialist should re-examine the children and come to his own conclusion. Alternatively, the teacher may be required to communicate with the nearest eye-camp organization.

5. What happens after that?

Once informed, the medical authorities will tell the teacher when and where the child is to be examined. It is important for the teacher to impress not only on the child but also on the parents that this opportunity must not be missed. At this stage the only costs are likely to relate to transport, but impecunious parents ought to be reassured that further expenditure, if any, is likely to be small or that help may be available. It is not too early to stress that if glasses are prescribed — as will be the case for any child in groups (iii) and (iv), and possibly (ii) and (v) — they must be worn if the child is to make satisfactory progress in school. After all, the child's future career may depend on this.

If glasses are the recommended solution to the child's problems, they will be posted by the optical dispenser to the school. The teacher should hand them over to the parents (having made sure that the child sees better with them than without them). Firm warnings should be given on (*a*) keeping the lenses and the frame clean by daily washing; (*b*) wearing the glasses constantly, except in bed or if sport should create a risk; and (*c*) the fragility of the glasses.

The test outlined in section 3 should be repeated every two years while the child is in school and action taken as appropriate. □

The chart is obtainable from the Department of Visual Science, Institute of Ophthalmology, Judd Street, London WC1H 9QS, England, at a price of US$ 3.00 each. Prices for large quantities are negotiable.

Isabelle de Zoysa & Susan Cole-King

Remuneration of the community health worker: what are the options?

Primary health care needs a large number of community health workers. Will enough volunteers come forward and will their service be dependable? If not, how are these workers to be paid? By fees for services rendered, or by salary? If the latter, should it be paid by the community or the government?

Primary health care has been accepted with enthusiasm and is being promoted in many parts of the world. It can be inserted into a broad spectrum of political, socioeconomic, and cultural settings, ranging from those in which basic health services are well developed and supported by auxiliaries working from institutions at the village level to areas in which coverage is poor and most health needs are handled by indigenous practitioners. The key agent of primary health care is the community health worker who is based in the community and performs a wide range of health-related tasks and encourages new development initiatives.

Many models for community health workers have emerged, and the wide disparity among the qualifications and job descriptions reflects the diversity of health settings (*1*). Community health workers differ greatly from each other in selection, training, tasks, relationship with the community and the formal health services, supervision, and reward mechanisms. They may work full time or part time, alone or as a member of a team. They may belong to the indigenous health care system or work beside it. All these are important issues requiring sound planning.

A policy issue that inevitably arises is the question of remuneration. Will the community health worker be paid? If so, by whom? Uncertainty in this area reflects poor design of the primary health care programme and may result in its failure.

Basically, there are three ways to solve the question of remuneration: volunteer service, community support, and support from external funds. Strong arguments have been made for each alternative, and this article will attempt to summarize them as a guide to policy-makers.

The Volunteer

Community health workers are often expected to work on a voluntary basis and to derive their means of livelihood from sources other than their health activities. This is seen as a measure of their enthusiasm and willingness to serve the community. An advantage is that deployment of community health workers on a

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large scale may be achieved at a lower cost. Indeed, many primary health care programmes rely on volunteers. This may prevail where the community health worker works part-time as well as pursuing regular activities. Sometimes young people may be willing to offer their services while waiting for employment, marriage, or an opportunity for further education.

Some forms of recompense may be more valuable to the community health worker than payment in cash or in kind. The prospects of further training or benefits such as free medical care or preferential access to health facilities are attractive. The sociocultural and political pattern of the community may offer the community health worker sufficient motive to work in the common interest. He will be accorded prestige, esteem, and moral support rather than economic rewards. The traditional ethical system of the community may encourage various arrangements for reciprocal help, exchange, and patronage. The community health worker may also be prompted by political or religious beliefs.

The tasks assigned to the community health worker are commonly time-consuming and often difficult. Even where the workload is light and can be fulfilled on a part-time basis, the costs entailed by lost economic opportunities may be too high. The seasonal demands on time for agricultural work can mean that all health-related activities are dropped when they may be most urgently needed.

The current enthusiasm for community participation must not be exploited to relieve governments of their responsibilities.

The use of volunteers has been described as a form of exploitation. Why should they offer their services free? It is easy for a government official to argue that they should work for the joy of helping others. Moreover they may be expected to work under difficult conditions, without pay, while the professional health workers are not ready to do the same (*2*).

A programme is usually at a disadvantage if it depends heavily on volunteers. They may be scarce where the workload is demanding and the tasks difficult, unpleasant, or tainted with social stigma. It is easier to generate enthusiasm for single activities than for the patient development of a health programme. Even the initially highly motivated worker may become dispirited after a time and gradually give up (*3*). A high drop-out rate contributes to decreased stability of the programme and increases training costs because of the need for continuous replacement. It becomes difficult to plan and manage the programme. Such troubles caused the abandonment of an early programme in Botswana (*1*).

Community Support

In certain circumstances some form of remuneration of the community health worker is mandatory, as in the case of urban industrial settings, where a cash economy rules and subsistence without a salary is difficult. Additionally, the pattern of ownership may prevent the community health worker living off the land. Such considerations are especially relevant where he is recruited from the poorer section of the community and an income is essential to the survival of the household.

In many cases the community health worker is supported by the community, which may pay in cash or in kind. A major advantage of this arrangement is that the financial input by the government will be complemented by the contributions of the community. Various methods have been tried for generating funds from the community. The worker's salary may be provided through locally operated insurance schemes or by local agricultural (or other) cooperatives. The community health worker may charge a fee for his service or take a commission on drugs sold.

User charges are the common mode of payment of indigenous practitioners, and if they are trained for primary health care work it is generally accepted that they will also continue to function as private practitioners. Such is the case of the traditional birth attendants in Honduras who work alongside other, voluntary, community health workers (*1*). However, user

charges are open to abuse. They may discourage the promotion of preventive services and the early treatment of disease. A fee-for-service system can defeat the aim of reaching the poorest of the poor who may not be able to pay for the services, however cheap.

Even if only a fraction of the cost is met by the community, participation in the provision of health care may produce a change of attitude if the health services come to represent value received for money rather than a public dole (*4*). A financial contribution by the local people gives them both the right and the incentive to participate in the running of the programme. Financing and decision-making are complementary functions that reinforce each other. In general, the accountability of the community health worker to the community is also strengthened. Organizing support, however, is time-consuming, and if all the energies and resources of the local committee are directed towards maintaining financial viability this may detract from the main purpose of improving health. The community has to be both willing and able to support the health worker. Where communities are loosely structured and poorly organized it will be impossible to maintain a source of income for the health worker. Mismanagement and breakdown of services are commonly associated with community institutions.

Health may not be a priority among all the other social and economic needs of households and the community. The perception of the local people of the benefits derived may not coincide with that of the health planners, and felt needs are often at variance with those identified on a scientific basis. The demand and expectations of both community and health worker may favour an effort towards delivery of curative services with a consequent neglect of prevention and promotion activities.

The prevailing opinion in the community may be that the government should bear the cost of health care. Many rural people believe, often with considerable justification, that their needs are neglected to the advantage of the town dwellers. A community typically underestimates the cost of services (*5*) but may nevertheless agree to make a financial contribution where there is no other way of obtaining those services (*3*).

There may not be sufficient local resources to pay the salary of a community health worker. Experience from some countries suggests that it is much more difficult, locally, to meet *recurrent* costs than to raise funds for a single project. Much depends on the nature of the local economy and the productivity of the area. This is especially true in agricultural communities where income is not evenly distributed throughout the year. An attractive system is the use of the agricultural or animal

A fee-for-service system can defeat the aim of reaching the poorest of the poor.

cooperatives as a source of funds or other resources. However, land may be scarce, productivity may fluctuate wildly, and it is often difficult to get people to work together without direct identifiable returns (*6*). Where the notion of risk-sharing is unfamiliar, those who do not obtain substantial immediate benefits from cooperative activities or insurance plans often withdraw support and thereby cripple the programme.

Many communities are plagued by dissensions and rivalries that interfere with cooperation. Most villages and urban blocks are heterogeneous groupings consisting of several communities, if the word community is used in the sense of a group of people who share a common identity and a common interest (*7*). There may be unequal access to resources such as land, water, and capital owing to a traditional social stratification associated with ethnic group, cast, religion, and sex, for example, and this may be reinforced by political and economic institutions. Communication across these barriers may sometimes become impossible. An agreement on local funding of a health project may not be reached or sustained. Further, the community health workers may be controlled by local interest groups to the detriment of the less privileged segments of the community. This can also occur when they are paid from external funds, but local power over

the performance of the community health worker is enhanced when the community is responsible for his maintenance.

If attention is focused on the communities most willing and able to support the health worker, the present maldistribution of health

As a consequence of a rise in social status the community health worker may no longer identify with the poor.

resources will only be exacerbated to the detriment of communities that may be in greater need. The current enthusiasm for community participation must not be exploited to relieve governments of their responsibilities.

Support from External Funds

The community health worker paid from a central payroll becomes, in effect, an auxiliary based in the community as an extension of the formal health services. The advantages are dependability, continuity, and predictability of support, and these promote programme stability and facilitate planning. Supervision and management by the health service become easier. The community health worker can be expected to observe staff rules, regulations, and discipline. Services can be extended to communities unable to raise the necessary contributions on a regular basis. Resources are distributed outwards to the periphery and do not support only urban hospitals and other health institutions.

It must be recognized, however, that the burden on the government's financial resources will be great. It is very difficult to reduce spending on existing health programmes so, at least in the short term, new funds must be provided to cover most of the additional costs. Even if the salary provided by the government is a small sum in comparison with the salaries of other health workers, it must be multiplied by the large number of communities supported in order to achieve adequate coverage.

There are also career problems. A career structure may be needed to avoid frustration and attrition. The admission of the community health worker to the ranks of government health workers, together with an increased prosperity, may stimulate new ambitions resulting in early departure from the village in the hope of furthering a career. The community health worker may also be subject to civil service rules and regulations, which perhaps include a move to another locality. A further problem is that qualifications for a graded civil service post may exclude illiterate but otherwise good candidates such as indigenous practitioners. Salaries on the civil service scale may be out of proportion to other sources of income in the community. If new regulations are tailored to the community health worker, dissatisfaction may be fostered if the terms and conditions compare unfavourably with those of government employees in other sectors (*1*).

As a consequence of a rise in social status, the community health worker may no longer identify with the poor and will probably feel primarily accountable to those who pay his salary. In some cases, association with an outside authority will be deeply distrusted for historical or political reasons, and the community health worker risks ostracism and loss of effectiveness as an agent for change (*8*). The community may tend to regard him as an external agent.

There are also constraints within the health profession itself. The inclusion of a popular, dedicated community health worker in the local government service may present a threat to the professional health workers, who may antagonize him in order to protect their own interests (*6*).

Some primary health care programmes are financed by nongovernmental organizations. These funds, however, are never available indefinitely and the record of transition from outside funding to local funding is very disappointing. Once dependency on external sources has been fostered it is a difficult trend to reverse. The possibilities are reduced for replication of projects because the major factor determining viability becomes the ability to locate a sponsor.

Dependence on external resources can create another kind of problem as well. If responsibility and control over the community health worker is removed from the community it will be unable to participate effectively in the management and supervision processes. Health care becomes a service "distributed" by a group of health professionals to the community. The argument is made that dependence on external resources has a "community oppressive" effect (*2*).

The Shared Responsibility Option

All three modes of remuneration are beset with problems. There is no single clear-cut solution and the choice will depend on a number of factors:

- the sociocultural, economic, and political features of the population to be reached;
- the structure and the coverage of the formal health system;
- the tasks expected of the community health worker and the amount of time to be dedicated to them.

Two main types of community health worker can be described (*9*). One serves to extend the coverage of the formal health system and remains under its control and often on its payroll. This worker is an "auxiliary to other auxiliaries". The second type stems from the community, which is responsible for paying his salary. There are, of course, many intermediate models where the community health worker has a dual allegiance to both the formal health system and to the community and where a combined sponsorship may be established.

The intermediate solution is often the most appropriate. Responsibility is shared by the government and the community. A strong institutional base in the community is needed in order for it to succeed. Mechanisms must be developed in unreceptive areas to encourage collective decision-making and the equitable distribution of costs and benefits. A credible and acceptable linkage must be forged with the formal health services and a strong partnership developed between government personnel and the community. This will require a strengthening of government institutions at district and local levels and improvements in planning and management skills.

It is widely accepted that the community must take a leading role in its own health care activities. The primary health care strategy aims at community self-reliance. Ideally, the community should be willing and able to depend on its own resources for its basic health care and yet sustain a harmonious relationship with the formal health services. A flexible and pragmatic approach is needed to search for innovative solutions. One possibility is to channel funds for the maintenance of the community health worker through organized community leadership or a health committee. Community control and responsibility may in this way be enhanced and not undermined while, at the same time, the government manifests its commitment to primary health care.

Discussion

An important lesson is emerging from experiences in primary health care programmes: adequate and sustained remuneration is essential to maintain the interest of the community health worker and to ensure the stability of the programme (*10*). The community health worker must, in fact, enjoy job security.

It is clear that there is no single set of rules. All the elements of the primary health care strategy have to be carefully considered when a programme is planned. The need to reward the community health worker has been highlighted as one of these elements but it should not be viewed in isolation. This issue is linked to many others, including the tasks performed by the community health worker, whether the work is full-time or part-time, and the relationship of this kind of health worker with the community and the formal health services. It is the resultant of all these issues that determines the model for the community health worker.

If the primary health care strategy is to succeed there must be a means of diffusing health awareness throughout the community and right into everyone's home. Family health care can be effective only if promoted by health workers who are in intimate contact with the community and if the health system has a responsibility to encourage it.

Primary health care should not be viewed as a cheaper means of spreading health care but as a more effective and equitable way of using national resources. A vigorous, committed health management team working from a strong institutional base in the community will be able to design locally relevant programmes. □

ACKNOWLEDGEMENTS

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Seeing the patient "whole"

Our present system of medical education is founded on the belief that the patient's symptom arises from "disease". We are taught which symptoms occur in which diseases, we construct differential diagnoses, and then we seek by examination and investigation to identify the disease which has caused the symptom.

The reality, however, is quite the opposite. The vast majority of symptoms complained about do not arise from disease, and are much more clearly related to "problems of living", for want of a better phrase...

Disease and emotional problems commonly coexist. It all feels the same to the patient. The only useful way forward is to see the patient, in the round, as an individual, with a family role, a work role and a social role.

— Raymond Pietroni, in *Hospital doctor,* Vol. C3, No. 24, 16 June 1983, p. 19.

Robert Boland & Mary Young

Putting a price on primary health care

In spite of its immense importance in decision-making, cost analysis is a neglected aspect of primary health care.

Primary health care is becoming increasingly the responsibility of national governments rather than local authorities or outside agencies. A series of national plans for comprehensive primary health care has been put forward dealing with inputs, processes, and outputs, but they all fail to deal rigorously with costs and funding. An analysis of the costs involved is an essential element in formulating plans, yet estimates of the costs of primary health care have generally been based on vague and arbitrary principles (*1*, *2*). Projects of India, Iran, Jamaica, Nigeria, and Turkey have provided scientific evidence to suggest that comprehensive primary health care can be achieved at a cost of $0.40 to $7.50 per capita per annum (*3*). These figures have been widely quoted and governments have often used them to compute rough estimates for their own countries, simply by multiplying the figure chosen by the number of people to be served (*4*).

Costs of Simple Projects

In the past, when health care in a community was provided by traditional healers, the system was self-supporting and there was no need to estimate costs. Even when Western medical care was first introduced through missionaries and other outside agencies there was no need for anything but simple accounting systems since the costs involved were usually obvious and direct and relied on funding from outside the country. No precise definition of the range of functions or quality of care was made, and generally a budget was drawn up and actual costs checked against this. Only the items paid for directly out of donor funds were included in the computation. Thus items such as "free" manpower, equipment and supplies were ignored, as were indirect costs such as infrastructure, administration, and fund-raising. To arrive at a cost per capita per annum the total cost of the service was divided by the total number of people in the community, which ignored the fact that many would still be using the services of traditional healers. Other factors that would tend to be ignored in this simple computation would be logistics, water and sanitation, depreciation of equipment, and facilities and training; thus the figure reached for the cost of primary health care was likely to be an underestimate. Indeed, the cost obtained by taking all the relevant factors into consideration could well be ten times the crude estimate.

National Cost of Primary Health Care

While this approach was adequate for the planning and management of local primary health care projects, where costs are essentially direct, it is not appropriate for national primary health care planning, which has to take account of the many indirect costs as well as

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the costs that will be shared by other sectors of the economy, such as the development of infrastructure. This highlights the fact that the purpose for which the cost analysis is being made is all important, for it will dictate which items are relevant to the analysis (*5*).

To identify the relevant costs for the purposes of national policy-making on primary health care, it is important first to define primary health care in terms of function—nutrition, maternal and child care, sanitation and water, control of communicable disease, family planning, immunization, health education, and basic curative care—and the scope and quality of care under each function. Next it should be decided exactly what purpose the cost analysis is to serve, since it is normally useful only for one purpose. It may, for instance, be needed to make decisions about extending or terminating a service or altering it to make better use of resources. It may be needed for planning future services or the further development of infrastructure, or it may be used as a measure of efficiency, for comparisons between regions or countries, or for future forecasts. Once the purpose of the cost analysis has been established, there will be a range of costs that can easily be attributed to the primary health care activity—direct costs such as staff salaries, supplies, drugs, and equipment. Some adjustments may have to be made to the figures to take account of services and supplies offered free. Then there will be the indirect costs for which some arbitrary estimates will have to be made, since they may well be for items such as infrastructure that benefit other areas of development as well as the health services and will thus be joint costs.

Deciding what proportion of a joint cost should be allocated to primary health care can present problems: the figure will necessarily be arbitrary, but the assumptions on which it is based must be clearly defined.

Computations of the cost of primary health care based on these data will be considerably higher than those for a locally organized primary health care project because they will take into account these indirect costs. And the figure will, of course, vary considerably from one location to another, according to what services already exist in the way of communications, logistics, and the availability of free manpower, equipment, and supplies.

Technical Complexities in Determining Relevant Costs

Even with clear definition of the matters outlined already, the determination of relevant direct and indirect costs still presents some difficulties. For instance the value of goods and services paid for by other organizations and donated free to a project may be difficult to determine where there is no market value known, as for example in the case of food surplus distribution. Similarly the value of international health manpower paid for by external funds may not be easy to establish. These can be considered as opportunity costs, and while they may be ignored at project level they are relevant for national planning purposes.

Where costs have already been incurred and cannot be reclaimed, i.e., in the development of existing infrastructure, they are considered sunk costs and are not relevant. However the extent to which new infrastructure must be created will be relevant. Where poor communications exist, for example, it may be necessary to provide a road to deliver primary health care, and since this will also benefit general development it can be considered a joint cost. But deciding what proportion of the cost should be allocated to primary health care can present problems; the figure will necessarily be arbitrary, but the assumptions on which it is based must be clearly defined.

Expenditures on land, buildings, equipment, and sometimes on training and organization will be relevant for more than one accounting period. To reach a figure for cost of primary health care per capita per annum, such costs must be amortized over an assumed working life or treated as costs in the year they are incurred, but it must be realized that the way such costs are treated will significantly affect

the figures for any one year. Cash expenditures in any one accounting period for the benefit of another accounting period (i.e., inventory accumulation) may also require adjustments since accounting flows are not the same as cash flows. Similarly, where staff are being paid for one service but are being used for primary health care work, the cost is relevant even though no additional cash is paid.

Whether a cost is considered relevant or not also depends on who is paying the bill. Thus at regional level, infrastructure paid for by the national government is not relevant, but at a national level all costs are relevant. The costs of goods and services will be affected by time and geographical location, too. Transport and "inventory carrying" costs are relevant, although they are often paid for by a third party and are not easy to establish. Moreover figures reached by the use of discounted cash flow techniques for "time adjustment" can be misleading because such computations depend on arbitrary assumptions about interest rates.

It must be remembered that the consumer often pays for his own health care, and cost estimates for primary health care must therefore include both public and private expenditure, though private sector data may be difficult to determine.

Materiality is a key concept in cost accounting—materiality in this sense meaning significance, not physical existence. In accounting, only material costs normally exceeding 5% of the whole are important enough to be determined with precision, but it is nevertheless important that all material items be included, and it should be accepted that the cost estimates may contain many small errors.

In the business world, accounting data are not fully accepted until audited by independent accountants. With all the complexities of primary health care cost data discussed so far, the opportunity for error (if not manipulation) is wide and the need for some auditing system self-evident. Moreover if the costs of primary health care are to be compared from one country to another, definitions of costs, direct and indirect, and an agreed methodology for dealing with opportunity costs, joint costs, and sunk costs will have to be established.

Other Influences on Costs

In addition to the technical difficulties outlined above, there are other problems related to organizational and political factors (*6*). At a project level primary health care has become highly professional, with increasingly sophisticated planning, management, and evaluation techniques (*7*). And at the national level there is increasing sophistication in methods to set priorities, determine social acceptability, and design all aspects of programs, but there still appears to be little acceptable methodology for collecting primary health care costs incurred by different organizations.

Since the major constraints on primary health care tend to be political and cultural rather than financial, all cost estimates are subject to political influence, and unacceptable data may be withheld.

First there is the problem of determining which organizations are actually incurring costs relevant to primary health care. Primary health care costs may be incurred by a variety of government departments, such as health, transport, public works, agriculture, and finance, but sometimes their accounting systems are unable to identify which costs are relevant to primary health care. Then there is the difficulty of getting organizations to use common definitions of cost which are comparable, and finally there is the problem of obtaining the data because, where significant losses are sustained or inefficiencies exist, organizations may be reluctant to release data because they wish to avoid embarassing disclosures. Moreover, since the major constraints on primary health care tend to be political and cultural rather than financial, all cost estimates are subject to political influence, and unacceptable data may be withheld.

As well as the internal sources of finance, consideration must be given to the external sources—international organizations, bilat-

eral organizations, and over 200 voluntary organizations active in the international health field—to assess whether or not their contributions are significant.

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We have discussed the complexity of costs as the scope of primary health care moves increasingly from locally organized projects to national comprehensive coverage. The conclusions stemming from this discussion are: that there is no "true cost" of primary health care, only a "relevant cost" estimated for a particular purpose and based on many assumptions; that simple cost data are not useful unless the assumptions on which they are based are relevant; and that the multiplicity of sources that incur costs and the presence of joint costs provide the potential for error and highlight the need for auditing. Finally it is suggested that a precise definition of primary health care, an exact specification of the purpose of the cost data, and careful analysis of the underlying assumptions are vital before the figures can be assumed to be relevant for decision-making.

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Choosing a city

If you want a good place to live with reasonable job prospects, choose a city of no more than 600 000 inhabitants. This is the advice of Professor Paul Bairoch of Geneva University in a report prepared for the International Labour Organisation. He has found that there are certain population threshold limits beyond which urban problems become very serious. For instance, traffic congestion starts to strangle a city when it reaches the 200 000 mark. At this point city officials should start investing in mass transit. It is also at 600 000 that pollution becomes a major threat in the temperate zones. Those in hotter climates feel it at about 500 000. Beyond the two million mark, the would-be emigrant would do well to look elsewhere for a place to live and work. Both life and work are very difficult in any place that big. Not only does the job market get worse but crime rates soar and the quality of housing and education is lower.

Apparently very few take Professor Bairoch seriously, or he hasn't reached them yet, because the trend toward increasing urbanization is up, according to United Nations projections. While slightly over one-half of the world's population will be living in urban areas by the year 2000, by 2025 the figure will have increased to two-thirds. The biggest growth has been and will continue to be in the supercities.

— *International dateline,* July 1983.

In Focus

Hepatitis

A factual summary of the latest knowledge of the various forms of hepatitis, based on a round table discussion among 11 specialists from research centres in 8 countries.

While differences between the clinical syndromes of viral hepatitis A (HA), hepatitis B (HB), and hepatitis non-A non-B (HNANB) become apparent on analysis of large numbers of cases, these differences are not reliable for diagnosis in individual cases of icteric disease.

Hepatitis A is frequently heralded by nonspecific symptoms such as fever, chills, headache, fatigue, generalized weakness, and aches and pains. A few days later, anorexia, nausea, vomiting, and right upper abdominal pain appear, followed closely by dark urine and light stools and jaundice of the sclera and skin.

The onset of hepatitis B and hepatitis non-A non-B may be prolonged and more insidious. The clinical features of the icteric phase are similar for viral hepatitis A, B, and non-A non-B. Biochemical test values indicating liver disease are also similar for all three types, although the serum enzyme and bilirubin elevations tend to be more prolonged in hepatitis B and hepatitis non-A non-B. The case fatality ratio is low (approximately 1:500 or 1:1000). Exceptions are hepatitis B following blood transfusion, and, in some countries, hepatitis during pregnancy. The latter cases have been diagnosed as hepatitis A, but the causative agents need to be investigated further. Persistent or chronic active hepatitis may follow hepatitis B or hepatitis non-A non-B, but not hepatitis A.

In view of the difficulty of differentiating between these diseases on clinical and biochemical grounds, the advent of specific serological diagnostic tests for infection with both hepatitis A virus (HAV) and hepatitis B virus (HBV) is of great importance. Hepatitis B virus has now been established as a major causative factor in primary hepatocellular carcinoma, one of the commonest tumours of man. The etiological agents of hepatitis A and hepatitis B have been identified.

Hepatitis A

Infection with HAV may occur at all ages among susceptible individuals. In young children, the infection tends to be mild or asymptomatic; clinical severity increases with increasing age. The patterns of disease vary considerably from population to population and

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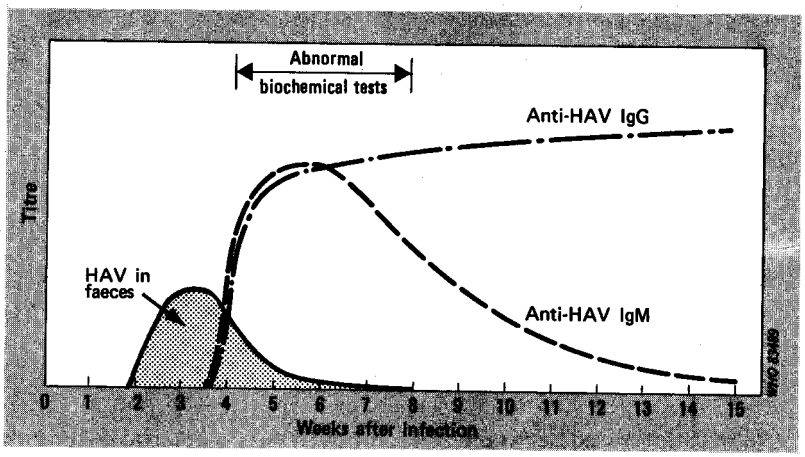
This article is a shortened version of a report of a round table discussion on viral hepatitis arranged by the World Health Organization and held in Munich, Federal Republic of Germany, in May 1982. The full report, by F. Deinhardt & I. D. Gust, was published in the *Bulletin of the World Health Organization*, **60**: 661 (1982). The participants were: Dr M. Balayan, Institute of Poliomyelitis and Viral Encephalitides, Moscow, USSR; Professor F. Deinhardt, Max von Pettenkofer Institute, Munich, Federal Republic of Germany (*Chairman*); Dr I. D. Gust, Queen's Memorial Infectious Diseases Hospital, Fairfield, Australia (*Rapporteur*); Dr J. Maynard, Division of Hepatitis and Enteritis, Centers for Disease Control, US Public Health Service, Phoenix, AZ, USA; Dr J. Melnick, Department of Virology and Epidemiology, Baylor College of Medicine, Houston, TX, USA; Dr K. Murray, Department of Molecular Biology, University of Edinburgh, Scotland; Dr R. Purcell, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD, USA; Dr G. Schild, Division of Viral Products, National Institute for Biological Standards and Control, London, England; Dr O. Sobeslavsky, Institute of Sera and Vaccines, Prague, Czechoslovakia; Dr M. Yano, Department of Gastroenterology, National Nagasaki Central Hospital, Japan; Professor A. J. Zuckerman, London School of Hygiene and Tropical Medicine, London, England (*Vice-Chairman*).

depend upon standards of hygiene and sanitation, transmission being by the faecal-oral route.

In developed countries, the pattern of reported cases is shifting from early childhood to older ages, paralleling improvements in socioeconomic and hygienic conditions. With time, as the risk of infection continues to decrease in the younger age group, a large population of susceptibles should result, providing fertile soil for future epidemics. The typical course of virus excretion and the development of specific antibody (anti-HAV) is shown in the figure.



Typical course of hepatitis A.

Hepatitis A virus and specific viral antigens (HAAg) are excreted in the faeces for 1–2 weeks before the onset of disease and for up to 4 weeks thereafter. A chronic carrier state is unknown. The detection of HAV or HAAg is thus evidence of current infection, but its absence does not preclude the diagnosis.

Anti-HAV IgM appears early in the illness and persists for a limited time. This assay is the test of choice for the diagnosis of hepatitis A and enables a diagnosis to be made within 24 hours. Anti-HAV IgG appears more slowly, persists for many years, and indicates immunity to the disease.

It has been estimated that there are at least 170 million persistent carriers of HBV in the world.

The value of immunoglobulin in controlling outbreaks of infection in population groups in which people are in close contact has been demonstrated repeatedly. The intramuscular administration of normal pooled human immunoglobulin (a 160 g/l solution in a dose 0.02–0.12 ml/kg of body weight) before exposure to the virus or early in the incubation period may prevent or attenuate a clinical illness while not necessarily preventing infection and excretion of the virus. Therefore large-scale routine use of immunoglobulin as a preventive measure against HAV among school-age or other special populations has not gained widespread acceptance. However, new methods for the determination of anti-HAV have been developed that make it possible to quantify specific antibody in pooled immunoglobulin and also to test potential donors for evidence of immunity, and these methods should provide a sound basis for preventing and controlling the infection.

Individuals entering highly endemic areas or institutions should be considered as candidates for larger doses of immunoglobulin with repeat dose schedules every 4–6 months. Where feasible the immune status of such individuals should be monitored to avoid unnecessary inoculation.

The successful adaptation of HAV to growth in cell cultures and recent advances in recombinant DNA technology suggest that it will soon be feasible to produce either killed or live vaccines. Although detailed strategies for the use of such vaccines cannot be formulated at present, it is likely that they will be similar to those used for the control of poliomyelitis. HAV vaccines could be administered widely in populations in which the disease is common and replace immunoglobulin for the protection of subjects travelling to endemic areas.

Hepatitis B

The extent of chronic HBV infection has been fully recognized only in the past few years, since tests for hepatitis B surface antigen (HBsAg) have become widely available. As a result of studies in many countries, it has been estimated that there are at least 170 million persistent carriers of HBV in the world. These people provide a major reservoir of infection.

Enormous differences exist in the frequency of persistent infection with HBV. In most Anglo-Saxon populations, for example, the carrier rate is less than one per 1000 while on the Pacific island of Rapa it is one in two. The risk of an adult becoming a carrier following acute infection is 5–10%, but in babies it may exceed 50%.

The prevalence of infection with HBV varies from country to country and depends upon a complex mix of behavioural, environmental, and host factors. In general, it is lowest in countries with high standards of living and highest in countries that are poor and overcrowded.

Two different patterns of infection are recognized. In populations with a high prevalence of HBV, the infection is usually acquired early in life and the highest infection and carrier rates are seen among children and young adults. The carrier rate declines with increasing age, as does the prevalence of specific antibody. In populations in which HBV is relatively uncommon, the majority of infections and the peak prevalence of HBsAg and specific antibody are in the 15–29-year age group. The highest rates of infection are found among people who have an increased risk of contact with blood or blood products. Prominent among these are health care workers (particularly laboratory staff, dentists, and surgeons), haemodialysis patients, patients and staff in institutions for the mentally retarded, intravenous drug users, and male homosexuals who frequently change partners.

Hepatitis B has no seasonal pattern and the long-term trend is not clear. Cyclic peaks, which have been a feature of the epidemiology of hepatitis A, have not been observed and epidemics due to the widespread use of contaminated blood or blood products are becoming rare.

Transmission from HBV carrier mothers to their babies appears to be the single most important factor for the high prevalence of HBV infection in some areas. The risk of infection depends on the proportion of mothers who are carriers of hepatitis B *e* antigen, a proportion that may be as high as 40% in some countries. Although HBV can infect the fetus *in utero,* this rarely happens, and most infections appear to be due to a leak of maternal blood into the baby's circulation or to ingestion of, or accidental inoculation with, maternal blood.

In view of the difficulty of differentiating between these diseases, the advent of specific serological diagnostic tests for hepatitis A and hepatitis B is of great importance.

Exposure to HBV usually results in an acute self-limiting infection, which may be subclinical or symptomatic. A proportion of infections fail to resolve, and these individuals become persistent virus carriers. Persistent carriage of HBV may be entirely asymptomatic or associated with the development of persistent or chronic active hepatitis. Differentiation between acute infection and the carrier state is of clinical and epidemiological importance and may depend on the determination of several parameters, including the immunopathology that can be observed in liver biopsy specimens. These determinations allow certain predictions to be made and give an indication of the degree of infectivity of the blood of such patients.

A high titre of HBsAg during the acute phase of hepatitis B, with persistence for more than 6 weeks, is often followed by the development of chronic hepatitis. Hepatitis B *e* antigen (HBeAg) can be detected with sensitive radioimmunoassays or enzyme immunoassays in almost all cases of acute hepatitis B infections. It normally disappears early during convalescence, usually before HBsAg disappears, and it can also be used to predict the

Table 1. Serological markers of hepatitis B virus

	HBsAg	HBeAg	Anti-HBe	Anti-HBc	Anti-HBs	Infectivity of blood
Subject in incubation stage or with early acute hepatitis B	+	+	–	–	–	High
Patient with acute hepatitis B or a chronic carrier	+	+	–	+	–	High
Patient with late or chronic hepatitis B	+	–	+	+	–	Low
Patient convalescing from acute hepatitis B	–	–	+	+	+	Zero
Person recovered from hepatitis B	–	–	–	+	+	Zero
Person who has been immunized or has recovered from hepatitis B or who has been subject to repeated exposure to HBsAg without infection	–	–	–	–	+	Zero
Person who has recovered, with undetectable anti-HBs or chronic infection	–	–	–	+	–	Questionable

course of the disease. HBeAg in the serum indicates persisting active viral replication. The blood of such patients must be considered highly infectious. Disappearance of HBeAg and development of antibody to HBeAg (anti-HBe) are in general good prognostic markers but do not guarantee complete clearance of HBV. Anti-HBs appears only late, sometimes several months to a year after the disappearance of HBsAg, and indicates immunity.

Antibody to hepatitis B core antigen (anti-HBc) is present in the early acute phase of the illness (sometimes it even appears before the onset of illness). It remains measurable for many years and is perhaps lifelong. In epidemiological studies anti-HBc is the best marker for evaluating HBV prevalence in various populations. Disappearance of anti-HBc IgM may be the most reliable way of recognizing the clearance of HBV, whereas persistence seems to be generally associated with persistent or chronic active disease and continuing viral replication.

A simplified schema of these determinations and their significance is given in Table 1. Diagnosis of the status of an HBV infection cannot be made by laboratory evaluation of HBV markers alone. The patient's history, general clinical data, clinical chemistry, and, when possible, liver histology obtained through liver biopsy specimens may also be needed to arrive at an accurate diagnosis in some cases.

Until recently the prevention of hepatitis B has been limited to reducing the incidence through hygienic measures, the selection of blood donor populations, the testing of donor blood for HBsAg, and the administration of hepatitis B immunoglobulin to individuals who have sustained percutaneous exposures to HBV-containing blood or other body fluids. Vaccines for active immunization have been developed recently and will play a major role in preventing hepatitis B in the future.

One basic method of interrupting transmission is to prevent infectious material from a hepatitis B patient or HBV carrier from entering the body of a susceptible person. This can sometimes be accomplished by taking simple environmental precautions in dealing with known or presumed infectious people or their blood. All blood and blood-contaminated material should be handled carefully, and instruments, including needles and syringes, should be cleaned and disinfected or sterilized before re-use. The use of good techniques and environmental precautions, notably in renal dialysis centres, can significantly decrease the transmission of HBV.

Outside the hospital environment, poor medical and paramedical practices may transmit HBV infections. Non-professionals who perform minor surgery, such as nose or ear piercing or scarification, seldom take appropriate precautions between patients. The simple heating of instruments over a flame and immersion of needles in boiling water for a minimum of five minutes will reduce the risk of transmission.

There appear to be no grounds for limiting the employment of individuals in medical or

other professions after they have recovered from hepatitis B, regardless of the continued presence of HBsAg, or of similarly limiting the employment of persistent carriers whether or not they are also positive for HBeAg, provided these people maintain adequate standards of personal hygiene. In some countries the exception to this rule is the exclusion of personnel who are HBsAg positive from departments dealing with dialysis, transplantation, or oncology where immunosuppressed patients are gathered and where considerable volumes of blood are used. Under these circumstances, if infection with HBV occurs, the infection could well become endemic in the unit.

In the rare case in which a health care worker is shown to have been involved in the transmission of hepatitis B, an investigation of the circumstances involved should be carried out and appropriate measures taken to prevent further transmission.

The most important method of achieving widespread prevention of hepatitis B is active immunization. Purified subunit vaccines have been prepared from HBV components found in the blood of chronic carriers of HBV and have been shown in several countries to be safe, immunogenic, and effective in preventing the disease. Strategies for the use of these vaccines must take into consideration the different patterns of hepatitis B prevalence, which may be divided into three categories — low, intermediate, and high — as in Table 2.

The selective vaccination of groups at special risk might be undertaken in areas of low prevalence. For intermediate- and high-prevalence areas, there seems to be little question that no effective control of hepatitis B will be possible unless entire populations can be immunized prior to exposure, that is to say during infancy and early childhood. However, in these areas, it is currently not possible to collect and process sufficient quantities of plasma to conduct mass immunization campaigns. It is so expensive to produce and standardize the vaccines that the countries most in need of them cannot afford them.

The production of synthetic HBV antigens by recombinant DNA techniques for use in vaccines is a promising approach that may eventually make it possible to carry out mass immunization in high-prevalence areas of the world at reasonable cost. Finally, vaccination strategies based on the identification of HBV carriers, such as the immunization of infants born to HBsAg-positive mothers, must be accompanied by accelerated programmes to produce suitable low-cost reagents for HBsAg detection.

Efficacy trials with normal pooled human immunoglobulin for the prevention of hepatitis B have given inconsistent and generally negative results owing to varying and usually low amounts of anti-HBs in these preparations. In contrast, special hepatitis B immunoglobulin with high anti-HBs titres has been shown to be effective in both pre-exposure and post-exposure prophylaxis. However, the general use of hepatitis B immunoglobulin for long-term prophylaxis cannot be recommended because of its limited availability, its cost, and the risk (although remote) of complications through repeated use over a long period of time.

The main indication for use of hepatitis B immunoglobulin is for postexposure prophylaxis — for example, after accidental inoculation with HBV-positive materials or for the newborn of HBV-carrier mothers. It must be stressed that the hepatitis B immunoglobulin should be given as soon as possible after an accidental inoculation (ideally within 6 hours and preferably not later than 48 hours) because its efficacy in preventing disease and the devel-

Table 2. Patterns of hepatitis B prevalence

Low	Intermediate	High
HBsAg 0.2–0.5 %	HBsAg 2–7 %	HBsAg 8–20 %[a]
anti-HBs 4–6 %	anti-HBs 20–55 %	anti-HBs 70–95 %
childhood infection infrequent	childhood and neonatal infection frequent	childhood and neonatal infection very frequent
Typical regions: North America, Central Europe, Australia	Typical regions: Eastern Europe, Mediterranean, Eastern Mediterranean, Japan, USSR	Typical regions: tropical Africa, southern Asia, parts of China

[a] Prevalences of up to 50 % have been identified in some isolated Pacific islands.

opment of a carrier state decreases rapidly with time.

The administration of hepatitis B immunoglobulin at birth and in repeated doses during the first year of life has been shown to prevent the development of a persistent carrier state in infants born to HBV-carrier mothers in up to 80% of the inoculated infants, although infection still occurs in many cases. These results may be improved further by the use of passive/active immunization of the newborn.

Although these strategies have been shown to be useful in developed countries, where the prevalence of hepatitis B is generally low, the current high cost of commercial reagents for HBsAg testing, together with the current short supply and high cost of hepatitis B immunoglobulin, have prevented their worldwide use. Efforts are now under way to introduce inexpensive techniques, such as enzyme immunoassays, for the detection of HBsAg on a global scale. In addition, the production of specific antibodies (anti-HBs) from hybridoma or other animal or microbial cells may provide an alternative source of anti-HBs for large-scale passive prophylaxis.

In treatment, hepatitis B immunoglobulin is of no value if given days after infection or in the treatment of acute, persistent or chronic active hepatitis.

Hepatitis B virus and primary hepatocellular carcinoma

From studies of the natural history of primary hepatocellular carcinoma it is clear that persistent or past infection with HBV is a common feature of the disease. Since few patients with primary hepatocellular carcinoma give a history of having had acute hepatitis, the original HBV infection must have been mild. The situation is summarized in Table 3.

In North America and most of Europe, where the prevalence of hepatitis B infection is rather low, primary hepatocellular carcinoma is uncommon and only about 25% of the cases that do occur are HBsAg-positive. In the Mediterranean region, e.g., Greece, where the prevalence of HBsAg carriers is higher, the tumour is more frequent and up to 60% of patients with it are HBsAg-positive. In tropical Africa and the South-East Asia, HBV is clearly associated with cirrhosis and primary hepatocellular carcinoma, which is a very common neoplasm. Patients are usually young adults who seldom have any history of alcoholism.

Epidemiological and virological studies provide evidence that HBV is a major causative factor in the etiology of primary hepatocellular carcinoma. The final proof will come from the widespread administration of hepatitis B vaccine, which holds the promise of preventing not only infection with the virus but also the cancer that is a result of the infection.

Delta-Antigen-Associated Hepatitis

Delta-antigen-associated hepatitis is caused by an agent that is the most unusual of the recognized hepatitis agents. Delta antigen was initially detected as a nuclear fluorescence in hepatocytes of patients with persistent or chronic active hepatitis B. Indeed, the delta antigen is inextricably linked to HBV infection. It appears to be a defective virus-like transmissible agent that requires HBV synthesis for its replication. At present only one serotype of the agent is recognized.

On the basis of limited serological surveys, the delta agent appears to have a worldwide distribution, but it is of particular importance in Italy, especially southern Italy, where it is highly endemic. It is transmitted by contaminated blood and blood products, and serological evidence of infection is found most often in frequently transfused haemophiliacs and others who are repeatedly exposed to blood, such as users of illicit parenteral drugs. It is probable

Table 3. Hepatitis B infection and primary hepatocellular carcinoma

	Prevalence of hepatitis B %	Primary hepatocellular carcinoma	
		Prevalence per 100 000	Patients with circulating HBsAg
North America and Europe	0.1–1.0[a]	1–3	25%
Mediterranean	5	20	60%
Tropical Africa and South-East Asia	10–25	Up to 150	50–80%

[a] As shown by blood donors.

that non-percutaneous modes of transmission also exist. There may also be a higher risk of infection among those with numerous sexual partners, especially male homosexuals.

The delta agent has been associated with both acute and chronic hepatitis, always in the presence of HBV infection. Delta-associated hepatitis is generally more severe than hepatitis B in the absence of the delta agent. Thus, severe rapidly progressive chronic active hepatitis is often associated with combined infection with HBV and the delta agent, and a sudden exacerbation of severe hepatitis in an HBV carrier is suggestive of delta-associated hepatitis superimposed on chronic HBV infection. In addition, approximately 5–10% of cases of HBV-associated fulminant hepatitis may have serological evidence of coincident infection with the delta agent.

Hepatitis Non-A Non-B

The term "hepatitis non-A non-B" is widely used for hepatitis caused by agents that are not serologically related to HAV or HBV. There is not yet a universally accepted serological technique with which to identify HNANB agents, and diagnosis is by exclusion. The distribution lf these agents appears to be worldwide.

In developed countries, HNANB may account for up to 20% of cases of clinical hepatitis, though in Japan the figure is approximately 50%.

The agents are transmitted via contaminated blood and blood products, especially anti-haemophilic factor. In those areas of the world where post-transfusion hepatitis B has been controlled by rejection of HBsAg donors, HNANB is now responsible for up to 90% of transfusion-associated hepatitis. Transmission from infected mothers to their offspring was reported in one epidemic of HNANB among women who had received rhesus anti-D immunoglobulin that was contaminated with HNANB agents. It is thought that HNANB may also be transmitted by non-percutaneous means, including intimate contact between individuals.

Although it is generally less severe than hepatitis B, at least 50% of patients with post-transfusion HNANB develop a chronic form of the disease, but biochemical evidence of hepatitis appears to diminish with time, suggesting that the disease may become less severe after one or more years.

Epidemic hepatitis non-A non-B resembling hepatitis A has been reported from Asia and the Eastern Mediterranean. It is an acute self-limiting disease occurring predominantly among young adults. It is more severe in pregnant women, in whom it is associated with a high mortality, especially in the last trimester of pregnancy. It is thought to be spread by ingestion of contaminated substances, especially water, and faecal-oral spread is assumed but not proven. Outbreaks usually follow the annual flooding of rivers. Such epidemics occur in the same communities only at intervals of several years, suggesting that immunity follows infection. The incubation period appears to be comparable to or slightly longer than that of HAV: an average of 30–40 days. Secondary cases appear to be uncommon. Complete recovery follows epidemic hepatitis non-A non-B. The epidemic nature of this hepatitis and its presumed faecal-oral transmission separate it from the previously recognized HNANB agents, which have epidemiological chararacteristics similar to those of HBV.

Serological tests of patients with epidemic hepatitis non-A non-B indicate that most patients have had a prior infection with HAV, which is not surprising since epidemic hepatitis non-A non-B occurs in regions where most individuals are infected with HAV in the first few years of life. There is no serological evidence for reinfection of patients with HAV, and the prevalence of markers of HAV infection is not significantly higher in patients with epidemic hepatitis non-A non-B than in the general population. Attempts to develop specific serological tests have not been successful to date.

The condition may be caused by an agent distinct from HAV or alternatively by a distinct but previously unrecognized serotype of HAV that is less readily transmitted than recognized strains of HAV. Evidence for the latter has recently been obtained in studies of hepatitis in the eastern USSR. □

Readers' Forum

Safe water will defeat guinea worm disease

SIR — I have read with great interest the letter entitled "Complexities of guinea worm disease" by Brieger, Johnson, Adeniyi and Akpovi, published in Readers' Forum some time ago (*1*). Being an ardent advocate of the eradication of guinea worm disease from all the endemic countries of the world, it is very gratifying for me to note the following observations made in the above letter as very important and of practical value.

1. Cases of guinea worm disease, though fewer in number, continue to occur because often the piped water supply does not cover the entire endemic town and is not continuous, and at some time or another there is a breakdown.

2. A person can acquire infection from a neighbouring endemic town or village.

3. There is a possibility of reintroduction of the infection in a disease-free place, particularly when the patient is not given any treatment and where the water sources are capable of being infected.

4. There is an urgent need to pay attention to the behavioural, cultural, and mobility patterns of the community.

These and related aspects were thoroughly considered in the workshop held in June 1982 under the auspices of the National Research Council in Washington, DC, USA. While taking stock of this health problem and drawing up the various components of strategy for the control or eradication of the disease, the following points emerged.

The first essential step is to identify places where cases of guinea worm disease have occurred during the last two years, through case-search operations carried out by paramedical personnel.

The disease spreads from water sources that people have to enter physically in order to fill their vessels. It is the only disease that is exclusively waterborne.

After the endemic areas (both actual and potential) have been identified, a safe water supply must be made to them on a priority basis. The infective water sources are to be closed once the safe water supply has been made available. In places where this is not possible, the sources can be made safe as far as the transmission of dracunculiasis is concerned by minor engineering measures, such as converting them into wells.

It is well recognized that provision of a safe water supply in all the endemic places may not be feasible. Moreover, the water supply may be intermittent, and there is a possibility of its breakdown from time to time, so that people have to continue using water from infective water sources. It is therefore necessary for these water sources to be periodically treated with a chemical capable of killing the *Cyclops* hosts.

The treatment of cases must be encouraged both as a medical relief measure and in order to ensure that the ulcer is dressed with an occlusive bandage to discourage the patient from entering the water.

The health education of the affected community is an important component of the disease control strategy. For personal prophylaxis, the simple measure of sieving water through a double-folded muslin cloth is advocated. The inhabitants of endemic places must be instructed about the need not to enter drinking-water sources.

There are bound to be complexities, some of which can be anticipated while others will be encountered only as the operations for the control or eradication of the disease are undertaken. These, however, will always remain surmountable, particularly for those epidemiologists who are acquainted with the problems encountered and overcome in the global eradication of smallpox.

M.I.D. Sharma
Formerly Director of the National Institute of Communicable Diseases, Delhi, India

1. *World health forum*, **3**: 216 (1982).

Pioneering work in smallpox eradication

SIR — Dr K. Raška's letter on the origins of the smallpox program (*1*) reports events from 1958, when the worldwide eradication of smallpox was recommended at the Eleventh World Health Assembly in Minneapolis, USA. The eradication of smallpox, however, was envisioned in 1947 by the late Dr Fred L. Soper, Director of the Pan American Sanitary Bureau (PASB).

Knowing that it was impossible to transport the smallpox vaccine, which required constant refrigeration, to some parts of the Americas such as the Andes mountains, Dr Soper consulted with Dr James P. Leake, of the US Public Health Service, a world authority on smallpox. Dr Leake reported that a freeze-dried vaccine had been used by the Netherlands and France in their colonies but that it had never been used in the western hemisphere. It did not need refrigeration and was liquefied at the place of vaccination.

For the production of a freeze-dried vaccine, Dr Soper approached the US Public Health Service, which turned the problem over to the National Institutes of Health, which passed it to the Michigan State Laboratory at Lansing (*2*). Progress on the vaccine was so encouraging that in May 1949 Dr Soper proposed the eradication of smallpox in the Americas at the Seventh Meeting of the PASB Executive Committee. The Committee voted to "approve the proposal of the Director of the Pan American Sanitary Bureau with regard to ... carrying out a public health program primarily designed to eradicate smallpox from the Americas...". Similar resolutions were approved at the quadrennial meetings of the Pan American Sanitary Conference from 1950 to 1970 and at almost all of the meetings of the Directing Council and the Executive Committee of PASB during the period 1947-70 (*3*). By the end of 1949, 50 000 doses of the freeze-dried vaccine were ready for testing.

In 1950 Dr Abraham Horwitz joined PASB at Dr Soper's invitation, expressly to plan and develop a program for smallpox eradication in the Americas. In August of that year he signed agreements for the control of smallpox with Peru and Bolivia. Tests of the dry vaccine had been made on 100 people and were considered satisfactory. In the area selected in Peru, 632 710 people of the estimated population of 1 360 000 were vaccinated from October 1950 to August 1951 (*4*). "Children vaccinated on one arm with freeze-dried vaccine and on the other with the glycerinated product, each of which had been exposed to room temperature for 30 days, had 94% of takes on one arm and 35% on the other" (*2*).

In October 1950, the Thirteenth Pan American Sanitary Conference recommended to Member States the development of systematic programs of smallpox vaccination and revaccination with a view to eradicating the disease (*3*).

Mexico was the first country to eradicate smallpox, in 1951. The last case in the Americas was in 1971 (Brazil) — when PASB was under the administration of Dr Abraham Horwitz — and in the world in 1977 (Somalia).

The World Health Organization approved the eradication of smallpox at the Nineteenth World Health Assembly in 1966 and announced worldwide eradication in December 1979 (*5*).

Minnis Coe
Formerly Administrative Assistant to Dr Soper,
Takoma Park, MD, USA

1. *World health forum*, **2**: 290 (1981).
2. SOPER, F. L. *American journal of public health*, **56**: 1654 (1966).
3. *Handbook of resolutions of the governing bodies of the Pan American Health Organization*. Washington, DC, Pan American Health Organization, 1952, p. 27.
4. *Annual report of the Director, 1951*. Washington, DC, Pan American Sanitary Bureau, 1952 (CD 6/13), p. 17.
5. *Weekly epidemiological record*, **55**: 122 (1980).

Traditional medicine is not quackery

SIR — Apropos of Dr N. S. K. Swami's letter "Traditional and modern medicine will not mix" in *World health forum* (*1*), I am afraid Dr Swami is himself mixing up traditional medicine with quackery. What is recognized as traditional medicine all over the world today has nothing to do with "rural quacks". Some of the traditional systems such as ayurveda, siddha, unani, Chinese, and Tibetan are among the organized and established systems of medicine and are not just practices based on symptomatic treatment of various diseases (*2*).

To say that "the fields of maternal and child welfare, surgery, traumatology, oncology, pathology, and bacteriology are unknown in traditional medicine" amounts to an ignorance of history as

well as of contemporary society. The depth of wisdom and experience revealed in the work of Sushruta (the father of Indian surgery) can seldom be matched by modern surgeons when he is dealing with subjects such as wound healing, urolithiasis, and anal fistula.

No-one disputes the fact that it would be dangerous to incorporate quacks into the health delivery system. However, to equate well-established systems of traditional medicine with quackery and dogma would be equally dangerous and unscientific. Science, by its very definition, implies a search for truth with an open and unbiased mind. To condemn a system or practice without first determining its actual merits does not speak of a true scientific spirit.

If Dr Swami were to make a study of traditional systems like ayurveda, as practised by experts in India, he would realize how wrong he is in saying that traditional medicine treats only the symptoms and not the disease. Dr Swami may also read the article by Professor A. P. R. Aluwihare of Sri Lanka (*3*) and visit Banaras Hindu University, where certain ancient surgical methods are currently being practised successfully in a modern setting.

What is necessary at the current juncture is an interdisciplinary effort to evaluate some of the techniques and principles of traditional systems, apart from the herbs claimed to be effective, particularly against refractory diseases. It is in such efforts that national and international bodies need to play an active role.

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Indian Council of Medical Research,
New Delhi, India

1. *World health forum*, **3**: 420 (1982).
2. *Indian journal of medical research*, **76** (suppl.): 1 (1982).
3. *World health forum*, **3**: 450 (1982).

Case studies wanted

SIR—I should be grateful if you would publish a request to your readers for copies of short case studies on primary health care, which could usefully form part of a book I am compiling in association with Dr J.-L. Lamboray, who is at present working on primary health care in Zaire. Our objective is to produce a book of interesting and realistic problems—*not* a series of "success stories"—so that students may use the cases as "concentrated experience" of the real world of primary health care, which contrasts so strongly with the theory for a variety of complex political, cultural, economic, and organizational reasons. An example of the sort of case study we have in mind is appended to this letter. It is called "The Truck", and it may intrigue some of your readers.

R.G.A. Boland
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University, Baltimore, MD 21205, USA

Illustrative case study: The Truck

In February 1979 Dr Marshall, coordinator of a number of primary health care centers in Zaire, was confronted with an urgent decision as he attended the monthly committee meeting in the remote village of Kimayulu. He was surprised by the tense atmosphere at the meeting. The Kimayulu primary health care center was considered to be a model for both preventive and curative care. It served 12 farming villages with a population of about 3000. The village had participated fully in setting up and running the center.

At the beginning of the meeting, after the usual greetings but with none of the usual humour, the chairman of the committee said: "Dr Marshall, we are pleased that you are here with us on this particular day. We have a great problem, and we need your advice. Some time ago one of our families saved up enough money to buy a truck, for the first time in our community, but no-one in the family can drive, so now when they want to use the truck they have to hire a driver. Dr Marshall, the problem we have been discussing for many weeks is: who is the chief of the truck? We want you to tell us, who *is* the chief of the truck?"

Questions on the case:

1. What is the story of the case?
2. What was going on in the village?
3. At the meeting, what alternative courses of action were available to Dr Marshall?
4. Justify what he should do (*a*) at the meeting; (*b*) later.
5. What mistakes could he have made?

Two and a half kilos, two and a half years

SIR—In keeping with the need to devise simple ways of monitoring the health status of populations and the efficacy of primary health care services, I suggest it would be useful to consider observing whether each newborn infant weighs at least 2500 grams and is born at least 2½ years after any previous birth to the same mother. This index, "two and a half kilos, two and a half years", would have several advantages.

First, it would provide a convenient summary index of the effectiveness of maternal and child health and other services, which share the common objective of producing a healthy infant. Second, it can be easily measured. Third, it could be applied at all levels of the health care system. Thus even the most unsophisticated rural health post dispenser or village health worker could be aware of the effectiveness of his work, and the index would also permit comparisons between the effectiveness of individual health posts, practitioners, regions, countries, and remedial interventions. Fourth, it would be a useful predictor of high-risk infants requiring special attention, since the infant mortality rate rises dramatically for infants failing either of the two criteria.

Finally, it would serve to focus the attention of all concerned on the desired outcome—healthy infants and toddlers. The relevance and importance of the methods used may thus be placed in proper perspective, according to the extent to which they help achieve that common goal.

Donald R. Hopkins
Assistant Surgeon General and Assistant Director for International Health,
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pH of babies' saliva

SIR — It is known that saliva has normally a slightly alkaline pH. An acid saliva was thought to be associated with moniliasis in newborn babies. I was therefore surprised when finding, during a study of moniliasis, a number of babies free from infection but with acid saliva. This led me to study the pH of the saliva in 100 normal newborn babies. The saliva was alkaline in only two of them, and these two later presented anomalies in the small intestine, causing vomiting with bile.

I then decided to follow 25 normal newborn babies and five premature infants, measuring the pH of their saliva periodically. It was found that in the normal babies the pH started to change from acid to neutral and later alkaline at about 3–3½ months of age. In the premature infants this did not happen until 4–6 months of age depending on their gestational age at birth; the more immature they were at birth, the longer it took for the change to take place.

It is generally recommended that complementary feeding, usually with cereal preparations, should be started between the fourth and sixth months of age, individual differences in the rate of development being one of the factors for recommending a range and not a fixed age. I thought that the changes observed in the pH of the babies' saliva could be an indication of development related to a greater activity of the starch-splitting enzyme ptyalin. The measurement of pH would thus be a guide to the appropriate time to start the introduction of cereal preparations in the babies' diet. For some years now I have been following this hypothesis in my pediatric practice, using a test paper and recommending the introduction of cereal preparations only after the pH of the babies' saliva has turned alkaline. It seems to work. Further exploration of the hypothesis and other related studies may be worth while.

Carlos Lara G.
Hospital Centro Medico,
Guatemala City, Guatemala

Simple answer to the cost of water supply

SIR—The major problems faced by the International Drinking Water Supply and Sanitation Decade are the financing of the installation of pumps and the maintenance of the pumps once installed. Unfortunately, the geographical distribution of water supply facilities may not coincide with the distribution by income groups. Pumps provided for the community are frequently "taken over" by the village head men. This being so, why not sell the pumps to these people, or to a village shop, at a subsidized price? The water would then be available to the community at a price that could vary with income, and the revenue would provide an incentive for the maintenance of the facility by the owner.

Mahesh Patel
Health Economist, Department of Community Medicine, University of Manchester, England

Prevention a part of cure

SIR — The health policy of many developing countries today is one of prevention. This suggests that cooperation between health workers and sanitary workers is highly desirable. Better sanitation can be attained by health education and by organizing simple facilities for waste disposal, drinking-water supply, and vector biology and control.

We may see here the importance of closer cooperation between preventive and curative medicine. A man lives, let us say, in an unhealthy environment. He falls ill, is admitted to hospital, treated, cured and discharged. He then returns to his old environment, where he may fall ill again. Is it not of equal importance to treat the environment as well as the patient, so that recurrence of diseases is avoided?

Curative medicine is undoubtedly good prophylaxis, in that it treats germ-carriers and eliminates foci of disease. But it is vital to strike at the root; to go behind the patient to the environment.

The relation of patient to medical worker must become closer, moving beyond the simple one of diagnosis and treatment. Doctors and nurses must look into the patient's background (whether he has access to proper latrines and clean drinking-water; how food is handled and prepared in his house) and his community life. The patient must then be shown what he must do to eliminate the factors which cause disease.

This is the task of health workers; the teaching of hygiene. They must also teach people how to keep healthy by eating the right kind of food, and they should be able to show people how to avoid accidents. Health education must become a major responsibility of the health worker in order to overcome the ignorance that is the scourge of the Third World. Isn't it still common to believe, in some rural areas, that disease is the work of the Evil One or the result of mere chance?

It would be desirable to organize training seminars for health workers, focused on the main environmental factors likely to have an effect on the health of the population. Thus, sanitary personnel and health workers, armed with new notions in prevention, will work together and their actions will complement each other.

Djibril Diop
Student, National School of
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Senegal

Why not sex education in Nigerian schools?

SIR — Before the nineteenth century, education was the responsibility of parents and the immediate kinship group. However, as Europeans penetrated into Africa, the traditional African educational system disintegrated, and a new system, taking children away from the compound and the farms, where they had worked side by side with their parents, drastically reduced parental responsibility.

In Nigeria, before the establishment of schools, children were taught informally those things that were essential for life and survival within the community. A father taught his son how to cultivate the land, and instructed him in the customs of his group. Mothers were responsible for their daughters; they taught them how to be good wives, mothers, and home-makers.

Under the Western system of education, children spent several hours in school. While they were away from home they met other children from different backgrounds. A new system of education and new acquaintances offered new ideas and habits, which were quickly copied. The new educational system and other changes, such as urbanization and industrialization, made it impossible for parents to participate fully in the education of their children. As education takes place formally in the school, in the teacher-pupil and pupil-pupil relationships, the best avenue for introducing sex education is within the school.

What is at present taught in schools as sex education is nothing more than moral instruction. A special course is held mainly for girls to educate them on such issues as sex roles in the home, menstruation, pregnancy, childbirth, and child care. This is not comprehensive, and in most cases excludes boys, who also need sex education.

Young people discuss sex with each other and frequently acquire false information in the process. Some of the questions they ask are: "Why do girls menstruate?" "Is masturbation harmful?" "How can we stop venereal disease?" "Is premarital sex all right if we are in love?" Together with other unanswered questions, which point to the inability of parents to discuss sex education with their children, these questions create the need for formal sex education.

Sex education by parents is grossly inadequate. Very few parents have the complete facts, and many pass on faulty information. Some parents shy away from the topic. Those who know the answers

lack words for effective communication. Others put the questions aside, telling their children that they are too young for such matters or that they will be answered later. Some parents moralize, others add a religious bias. Some parents have loose morals, either through sexual abnormalities or unpleasant experiences. They will find it difficult to give unbiased information. The basic need of the child is for straightforward, factual information that will help him solve his sexual problems, and this can only be provided by the school.

Education and life in Nigeria are undergoing profound changes. The traditional system which gave control of the children to the parents has given way to formal education. The traditional practices with age grades, initiation ceremonies, and other activities that formerly provided effective general education, including sex education, are no longer open to the African child. Schools must be aware of the gap created when traditional education was replaced by formal education. Some children begin nursery school at the age of three and continue until they obtain a degree. And outside the home, there are many factors that influence them — pornographic literature and magazines that glamorize sex. A sexual revolution is now taking place, and there is a great deal more freedom than there was in previous generations. A new morality has emerged among Nigerian adolescents, manifesting itself in sexual and other behaviour objectionable to adult society.

The lack of sex education in school and at home creates a danger for children. As a result of their ignorance, students are faced with problems which could have been averted if they had had sex education in school. School is the one place where children are under continual instruction and observation, and where attempts can be made to study their background pressures, relationships, problems and information gaps. The school, therefore, has the opportunity to give every boy and girl sensible instruction. By reaching Nigerian youth today, the schools can help to make tomorrow's parents better and tomorrow's family stronger.

The State School Management Boards, State Education Commission, Ministries of Education and local governments, who are in charge of the schools, can employ qualified teachers to prepare curricula and teach courses. Hence pupils will be able to interact with experts in sociology, psychology and biology.

Sex education in the school will not solve all the problems of children. It will, however, help them to make intelligent decisions on sexual matters, and help in the development of the individual's personality, so that he can function well in his society.

Davidson C. Umeh
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Progress in Ethiopia

SIR—The article "Ethiopia: time-budgeting for development" by Solomon Ayalew (*1*) was misleading and made incorrect statements about the status of health services in Ethiopia.

The Ministry of Health's estimate that 43% of the population are covered by the health services is not based on false assumptions as the writer says; it is a calculation based on the availability of a health station within a walking distance of 12 km, taking the average population density of the country as 26.7 per km^2. According to studies undertaken in the United Republic of Tanzania, Zambia, and other countries, a walking distance of 12 km is acceptable for patients. The task force charged with the preparation of Ethiopia's 10-year indicative plan, of which Dr Ayalew is a member, also considers this distance to be reasonable.

Ethiopia has taken a determined step towards reorienting its health services for the benefit of underserved people in rural areas. During the past few years the health services have been reorganized in accordance with the primary health care approach, and the following advances can be claimed.

- Community health services are being developed.
- The number of health stations has more than doubled, and almost all the new ones have been built in the rural areas.
- Maternal and child health services have been strengthened, and all hospitals, health centres, and health stations have regular maternal and child health services.
- The control of communicable diseases has been strengthened through the expanded programme on immunization, environmental health activities, and the control of diarrhoeal diseases.

- Health information has been included in the literacy campaign, to reach as many people as possible, and health education is being strengthened through the use of the mass media, mobile teams, and scheduled lectures at health institutions.
- The number of health workers is being increased through the expansion of training institutions and the revision of the curriculum.

There is now a high demand for health services. Since the Ethiopian revolution the number of visits to health institutions has more than doubled, and the number of maternal and child health visits has increased many times. The participation of the people in the building of health stations, health centres, and hospitals clearly indicates the kind of confidence that people have in the health services.

Gabre-Emanuel Teka
Head, Planning and Programming Bureau,
Ministry of Health, Addis Ababa,
Ethiopia

1. *World health forum*, **3**: 129 (1982).

Solomon Ayalew replies

The social and political achievements of the Ethiopian Revolution are important historical landmarks that will be remembered with respect for generations to come. To the credit of the Ethiopian government the revolution grows stronger and is solving the basic social and economic problems of the nation. Yet it must be clear that Ethiopia is far from being in any state of social and economic perfection. Many years of sacrifice and hard work will be required before the country can pass beyond its present state of underdevelopment. In view of this reality, to boast of achievements without acknowledging defects would damage development efforts and possibly contribute to frustration and the shattering of ideals. It is with this in mind that I argued in my article for a still more radical approach to the implementation of the Ethiopian government's commitment to the achievement of health for all by the year 2000. It is clear that a committed government beginning with a start of low health service coverage is far more likely to achieve national coverage by the year 2000 than one beginning with higher coverage but little or no commitment.

Yet I still find it difficult to accept a technique for calculating health service coverage that is based primarily on the average population density as indicated by Gabre-Emanuel Teka. This approach does not do full justice to the efforts being made in Ethiopia. Coverage must be considered in terms not only of health stations or clinics but of the whole system of health development including health care.

With regard to the health services, the aim is to strengthen community health care and back-up services all the way from the health station to the urban hospital. There is a plan to redistribute scarce health resources from urban to rural areas. To develop the health sector, in the country's 10-year indicative plan, each health station would have its staff increased from the present one or two health workers to an average of three and its budget increased threefold. When most of the scattered population is resettled and when 10 community health workers and 10 traditional birth attendants are associated with each station, with the support of strong back-up services, a health station might be expected to provide genuine coverage for about 10 000 people.

Edward G. Kasili

Coping with cancer in sub-Saharan Africa

With mortality rates from cancer in sub-Saharan Africa approaching those in developed countries, there is clearly a need for improved methods of treatment, especially chemotherapy. But there are many obstacles in the way, ranging from the fatalistic belief that all cancer is incurable to critical shortages of trained personnel, facilities, and drugs. The author proposes an orderly programme for overcoming these problems.

About two decades ago, it was widely believed that malignant neoplastic disease was rare among Africans. However, the introduction of cancer registries in many centres and the progressive documentation of cases has shown this belief to be wrong. For instance, cancer deaths in Kenya account for as much as 20% of the overall mortality in adults and 9% of that in children. The situation is likely to be much the same in other countries of sub-Saharan Africa and comparable to that in Europe.

Malignancy, as seen in Africa, generally strikes younger age groups than in Western countries and kills rapidly. This has far-reaching implications for the economically productive population of the developing countries and for their economies in general. However, these facts are understood neither by the lay public nor by health planners who thus do not take them into account in their health budgets. Inadequate finance magnifies the considerable problems already confronting cancer workers in sub-Saharan Africa and makes the measurement of the extent and nature of the cancer problem a matter of priority. At present, we rely on hospital-based statistics, which are obviously inadequate. Similarly, efforts to control cancer morbidity and mortality must be based on knowledge of their etiology. Such information is available only for Burkitt's lymphoma and possibly for primary hepatocarcinoma, carcinoma of the nasopharynx, and carcinoma of the oesophagus.

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The Nature of the Problem

A rational approach to cancer therapy is only now beginning to be possible in most African countries. Until the late 1960s, the sole treatment was surgery. Radiotherapy, which has been in use for over 50 years in Europe, is available in only a few centres in Africa. Chemotherapy was first used in Uganda in the mid 1960s, e.g., cyclophosphamide for Burkitt's tumour and nitrogen mustard trials for Kaposi's sarcoma.

On presenting themselves for treatment, the majority of patients already have advanced disease with large tumour burdens. These will obviously have a relatively high proportion of

drug-resistant tumour cells which are a source of tumour recurrence when the susceptible cells are killed. Even when patients are seen at an early stage at peripheral hospitals, diagnostic services are often centralized and confirmation of the diagnosis is delayed, with the result that chemotherapy is begun too late. This adversely affects the initial response of the tumour to therapy and causes high failure rates, brief remissions, and short survival. This is particularly true of leukaemia patients in Kenya, the majority of whom die before therapy is even started.

Another problem is that, owing to inadequate facilities, staging procedures are often of limited scope; this leads to understaging of the disease in most cases, which in turn affects decisions about the type of treatment and the eventual prognosis. The chemotherapist thus frequently finds himself consulted only as a last resort. The primary physician's lack of interest in chemotherapy, compounded by a fatalistic view that all cancer is incurable, not uncommonly leads to the inappropriate channelling of patients, causing further delay. This negative attitude is enhanced by uncertainty about the rationale and principles of cancer management and denies the patient the benefits of treatment.

The shortage of oncologists and chemotherapy-oriented physicians and the overworked and overcrowded centres result in sub-

In Africa, Western-developed drug protocols are often ineffective; increased dosages and more vigorous regimens are frequently needed to obtain comparable levels of remission.

standard care, even when treatment is available. The lack of the meticulous approach required in the management of cancer patients contributes to increased iatrogenic complications. Psychosocial aspects, which are of increasing importance in the total care of cancer patients, are rarely given any attention.

Apart from scattered data on cancer in Africans in general, there is hardly any information on the biological evolution of the majority of cancers. For example, such tumour characteristics as cell kinetics, doubling times, and the presence of cell markers, needed for the design of effective chemotherapy protocols and for prognosis, have not been studied. Chemotherapy in our patients therefore remains a question of trial and error, since the available data on the effectiveness of drugs, which were collected in studies on Caucasians, do not necessarily apply to African patients. This is borne out by our experience in Kenya, where standard protocols for inducing remission of acute leukaemia in Caucasians are not as effective in Africans. In fact, the dosages have to be increased and more vigorous regimens used before similar results can be obtained.

Turning to logistic problems, cancer chemotherapy is more difficult to handle in sub-Saharan Africa than in Europe or America, because the service is usually limited to one centre, either for the whole country or a large catchment area, often at a considerable distance from the majority of patients who thus do not come for treatment. Or if they do, their tumours are already too advanced for them to benefit from treatment. Even for those who do achieve some form of remission, follow-up and maintenance therapy are often abysmal failures.

These problems are complicated by the fact that cancer is new to the African concept of disease, and many patients seek medical attention only when they are totally incapacitated, especially when the neoplasm is painless at the beginning. Such patients tend to rely initially on quack doctors and only turn up at hospital when they are unfit for any aggressive treatment. Furthermore, this lack of understanding makes patients resist surgical procedures that could cure them in the early stages of their disease. Indeed such patients, once they get symptomatic relief, default because they do not understand the need for continued drug treatment or frequent clinic attendances. Also they generally do not take the oral medication as instructed, making intravenous therapy mandatory. Where successful follow-up treatment would be possible, supervision from the primary care doctor is either lacking or inadequate, even when guidance from an experienced chemotherapist is available.

Chronically inadequate supporting services severely jeopardize the success of chemotherapy. For example, component haemotherapy, tailored to support cancer management, is frequently lacking at both peripheral hospitals and referral centres. In addition, such factors as inadequate laboratory facilities, shortage of antimicrobial agents and an aversion to interdisciplinary teamwork contribute to making cancer chemotherapy a very difficult, frustrating and often unrewarding endeavour. Moreover the nursing staff do not have the necessary experience to care for the very ill cancer patients.

Despite the high cost of cancer, in both direct and indirect terms, the question arises whether it is worth while to spend large sums on expensive cancer drugs rather than use such resources on the more preventable causes of ill-health in the community. This problem is clearly felt in the developing countries of sub-Saharan Africa where foreign exchange is often in short supply. One side-effect is a chronic shortage of antineoplastic drugs either because their cost is prohibitive or because they have been relegated to a position of secondary importance in essential drugs lists. Consequently, effective long-term therapeutic regimes cannot be sustained and alternative regimes in resistant cases are virtually non-existent. This adversely affects not only the quality of survival but also the rates of remission.

Another problem, not directly related to cancer chemotherapy but deriving from it, is the complete lack of facilities for the physical and psychosocial rehabilitation of the long-term survivors. Although the few chemotherapists in Africa have yet to encounter this problem, it should be anticipated for the near future. This aspect is little understood and the uncertainty about the outcome and side-effects of therapy is not usually discussed with the patient or his relatives.

What Can Be Done?

In view of these problems, it is inevitable that the results of cancer chemotherapy in sub-Saharan Africa will be inferior to those obtained in Europe and America. Treatment failures are frequent, remission rates are low, and the quality of patient care and survival prospects are poor. The majority of the patients are given only palliative treatment. Should we accept this as a transitional stage in the development of cancer chemotherapy in Africa? It need not be accepted if active steps along the following lines are taken.

Centralized treatment

At this early developmental stage of cancer chemotherapy in sub-Saharan Africa, the approach should be that of centralization in spite of the problems of follow-up discussed above. The existing centres should be strengthened and made responsible for training the medical and paramedical personnel needed to open other centres. It is only at these centres that a multidisciplinary approach is feasible, which alone will permit an improvement in therapeutic results. These centres would supervise research and surveys of the incidence, prevalence and patterns of cancer.

Cancer is new to the African concept of disease; patients thus tend to ignore painless neoplasms and seek medical attention only when they are totally incapacitated.

Training in oncology

Medical oncology, as a discipline, should be integrated into medical school curricula, at both undergraduate and postgraduate levels. All teaching hospitals should establish cancer treatment units under teams of physicians specially trained in various aspects of oncology and drawing on the general expertise of the hospitals. The policy and practice of integrated teamwork should be inculcated into the prospective oncologist from the outset, and all doctors should be trained to accept the fact that a cancer patient is no different from any other patient either medically or ethically, and is entitled to the same quality of medical care. Besides minimizing the fatalistic attitude towards cancer, this will contribute to early diagnosis and an awareness that cancer must be treated urgently.

National cancer planning

It is vital for governments and health planners to be made aware of the need for a comprehensive approach to the development of national cancer programmes. These programmes should be well coordinated so that duplication of services is avoided and the optimum use is made of available resources. Steps should be taken to limit drug shortages, and ways and means should be explored for making antineoplastic agents available to patients at a reasonable cost.

Health education

Through the mass media, a sustained and determined effort should be made to educate the public on risk factors in the etiology of cancer, its nature and ultimate effects, early symptoms, and the action to be taken when cancer is suspected. This will increase early detection and treatment. The public should be made aware of the fact that early detection is the most important factor in successful cancer treatment and that cure is possible for many cancers in their early stages. It is, of course, essential that such health education should be matched to available diagnostic and treatment facilities.

African treatment protocols

Although most of the treatment failures can be blamed on an advanced stage of the disease and inadequate facilities, the ineffectiveness of the currently used chemotherapeutic agents also plays a part. New protocols need to be devised and tested in African populations. We know very little about how most of these cytotoxic drugs are handled by the tumour and normal cells in Africans. This means that drugs and drug dosages and tumour sensitivities should be tested to find suitable schedules applicable to Africans. This is an area in which pharmaceutical companies can participate to provide the much-needed financial support. □

Progress in family planning

The developed countries have had widespread practice of family planning, but the only country to provide services officially was Japan, which did so only for a short time in the early 1950s. In 1960, only three developing countries had population policies; only one government was actually offering family planning services; and no international development agency was working in family planning. By 1980, 35 developing countries had official policies to reduce population growth rates, and another 31 officially supported family planning activities. These 66 developing countries contained 91 per cent of the population of the developing world.

— Rashid Faruqee, in *Finance & development*, Vol. 20, No. 2, June 1983.

Reuben Eldar & Edna Eldar

A place for the family in hospital life

The view that it is the family's responsibility to care for its sick members is so deeply rooted in many societies that relatives will not leave a sick person even when he is admitted to hospital. Most hospitals have not taken this practice into consideration.

Late in 1980 we had the opportunity of visiting many hospitals in various parts of the Philippines. One of the things that impressed us most, wherever we went, was the fact that patients always seemed to be surrounded by members of their families, either looking after them or simply there to keep them company, while the hospital staff accepted their presence with equanimity.

We have observed this custom in other parts of the developing world and feel that it deserves discussion, since there is obviously a great deal to recommend it. However the practice can also cause problems to the smooth running of hospital life and we propose some steps that might be taken to overcome them.

Who Should Care for the Sick?

Hospitalization removes a patient from his familiar surroundings, and can deprive him of the psychological and emotional support he needs during illness. Regular visits from family and friends are therefore very important because they help to preserve some continuity with his home life. The value attached to this continuity varies from country to country, and between ethnic groups in one country. In the USA, for instance, the Navaho Indian's concept of care for the sick leads him to expect undivided attention and a certain amount of ceremony, and he therefore feels lonely and abandoned in hospital. In the south-west of that country, people of Anglo-Saxon origin prefer modern medicine and hospital care when they are sick, while those of Spanish origin look to their families for care and support.

In many parts of the Third World today, hospitals are viewed with fear as being last resorts for the dying, to be avoided at all costs. But even where this view is not held, many families are still reluctant to hand over the care of their sick to anyone else, and will bear all kinds of inconvenience, from long journeys and inadequate transport to loss of income, to remain with them during treatment. Friedl describes a scene in a hospital in rural Greece that was similar to our experience in the Philippines and must be typical of hospital life in many developing countries — five relatives of one patient seated round the remnants of a picnic on the floor, the husband of another heating food for his sick wife, and the relatives of a third looking on (*1*).

In the West there is a far greater acceptance of professional care in sickness than there is in developing countries. Medical care became increasingly hospital-oriented in the latter part of the 19th century, with the more frequent practice of surgery and the introduction of medical techniques requiring special equipment, highly trained personnel, close obser-

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vation of patients during treatment, and a high standard of hygiene. Gradually the everyday care of the sick came to be seen as the responsibility of nurses and doctors rather than of families, and hospitals, including those for children, restricted visiting to a few hours a week so that it should not interfere with the work of the professional staff.

In the past four decades, however, there has been a gradual realization that this highly specialized, impersonal approach to care has not always been in the best interests of patients, particularly young children, where separation from the parent is now considered to be more harmful than the illness itself in many cases. In 1959 a committee convened by the British Government recommended that parental visiting should be unrestricted, and that where possible mothers should live in with their young children while they are in hospital (*2*).

In North America too, there was a general relaxation of visiting policies in the 1960s, and some hospitals both in Britain and in the USA established facilities for mothers to live in with their children. A controlled study showed that the incidence of emotional and infective complications was significantly lower in a group of children admitted with their mothers compared to an unaccompanied group (*3*). However a survey in Britain indicated that only

Patients' families are particularly receptive to health education, and they will take the knowledge they acquire back with them to the community, where it is most needed.

34% of mothers of one-to-five-year-old children (the most vulnerable age group) would make full use of unrestricted visiting hours should their children be admitted to hospital (*4*). The reasons generally adduced were: conflicting commitments at home, lack of self-confidence in the hospital environment, and lack of awareness that a parent's presence in hospital would be of benefit to the child. Other reasons given were travelling costs and the loss of working hours and income.

Studies showed too that nurses were generally not in favour of more relaxed visiting practices, and sometimes even strongly opposed the trend: they found it more difficult to get on with their work under the critical eye of the mother, and often resented having to entrust to them the more gratifying tasks such as feeding and dressing children (*3*). Another study concluded that time alone would not change these attitudes and that a complete redefinition of the roles of mother and nurse in hospital was needed to overcome reluctance on both sides to extended visiting. It recommended that the mother be responsible for the physical and psychological care of her child, the nurse for professional care and for providing the mother with guidance. A recent study in the USA adds weight to this recommendation (*5*). It found that, given the appropriate guidance and encouragement from nurses, mothers have been able to overcome psychological barriers and give more effective help, which is of benefit to the staff as well as the patients.

For families in general, greater freedom to be with their sick relatives and to share in their care even in hospital helps to alleviate their worries and makes them feel more useful. This is particularly important to the close relatives of critically ill patients who find it hard to sit by with no effective role to play.

For a patient the transition from hospital life to home life after discharge is considerably eased if he has not been isolated from his family during treatment.

However, visitors may sometimes become a strain for both patient and staff merely because there are too many of them or because they tend to disregard hospital rules and regulations. A particular problem is posed by visitors who expect to stay with the patient throughout his hospitalization, whether or not there are special facilities for them to do so, and this is common practice in many countries. In Malawi, for instance, a patient has "guardians" who accompany him from his village into hospital, look after him while he is there, and accompany him back to his village on discharge. In the Philippines these people are known as "watchers", and they are very common

among all classes in rural as well as urban areas. Though their presence is accepted in both private and government hospitals, the watchers often cause a great deal of trouble with their many belongings, sharing the patient's bed, occupying a vacant bed in the ward, or simply spreading themselves out on the floor. In the vast majority of cases they are given no instructions on the standard of behaviour and cleanliness that is expected of them while in hospital, and they are liable to misuse toilet facilities, make the wards untidy, and even spit on the floor, thus creating conditions for the spread of infection.

Sometimes the problem is compounded by shortage of staff, for when the nurses are overworked they tend to rely on the assistance of the watchers, even though they may have no knowledge of simple nursing care or any real understanding of the disease beyond mere superstition.

In order to overcome these problems we have a number of suggestions to make. The custom is so deeply rooted in the cultural traditions of many countries that it would be inappropriate to think of curtailing it. The question is rather how to get the maximum benefit out of it. To this end we recommend that each hospital formulate a policy regarding visitors who live in and the tasks that could be assigned to them, and that hospitals take the opportunity for health education afforded by the presence of visitors.

Formulating a Policy on Visiting

Hospital administrators should decide first how much regulation of visitors would be appropriate to their particular hospital and should then consider the following questions. Should visitors be equally allowed to all patients, whether their condition is mild or severe, whether they are adult or child, whether in private rooms or in wards? Should an unlimited number of visitors be allowed to live in with the patient, or should only one visitor at a time be permitted to stay, and others allowed to be present only during visiting hours? Should living-in visitors be requested to leave the patient during physicians' rounds or the performance of procedures? Should children be permitted to live in, and starting from what age? Should visitors be allowed to bring and prepare food for the patient? Once the policy has been formulated, written instructions should be circulated to the whole staff, and the policy should be explained to the community served by the hospital to obtain its maximum cooperation and to avoid the conflict and confusion that so easily arise. It would also be useful if hospitals could prepare simple written instructions for visitors as to the behaviour expected of them while they live in.

It is now recognized that separation of a young child from its parents while in hospital is likely to prove more harmful than the illness itself.

The next step is to consider what facilities are to be provided for living-in visitors that will not pose extra problems for the staff. Mothers spending 24 hours with their hospitalized children need at least a comfortable chair, or space and matting below the child's bed. Watchers also require toilet and washing facilities, resting space on adult wards or sleeping quarters elsewhere, and a kitchen and storeroom. All these can be very modest, and should be supervised for orderliness and cleanliness. Premises for living-in visitors within the hospital compound or the construction of a simple dwelling on a vacant plot are possibilities.

Active Role for Living-in Visitors

The type of tasks with which relatives can be entrusted will depend largely on their sociocultural background and educational level, as well as on conditions in the hospital, but consideration should be given to the fact that they will require some training. In principle, relatives and watchers can perform simple "attending" nursing practices and household tasks, and responsibility for their training would best be undertaken by the head nurse, supported by the chief nurse's office. If the visitors were to perform housekeeping or maintenance tasks outside the nursing unit (such as in the laundry, repair shop, garden or stores) their training

would most likely be entrusted to the administrative office. One should remember that, even after they have been trained, relatives need constant retraining and supervision; nevertheless, their work would represent valuable community participation in the health care system. With the present trend for shortening the length of stay in hospital, families will be able to cope more competently during the recovery period at home if they have been involved all along.

Health Education

In most developing countries little has been done as yet to provide health education in hospitals, and the few activities that are taking place tend to concentrate on the patients without involving their families, except in the field of family planning. Yet patients' families are particularly receptive to health education, and they will take the knowledge they acquire back with them to the community where it is most needed. In addition to the preventive aspects, the health education of living-in visitors would cover care and maintenance of the chronically sick. The content of an education programme must, of course, depend on the watchers' capacity for understanding and the most important health problems of their community.

The opportunities for health education activities in hospitals are many and varied, but effective health education does not just happen; it should be planned carefully according to sound principles. Everyone who comes into contact with visitors teaches them something, and for this to be effective all personnel should be aware of their roles and be working as a team. Practical teaching and "learning by doing" are very useful; mothers of children admitted for malnutrition, for example, could be shown how to prepare the food themselves and how to raise plants rich in proteins, vitamins, and iron in their own homes, as well as being given instruction about adequate nutrition. Other possible means of education are demonstrations, posters, reading materials, recorded talks, lectures, and films. The example set by the staff in behaviour, cleanliness of premises, and respect for the facilities should not be overlooked.

* * *

Modern institutional medical care tends to be specialized, formal and impersonal, and more disease-oriented than patient-oriented. Imported into developing countries it often conflicts with the traditional, more personal approach to illness and care that involves the whole family.

Medical and nursing staff in developing countries should therefore not focus only on the patient but recognize the traditional strength of family life. □

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Heather E. Hudson, Victor Forsythe,
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Keeping in touch by two-way radio

In developing countries, the delivery of basic health care services is often hampered by communication problems. A pilot project in Guyana, involving two-way radio links, offers a promising solution.

Despite the obvious and urgent needs of the rural poor in the developing world, the extension of physician-based health care into rural areas is difficult and costly. There is a shortage of physicians, and to employ them in such areas may not be the best way of using scarce personnel resources. Moreover, rural areas generally lack the laboratories, diagnostic equipment, and hospitals on which physicians rely, and there are no telephone services. Therefore cadres of primary health care workers have been trained to deliver basic curative and preventive services in rural areas.

These health workers are expected to provide basic care in their communities under very difficult conditions. Drugs and supplies may take weeks or months to arrive, patient evacuations may be possible only if a vehicle happens to be available, and help may be hours or days away.

Total reliance on the semiskilled could, of course, result in second-class health care if rural people were denied ready access to physicians when necessary. Thus, in many parts of the world, health workers use simple two-way radios to keep in touch with physicians at regional hospitals. Communication links enable paraprofessionals to treat patients with the advice of a doctor and allow doctors to monitor patient progress and assess diagnosis and management plans.

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Guyana's Medex Program

In 1976, faced with the isolation of large segments of the population from any health service, and a continuing decline in the number of physicians living in the country, the Guyana Ministry of Health initiated a program for the delivery of primary health care services to remote and rural areas. More specifically, it was decided to establish a medex program. "Medex", a contraction of the French words *médecin extension,* literally means "extension of physician", and medex personnel are specially trained health workers who deliver primary community and clinical health care.

Initial funding for the program came from the Canadian International Development Research Centre (IDRC), while the United States Agency for International Development (USAID) provided technical assistance. During the earliest phase (March 1977–January 1980), 61 medex workers were trained, of whom 16 are at present working in the hinterland of Guyana, 25 in rural areas, 4 in the

riverain districts, and 16 in the cities. Additional medex workers were trained in 1981 and 1982, with the financial support of USAID, and technical assistance from the University of Hawaii medex program.

Most medex field workers are located in isolated rural areas. Only along the coast is there a road network, with ferries across the many rivers. Inland from the coast is the so-called "riverain" region, where transportation is by boat. Further inland is the hinterland, where jungle gives way to savanna, and where four-wheel-drive vehicles and motorcycles may be used in the dry season, although villages may be totally cut off during the rains. Transportation between towns is by air. There are few national telecommunication facilities along the rivers and in the hinterland; government agencies and private companies operate their own two-way radio systems.

Medex workers based along the rivers and in the hinterland thus had great difficulty communicating with supervisors, drug and commodity suppliers, and sources of medical and technical assistance. A letter could take weeks or even months; the time required for travel meant that medex workers were rarely able to follow up hospitalized patients. In emergencies a medex worker had to try to get a message through on one of the private radio systems, which were not always accessible or reliable.

Communication links enable rural health workers to treat patients with the advice of a doctor and allow doctors to monitor patient progress.

The Two-way Radio System

In 1979, in cooperation with the Guyana Telecommunications Corporation (GTC), which assumed responsibility for installation and maintenance of the network, USAID funded a pilot project which provided two-way radios in nine medex locations. A training manual was prepared, and a training workshop provided the medex workers with practical experience in using the radios.

By June 1980, single-sideband high-frequency transceivers were installed in nine rural locations: four in the coastal/riverside districts and five in the remote hinterland. The base station was at medex headquarters in Georgetown. Careful evaluation of the medex operation indicated that communication for 1–3 hours a day would be satisfactory, and that all stations should be able to communicate with Georgetown. Communication between individual stations was a secondary consideration.

After consultation with the Guyana Telecommunications Corporation and other users, three frequencies were selected:

Channel 1 4240 kHz USB
Channel 2 5300 kHz USB (Primary)
Channel 3 6920 kHz USB

Channel 2 is an overall network compromise. Under typical propagation conditions, all stations can communicate daily with Georgetown on Channel 2 during the hours 8.30–10 a.m. and 3–4.30 p.m. Channels 1 and 3 serve as backup routes of communication in the event of Channel 2 being fully used or in the event of transmission difficulties.

Since the rural areas rarely have anything more than privately owned generators, 12-volt battery operation was recommended. Each station is equipped with (1) a fully transistorized 25-W transmitter-receiver with a push-to-talk microphone, (2) a three-element dipole with each element designed to operate on one of the three frequencies, (3) a 12-volt automobile battery and charger, and (4) a set of hand-tools including a screwdriver, pliers, and a hygrometer. Two stations are equipped with solar photovoltaic panels continuously operated as trickle chargers, the panels being protected against reverse voltage. A crucial component of the system is the installation and maintenance contract between USAID and the Guyana Telecommunications Corporation.

Utilization

The radio base station at medex headquarters is operated from 8.30 a.m. to 4.30 p.m. during the week. The operator not only passes

messages over the radio but also follows up by telephone to check on drug orders, patients in the hospital in Georgetown, aircraft schedules, etc. On Saturday morning, a medex physician holds grand rounds by radio, during which each field worker is expected to present a recent case or to propose diagnosis and treatment of a case presented by the Georgetown physician.

Administrative traffic, including ordering of drugs and supplies, arranging transportation, and following up on vouchers, accounted for 43.6% of calls. Consultation between a medex worker and a physician in Georgetown was the purpose of 28.2% of the calls. Saturday morning educational conferences or grand rounds and emergency messages accounted for 2.7% of the calls. Because the medex radio network was the only available means of communication in some remote communities, other government departments and development agencies began to use it to communicate between field locations and Georgetown.

To evaluate the system, data from radio logs were analyzed over a nine-month period. In addition, interviews were carried out with field workers who had two-way radios and others who did not. Over the nine-month period, the hinterland stations were the heaviest users, with the most remote station placing the greatest number of calls. Hinterland locations averaged 74% more calls than coastal/riverain stations. The duration of the hinterland calls also tended to be slightly longer than that of coastal/riverain calls. Most traffic was between the field stations and headquarters in Georgetown, although field workers also used the system for occasional communication with each other. Hinterland stations tended to originate more calls to Georgetown than did the coastal/riverside stations.

Impact

The two-way radios have facilitated arrangements for the transport of goods, hastened arrangements for leave, and shortened delays in correspondence and other regular administrative matters.

Radio follow-up has generally reduced by half the time previously taken to obtain drugs, i.e., to an average of one month instead of two. The combination of a radio message plus telephone calls in Georgetown has speeded up the release of drugs and permitted the creation of larger and more stable stocks.

Radio has significantly facilitated consultations between field worker and physician. Previously, such consultations were carried out, if at all, by time-consuming correspondence or personal visits. Radios shortened this period to less than one hour. Whereas no medical consultations were performed at four out of the nine medex pilot sites prior to the introduction of radio, eight of the nine medex workers used the radio for consultations after its installation.

Remote medex workers report that regular radio contacts with their colleagues have lessened their sense of isolation, boosted their morale, and helped build their confidence.

The primary medium of consultation for medex workers without radio remains the letter or visit, but they rarely obtain consultative assistance and spend much less time on consultations than do their radio-equipped colleagues.

Because of the time and difficulty in travelling to regional hospitals, five of the nine pilot medex locations carried out no patient follow-up prior to the installation of the radio system. After installation, the majority used the radio for this purpose, with occasional weekly or monthly visits to their district hospitals.

Although the radio can save time, it cannot by itself generally accelerate the transport of emergency cases to hospital, which largely depends on the existence of passable roads and reliable vehicles or the availability of an airplane. Thus, while medex workers with radios can arrange evacuation faster than in the past, the speed of the operation is not substantially affected.

A major difficulty with all rural health delivery programs is maintaining the morale and enthusiasm of isolated field staff. Remote med-

ex workers with radios are often in regular contact with their colleagues, and report that such contacts have lessened their sense of isolation, boosted their morale, and helped build their confidence through the exchange of ideas and experience.

In Guyana, the introduction of radio appears to have had no major effect on the patient referral rate. While the number of referrals in locations where radios have been introduced has lessened, the trend is not clear. The medex workers believe that the reduction in referrals is due to expanded medical knowledge on site gained through regular radio consultations.

No significant difference was found between death rates before and after radios were introduced, or in mortality between referrals from sites with and without radios. Data on all cases treated by medex workers at sites with and without radios over several years would have to be collected to evaluate the impact of improved communications on mortality rates. Doctors at medex headquarters believe, however, that radio contact has aided early correction of diagnoses for cases that have been misdiagnosed or are uncertain.

An important aspect of the radio link is the improvement of morale that comes when the field worker knows that a doctor is on call. Keeping in touch with workers in other villages can reduce isolation.

Each Saturday morning, the two-way radio system is used for a continuing education session, during which a physician at medex headquarters presents a hypothetical case and quizzes the medex workers on steps in diagnosis and treatment. This program is considered valuable by both field workers and headquarters staff in refreshing the memory of the former on certain diagnoses and procedures and in making them aware of new problems or techniques.

Expansion of the Network

On the basis of the evaluation and taking into consideration the needs of the rural health care delivery system, the medex program now plans to expand its two-way radio network, priority for additional radios being given to health workers in the hinterland.

Since the extended network is to serve the Ministry of Health and not just the medex program, the Ministry's requirements have to be borne in mind. The Ministry is committed to decentralization of services, and it is consequently important to link regional hospitals into the system, as they will become the focal points for these functions. However, transport routes to some parts of the interior are not regionalized but radiate from Georgetown, so that patients from these areas are likely to continue to be referred to Georgetown. Corresponding communication links will be required.

Within this framework, a set of guidelines and criteria were developed to identify priority sites for the expanded network. It was decided that medex headquarters should be linked to the Ministry of Health offices and to Georgetown Hospital to facilitate administration and patient follow-up. In the field, it was proposed to provide communication first to health workers based in remote areas. Most of the sites in this category were in fact medex locations, but a few were designated for public health nurses and malaria workers. It was also proposed to provide radios to community health workers in regions that are totally inaccessible during the rainy season and to equip boats and vehicles with portable units.

On the basis of pilot project experience, the country has been divided into four zones, each with at least one regional hospital. One frequency is to be dedicated to each zone on the currently unused fourth channel. The other three channels will be available for communication with Georgetown or any other location in the network. This design should meet the Ministry of Health requirements for decentralization as well as integration of the medex workers into the health care system.

The solar panels installed at two sites functioned with no problems during the pilot project period, while several of the portable gasoline generators required repair. Since the capital cost of solar equipment is now lower than that of generators, and their operating costs virtually nil, solar power is to be used in all future installations.

One important element of the project was the training given to the field workers in proper use of the radio and in basic maintenance.

Another key to the success of the system appears to be the strength and professionalism of the medex organization itself. Field staff can rely on the operators at medex headquarters to follow-up messages and requests, to get answers to questions about referred patients, to track down shipments of drugs and supplies, to find and expedite delayed paychecks. Thus confidence in the system is high. In turn, the medex organization ensures that the equipment is properly maintained.

One important feature of the relatively simple two-way radio technology is its suitability for audio conferences. As all locations may tune to the same channel, all may participate in grand rounds or receive important bulletins from headquarters. An inherent disadvantage, of course, is the lack of privacy. However, more modern systems that are designed for one-to-one private conversations may not include conference capabilities. The use of a communications satellite, where this is feasible, can make it possible to establish a teleconferencing network simply by assigning the same frequencies to each location. No complex terrestrial switching is required. For example, in Alaska, the public health service leases a dedicated audio conferencing network which provides communications to village health workers via satellite. The same satellite system is used to provide public telephone services. Indeed, satellite systems may eventually prove to be the most cost-effective means of providing rural telephone and broadcasting services and may also be designed to include dedicated medical communications networks at very little additional cost. □

Nothing new

Integrated vector control is not a new concept. . . During the latter part of the nineteenth century and the early part of the twentieth century, when the role of vectors in the transmission of diseases was conclusively demonstrated and accepted, recommendations for vector management and control included: (1) personal protection, i.e., screening and use of repellents; (2) habitat management and source reduction, i.e., draining water-sources and getting rid of artificial breeding-sites; (3) the use of insecticides both as larvicides and adulticides; (4) an appreciation of the possibilities of biological control by recognizing the role of fish in reducing larval numbers; and (5) training and education. The development of the long-lasting residual insecticides during the 1940s presented a single method of vector control. . . However, the development of resistance to insecticides in vectors, concern about environmental contamination and human safety, and the increased costs of alternative insecticides led again to an emphasis on the development and use of several control techniques simultaneously or sequentially i.e., integrated vector control. The essential requirement. . . is the availability of more than one method of control, or the ability to use one method that favours the action of another. . .

— From *Integrated vector control*, Geneva, World Health Organization, 1983 (WHO Technical Report Series, No. 688: seventh report of the WHO Expert Committee on Vector Biology and Control).

R. G. Kaminsky

Development of a rural laboratory in Tunisia

Adequate laboratory facilities have an important role in public health care, but are often lacking in developing countries. This account of how a basic clinical laboratory was established at a district hospital in Tunisia may help others involved in similar work.

In 1978, the Ministry of Health of Tunisia and Project HOPE launched a cooperative program to develop a strong preventive health care system. The program was aimed at changing Tunisia's health care system from one focusing almost exclusively on curative services to one providing an integrated network of comprehensive services, with much greater emphasis on maternal and child health, and on primary health care. This meant that there would be new emphasis on public health and preventive medicine, requiring a dramatic change in approach and understanding on the part of care providers. The program involved a considerable amount of field training of health science students and health care support staff.

Djemmal, an inland town in the southern Sahel region, was selected by the government as the site of the pilot project. The town is an agricultural center in an area of olive tree plantations, although it has begun to attract some small factories as well. Hard surface roads connect Djemmal to the Mediterranean coastal cities of Sousse (26 km) and Monastir (20 km), which both have university hospitals. In Monastir there is a school of pharmacy and dentistry where laboratory technicians and technologists are trained.

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A small, 30-bed hospital in Djemmal serves as the secondary care center for the district's 60 000 people. Two physicians on contract to the government and various support staff were working in the hospital during the project. The physicians also provided care in the hospital's 10 satellite dispensaries on a weekly rotation basis, as well as in a maternal and child health clinic next door to the hospital.

One of the hospital's several major deficiencies was its lack of a basic clinical laboratory. No trained laboratory workers were available, and no clinical laboratory services could therefore be provided in the district. Analyses required for inpatients were performed at the Monastir hospital laboratory, with considerable delays in reporting results—up to a week or more. Ambulatory patients from the 10 dispensaries had to undergo a journey themselves to reach the laboratory facilities. This was often prohibitively costly both in time and money. Furthermore, it imposed an extra burden on the already strained capacity of the laboratories at Sousse and Monastir. Delays in sending laboratory results to physicians in Djemmal and at the scattered dispensaries frustrated medical practice and often negated the value of the original consultation.

To overcome these problems, Project HOPE agreed to help plan and establish a clinical laboratory at the Djemmal hospital. The laboratory would not only serve community medical needs, but also provide a site for training students of various health disciplines, including those from the nursing, midwifery, laboratory technology, and medical school fa-

Examinations performed at Djemmal laboratory in 1979

Examination	Number performed
Sedimentation rate	1128
Glucose concentration	1029
Complete blood cell count	918
Sugar and albumine in urine	311
Hemoglobin and hematocrit	292
Blood urea nitrogen	211
Rhesus type	174
Stool examination – parasitology	163
Complete urinalysis	120
Urinary sediment	103
Transaminases	101
Blood grouping	76
Gram's stain	73
White blood cell count	49
Vaginal secretion – wet smear	36
Bilirubin	26
Biliary pigments	24
Serum proteins	17
Adhesive tape test for pinworm diagnosis	15
Acetonuria	12
Addis-Hamburger count – urine	6
Platelet count	4
Spermiogram	2
Reticulocyte count	1
Total	4891

culties in Monastir and Sousse. The Ministry of Health provided a Tunisian counterpart to the Project HOPE team member directing the laboratory installation—an essential requirement if the laboratory were to continue beyond Project HOPE's involvement.

Externally donated funds covered initial capital expenditures. This equipment was all bought locally at an approximate cost of US$4500. The major items were a binocular microscope, a spectrophotometer, a centrifuge, and a microhematocrit reader. Djemmal hospital permitted the temporary use of its electric autoclave and a small refrigerator in which perishable supplies were stored. The Monastir laboratory provided distilled water, solutions, and reagents. Djemmal hospital also created a small budget to cover the recurrent costs of glass equipment and reagents not provided by the Monastir laboratory. Reliable supply lines were not a problem: Sousse had a large government agency where routine laboratory supplies could be bought.

As the laboratory expanded, additional equipment was supplied by the Ministry of Health and other donors. This included a rhesus typing viewer, a manual cell counter for differential blood counts, an electric sterilizer, a fixed volume dispenser, a second binocular microscope, the small refrigerator that belonged to the Djemmal hospital, a torsion scale, and a small table incubator. Within two years the laboratory was fully operational and could easily be maintained within the limits of available resources.

The various routine examinations conducted in the laboratory during 1979 are shown in the table. These numbers were determined by the needs of the physicians at the Djemmal hospital. All the examinations could be performed with the equipment at hand; nonroutine, less frequently requested tests were passed on to the Monastir laboratory—these were mostly analyses of bacteriological samples and other types of biochemical and serologic tests.

All laboratory procedures adopted at Djemmal were identical to those in the Monastir laboratory. In this way, the same reagents could be used, supervision and control were consistent and the practical experience gained by the medical technology students was standardized. A manual describing the technique for conducting each laboratory procedure was developed and kept at hand for everyday use.

One of the hospital's deficiencies was its lack of a laboratory. No trained laboratory workers were available, and no clinical laboratory services could be provided in the district.

The manual's format allowed for easy addition or removal of pages when amendments were necessary. It also contained some theoretical concepts, basic illustrations, an appendix of

normal values, and instructions for preparation of solutions and reagents.

Initially, a small well-ventilated room measuring 4 m × 3 m in the Djemmal hospital was allocated for the laboratory. It had a built-in bench with a sink and running water, two tables, storage space, and electricity outlets. All the original equipment was placed in this room. The laboratory operated six hours a day, six days a week.

Samples from inpatients were collected by hospital nurses and brought in when the laboratory opened at 7.30 each morning—each one accompanied by a request slip signed by a doctor. Outpatients began arriving at the same time. Work at the bench started at 9.30 a.m. and only urgent analyses were accepted after that time.

After the initial investment in essential basic equipment, the laboratory is relatively inexpensive to operate and maintain.

The results of laboratory tests were distributed to the hospital the same day that the samples were received. Results sent to the outlying dispensaries were either mailed or carried in the car taking the physicians to their dispensary consultations. Reports from Monastir or Sousse came to the Djemmal laboratory with the hospital ambulance. At the end of the day's work, all results were entered in a registry book, which contained separate sections for hospital patients and dispensary patients. Data recorded included the patient's name, sex, age, referral site, type of examination requested, and results.

Although a Tunisian counterpart was unofficially assigned to work with the Project HOPE team member from the start of laboratory operations, it was not until five months later that a full-time Ministry of Health laboratory technician position was officially allocated. A year later, in February 1980, a second Tunisian laboratory technician was officially assigned.

Two well-lit and well-ventilated rooms measuring 5 m × 6 m were subsequently incorporated into the laboratory facility adjacent to the space originally allocated. One room had an area for collecting samples from patients and a second area where a bench and sink were built for the performance of all biochemistry tests. The second room was converted into office and storage space, and was considered suitable for possible future use for bacteriological and serologic tests.

Although the number of examinations conducted varied each month, the general tendency was one of constant increase. There was growing demand from the hospital, but the bulk of the examinations were requested by the dispensary services, particularly after the introduction of new child welfare and family planning services at various dispensaries. Simple statistics on user demand were compiled monthly from the daily registry entries and illustrate the growth of the laboratory and its integration into the changing health care delivery system of the Djemmal region.

It is important to emphasize that provisions for upgrading the technical staff were included in the laboratory's development plan. Informal discussion of problems as they presented themselves on a day-to-day basis ensured that basic scientific concepts were understood. Discussion of special topics was reserved for days on which the workload was light. On these occasions, visual aids such as slides and illustrations were used. Constant supervision of local laboratory staff was maintained in the early months of operations.

The laboratory in Djemmal now serves an entire rural population and provides support for public health and primary health care programs. It has added significantly to the satisfaction of health care providers and patients, resulting in improved medical services. After the initial investment in essential basic equipment, the laboratory is relatively inexpensive to operate and maintain. An estimate of annual running costs for reagents and small supplies is

$750. This includes the recurrent budget provided by the Djemmal hospital and the supplies donated by the Monastir laboratory. The salaries of the laboratory technicians and a cleaner and the transportation costs are not included.

The prerequisites for the success of such a laboratory include recognition of its need and willingness to staff and equip it; administrative cooperation in the form of a budget to meet recurrent expenditure needs; frequent supervision, which can provide invaluable stimulus to otherwise uninterested personnel; and strong support from the community through its appreciation of the value of the service in terms of reduced travelling time and improved health care.

The government physicians practicing in the area found the laboratory very useful, especially in the management of their numerous diabetic patients, in the treatment of anemias in children and pregnant women, in following up cases of dermatomycosis, and in monitoring renal disease. They sometimes came to the laboratory to discuss results or ask what other tests could be offered for a specific patient. The opportunity for such interaction with laboratory staff obviously arose infrequently during the physician's former use of more centralized facilities in Monastir. Today, the laboratory is still operating. Indeed, it has expanded its services considerably, performing more than 11 000 examinations in 1981. The addition of a further laboratory technician is now under consideration. □

Architecture for the elderly

Some of the special needs of the elderly are to have designs that provide them with (or permit them to have) security, independence, involvement, and last, but not least, privacy. To a greater or lesser extent, the environment... will stimulate, inhibit, or prevent the achievement of these goals.

To assist elderly persons in maintaining dignity and self-respect, we must give them the maximum leeway for independent actions, such as entering or leaving the building, or doing as they please when they please. The architectural elements should permit the elderly or the infirm to do as much for themselves, as well as they can, for as long as they can....

Just as we all do, elderly persons need to have a sense of worth. They need to be involved in the life around them so that they will be encouraged to give of themselves. They need adventure and excitement, something to look forward to, something to make tomorrow different from today, and a sense that they are a part of it.... Anticipation and involvement with all ages helps keep people young. Isolation and an artificial environment restricted to one age group will inevitably produce the tendency to withdraw which is so common in elderly people.

— J. Armand Burgun, in *Journal of public health policy*, Vol. 4, No. 1 March 1983.

Point of view

Paul B. Beeson

When medical education tries to do too much, it achieves little

It seems to me that today the pendulum in medical education has swung much too far towards flexibility. Curriculum committees have met the science explosion of recent decades with a series of modifications, embodying a compressed core curriculum and a vast assortment of elective work.

My dissatisfaction with the imbalance between core and elective studies stems from my belief that the medical school phase should aim only to provide a solid foundation on which to superimpose training for some kind of medical service to people. With their two years in clinical subjects split into so many short experiences, our students are associated with a certain group of teachers just long enough to pick up a smattering of something, but not to master fundamentals.

In formal medical education we must accept that we can deal *well* with only a few selected topics. Having chosen those topics, we should go into them in a way that will provide some depth of understanding. One requisite is information about how our present state of knowledge was attained. Teachers, having lived through an evolution of methods and ideas, may forget that their students are being exposed to fields of practice for the first time. Attempts should be made to show how it was that progress came to be achieved. A companion piece to this is critical appraisal of current medical writing. Here the teacher helps students to recognize flaws in experimental design or in conclusions drawn. This can help to prepare them for a lifetime of self-motivated continuing medical education.

While I agree with the idea of allowing some opportunity to pursue special interests in greater depth, my feeling is that elective programs have been allowed to occupy too much time, and that the worth of some of them is highly debatable. I particularly object to elective courses in which the experience to be gained is familiarity with some technology. The medical student should not spend time on the basics of tertiary medical care. For one thing, the techniques change constantly and are likely to have been outmoded by the time the emerging doctor really needs to use them.

Arranging for medical students to participate in research is, in my opinion, a reasonable and desirable use of elective time, and has often seemed to work out well. All medical graduates can gain something from firsthand observation of just how hard, and often tedious, it is to add a bit of new information to the knowledge base of medicine. The main worry I have relates to the policy of offering research experience over short periods of time — say two or three months. Joining an ongoing program for such short periods often consists of merely supplying a pair of hands for certain procedures. The student misses the exhilarating experience of grasping the meaning of the questions being asked and then helping to design, one by one, a series of experiments to answer those questions. If he is going to participate in research as an elective, it might be preferable to arrange for this to occupy a couple of half-days a week throughout some years, perhaps all four years.

In conclusion, I should say that the proportions of time allocated to core and elective subjects should be changed and the frivolous electives eliminated, since ample provision already exists in residencies and fellowships to train later on for specialized practice. □

Professor Beeson is Emeritus Professor of Medicine at the University of Washington, Seattle, Washington, USA. This article is taken from his paper "Priorities in medical education", published in *Perspectives in biology and medicine*, **25**: 673 (1982).

Yusuf Ali Eraj

No-one is realistic about family planning

If you are a doctor working in a government clinic in a developing country, you come to work in the morning to find 60, 80, or 100 patients waiting.

So the staff starts finding out who is seriously ill. Who's got a temperature? Who's got pneumonia? TB? Dysentery? Malaria? By the time it's 4 o'clock and the nurses go home, you haven't even finished with the really sick patients. So there is never any time for the woman who has come for family planning services.

There are thousands of women in Nairobi, in Dar es Salaam, in Delhi, in Dhaka who want not to have a pregnancy in the next six months. But nobody thinks about where they should go for advice. They are told to go to the government clinics, but these do not have the facilities or the manpower to meet their needs.

When a demographer arrives from Europe, the moment he lands in Nairobi he gets a car, he starts seeing the country — and he writes nothing of any value. The man has no communication with the people, but he starts collecting figures. If the $40 000 spent on him were to be spent on family planning services, many more women could prevent pregnancies. Aid agencies like to send their so-called experts, who talk of information, education and evaluation. All these are myths. Things are so disorganized in developing countries that you can't evaluate anything properly. You see figures and statistics but everything has been cooked up in coffee shops and beer halls.

All the talk is about "the rural area". People forget about the women in the big towns who want to prevent pregnancies — and there are millions of them.

If you opened a clinic right in the centre of Nairobi or Lusaka and kept it open 24 hours a day, it would be busy. There are so many women in the big cities who don't want to have a child this year.

In Sweden I met a man who said that in his (African) country, they had just opened 5000 family planning clinics. I asked him, had he seen one, and he said no. I'll tell you what happened. All that happened was that there were 5000 health centres and they were instructed to provide family planning services also. Nobody asked them, "Do you need more staff? Do you need medicine? A special couch? Or a table?".

In a developing country you never get anything unless you ask for it. The staff doctor of a clinic is never asked, "Do you need anything?" He is just told that health services are free from now on; that primary health care is to be introduced now; that family planning services are to be started. This really means that, in practice, the clinic remains scantily equipped, solely for curative purposes, for some of the patients.

There are really no resources to cope with anything like health education, nutrition education, immunization, etc. In theory integration provides everything; in reality it throws dust in the eyes of the public. □

Dr Eraj is President of the Medical Association of Kenya. This article, drawn from an interview with Dr Eraj, appeared in the UNFPA newsletter, *Population*, p. 3 (March 1982).

D. Paul Sondel

Road safety: putting people first

It took from 1900 to 1952 — half a century — for drivers in the USA to kill one million human beings. But by 1975, only 23 years later, they had killed a second million. And by 1991, in just another 16 years, they will at current rates have killed a third million.

Mr Sondel is United Nations Adviser to the Traffic and Licensing Directorate of the State of Bahrain. This article is adapted from a paper he presented before the College of Health Sciences in May 1982.

Today, the leading single cause of death in the USA for all persons aged 1–34 years is the motor vehicle. The figures for Europe are equally sobering: 73 700 killed and 946 000 seriously injured in 1965; by 1980 the figures had climbed to 115 202 killed and 2 615 000 seriously injured.

In the rest of the world the picture is just as grim but the figures are not readily determined. In the densely populated cities of developing countries in Africa, Asia, and South America, the roads are jammed with every imaginable form of wheeled transport: carts pulled by donkeys, horses, goats, bullocks, camels, and people; bicycles, tricycles, and bicycle rickshaws (with and without motors); scooters and motorcycles; private cars; and buses of all shapes and sizes, from overgrown jeeps to 72-passenger buses spilling over with 120 people. Everything with wheels is out there! At least 100 000 people died on Indian roads in 1981. How many around the world? A fair guess is 350 000. Europe, India, and the USA give a total of 265 000 deaths, and that leaves out all of Africa, the rest of Asia, and Latin America. Dependable data are just not available.

And what about those who do not die, but suffer lifelong disability because of motor accidents? Spinal cord injuries are probably caused more frequently by motor vehicle accidents than by anything else. A 1976 study (*1*) found that each year about 5000 people in the USA suffer cutting, crushing, or other severe injury to the spinal cord in crashes. Two-thirds of these victims are under 36 years of age, and more than two-thirds are male. About 60% do not die; roughly 2600 remain permanently crippled, at enormous direct and indirect costs to themselves and society, not to mention the immeasurable suffering.

The single most important thing a person can do to stay healthy and alive is to pay close attention to the way he or she drives, rides a bicycle, or walks. Traffic safety education should be given in the schools, and this should include the professional preparation of drivers where appropriate. Restraint systems in motor vehicles are very important for both driver and passengers, and special restraint systems should be used with children.

People should become more involved in the bigger issues concerning traffic regulation and safety. A change in attitude is indicated. Why should we accept the notion that people must always be on guard because of cars? Cars do not need to be allowed everywhere, at all times. People should take precedence over motor vehicles.

Members of the public should take part in planning traffic circulation and in designing living areas for the benefit of residents, not the convenience of drivers. Schools should be built within residential areas and away from traffic so that children are not forced to cross busy roads. Attempts should be made to reduce the need for travel; if travel is a necessity, public transport systems should be available.

In sum and as I have said elsewhere (*2*), my message is this: "People are ... more important than the machines they make and use ... What sense is there in saying that we are trying to improve the quality of people's lives when we impose traffic systems on them which are built on the assumption that life itself is worth less than the economic necessity for rapid transport?" □

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2. *World Health,* May 1982, p. 10.

Environmental Health

Salesi Finau & Sitaleki A. Finau

Better accounting improves water supply

Village water supplies in Tonga were deteriorating because of non-payment of water rates and poor management of funds. The introduction of a simple accounting system improved the supply and provided a method of surveillance.

Surveillance of the village water supplies in Tonga has long been a problem. There has been no satisfactory system of surveillance since the beginning of the rural water schemes in 1960 (*1*). After the initial enthusiasm and novelty wore off, water supplies deteriorated in quality and quantity. Water tanks were regularly allowed to become empty, serious mechanical breakdowns occurred, wells were neglected, and water wasted.

This paper describes an attempt to improve and maintain the water supply according to WHO standards. The aim was to have good quality water available 24 hours a day.

The Kingdom of Tonga, a constitutional monarchy, consists of 150 islands in the South Pacific, with a total land area of 697 km^2. Thirty-seven of the islands are inhabited, the total population being 100 000. Health expenditure in 1978 accounted for 13.3% of the total national budget, and represented a sum of $ 11.60 per capita. About 80% of the population live in areas with piped water. The size of the villages varies; the capital, Nuku'alofa, has a population of 20 000.

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Community Involvement in Village Water Supply

The active participation of the villagers was demanded by WHO, UNICEF, and the Government of Tonga from the planning stage, and half the total costs were met by the village. Participation included the provision of labour for well-digging, trenching and transport of materials. Supervision and technical assistance were provided by the public health section of the Ministry of Health and the Tonga Water Board.

The daily administration of the water system was the responsibility of a water committee of 11 members elected at the village meetings. This committee consisted of a water superintendent, a secretary, a treasurer, a pump operator, and six other members. The chairman is the town officer. The functions of the committee are laid down in the water supply regulations. The water committee is responsible for:

- supplying water 24 hours a day;
- electing an auditor;
- deciding water rates;
- reserving cash for maintenance or emergencies;
- reporting technical problems immediately to the public health section;
- repairing leaks, and
- providing labour for maintenance.

When water supplies became intermittent, investigations revealed a lack of funds for diesel fuel, spare parts, and proper repair work. The main causes were non-payment of water rates and poor management of funds through lack of accounting skill. Therefore a course in simple accounting was initiated.

Accounting System

The person elected treasurer had a good reputation for reliability and honesty. The secretary kept all records on income and expenditure, the register of water consumers, and the register of ratepayers. When payments were made, the amount paid was written in the column under the appropriate month. This method had proved to be too cumbersome, and so an attempt was made to improve accounting skills.

The difficulty was the high number of entries and the small amounts involved. An effort was made to reduce the number of entries to one per quarter by sending out bills to consumers every three months and by dividing the village into groups with different specified times to pay the water rates. The first method suggested was to make entries in a main ledger and a consumer ledger and to issue a cash receipt. Individual accounts were thus kept for each villager. Each month a summary sheet showing credit and debit was compiled. From these summary sheets the individual account was matched with the main ledger to find any differences. The cash assets equalled the balances for each item in the main ledger.

The difficulty with the original accounting system was the large number of entries and the small sums involved.

The proposed change was found to be too complicated and fell into disuse after three months. The reasons given were that there was too much book work, the clerks did not understand the system, and the secretaries were keeping the books, not the treasurers.

A simpler system was therefore proposed, and at the same time the responsibilities of treasurer and secretary were more clearly defined; the treasurer was described as "a keeper of all financial records, not a keeper of cash". The secretary's duty was to fill in the receipt book, giving reason for payment, the amount, and the date. The receipts were numbered and made out in duplicate, with one copy for the ratepayer and one for the treasurer. In this book a record of all income was kept.

A register of ratepayers was kept with columns for each month. The number of the receipt was entered under the appropriate month after payment was made.

The third book contained two columns for income and expenditure. Income and itemized payments were entered before each monthly meeting of the water committee. The total under each column could then be easily compared at the meeting.

A course was organized to teach the new accounting method to participants from 33 villages, divided into five groups. Two of the participants left the course voluntarily because their literacy level was below that required.

The participants were provided with free receipt books, registers, and balance books. They were asked to provide actual data from their own villages for the exercises. Redefining the roles of the treasurer and secretary took most of the first day of the two-day course. Those who were not good at arithmetic were persuaded to use students in the village. An additional feature was the emphasis on auditing by villagers other than the committee members.

On follow-up three months later all villages were still using the system. Some villages had changed their treasurers but the water superintendent and the immediate past treasurer were able to teach the system to the incoming one.

Discussion

The public health section of the Ministry of Health has been closely involved with the rural water scheme at all stages of construction and maintenance. During these courses health inspectors were present to take note of what was

taught. The success of the second accounting system has improved the management of the water supply. With such a simple system a quick comparison of income and expenditure could be made each month. If a deficit showed or new work was planned, water rates were increased accordingly. It was also easy to see who had or had not paid his water rate.

A clear and accessible record of expenditure made it possible to check back and compare costs of repairs or assess the efficiency of a particular mechanic. The rate of consumption of diesel fuel gave a clue to the amount of water used, excessive water loss due to leakage, loss of diesel fuel, or changes in the efficiency of the pump. The latter may indicate that repair or servicing is needed.

The public health inspector from the Ministry of Health must keep a strict check on the books to avoid any discrepancies. This is important so that the new role defined for the treasurer is not threatened. If bookkeeping is inaccurate, this will justify maintaining the treasurer's traditional role, that of a cash holder.

This simple accounting system has not only kept village finances in order but helped the surveillance of the water system. It must be noted that an initial change of traditional practice was needed, and this was then replaced by the new system. The use of realistic material for training gave a good start to the system. Clear and orderly financial statements provided the incentive and the will among committee members to work together for a common goal. □

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Biodrugs are coming

The new era of natural medicinal products, of "biodrugs", has begun, and it is the pharmaceutical combines which are developing much of the relevant research technology. For those of us investigating this field in the developing countries, the question arises: will we in the future have to spend scarce foreign currency to reimport our own plants and extracts? Are we going to lose the battle once again?

In the middle of the present century, when the great pharmaceutical industry was growing up, we lacked the technology and scientific knowledge to manufacture drugs. Our role was limited— at best— to providing raw plant materials. Today it is in the countries of the Third World that the tradition of using medicinal plants survives in its least adulterated form, and this makes it easier for us to identify the plants which need to be scientifically evaluated. Drugs of the types that are now being studied by modern science could be manufactured with the level of technology already attained in many developing countries.

— Xavier Lozoya, in *World health*, June 1983, p. 7.

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Drinking-water: a determinant of health

The provision of safe drinking-water is bound to have a beneficial effect on the health of the community. This effect can be assessed by the incidence of acute diarrhoea in children.

One of the difficulties in evaluating the impact of the drinking-water supply on health is the lack of local demographic statistics, particularly in rural communities.

The Ministry of Health figures are based on vital statistics from each district. The district generally coincides with the local administrative unit, or "commune". This prevents comparison of the incidence of water-borne diseases between communities that have drinking-water and those that do not.

A comparative study was carried out to measure health changes in communities recently provided with safe drinking-water through the rural water supply programme. The indicator selected was the number of consultations for acute diarrhoea in children under five years of age.

In this study a "locality with a water supply system" is one that has a domiciliary water supply, such supply being part of a system of water storage and distribution. A "locality without a water supply system" is one in which water is brought to the home from springs, rivers, canals, and similar sources.

Five localities with a water supply system, located in three representative regions of the country, were compared with five other localities not included in the rural water supply programme but similar in socioeconomic characteristics and belonging to the same region.

The choice of localities was based on the following criteria:

— the existence of a rural health centre with a resident auxiliary worker in continuous attendance;
— comparative ease of access to the rural health centre.

The five localities with water supply were chosen from the 25 communities included in the socioeconomic evaluation of the programme, of which only 16 have a health centre. The health workers were asked to record all consultations for acute diarrhoea in under-fives during the four weeks from 18 January to 22 February (summertime in the southern hemisphere). Instructions were given by the social workers attached to the programme and were the same for localities with and without a water supply system. Compliance with the instructions was checked weekly.

At the end of the four weeks, a monthly rate of consultations for acute diarrhoea in under-fives was calculated for each locality. The

Abridged from an article in *Obras sanitarias*, 1 : No. 3 (1979).

Comparison of the consultation rates for acute diarrhoea in under-fives during the 4-week study period in rural localities

Region	With drinking-water		Without drinking-water	
	Locality	Rate per 1000	Locality	Rate per 1000
VI	Llallauquén	28.9	Roma	101.3
VI	Puquillay	27.8	Larmahue	202.1
VII	Morza	133.3	Pta de Diamante	600.0
VII	Camarico	196.7	Mariposas	529.4
IX	Pailahueque	13.3	Malalcahuello	96.4
		55.0		212.7

population data utilized in calculating rates were taken from the national census of 1970. According to the census the total population of the five localities with a water supply system amounted to 2697, of whom 418 were children under five. The population in the localities without a water supply system was 2799, of whom 409 were under five.

The results are presented in the table. The rate of consultations for acute diarrhoea in under-fives in the localities with a water supply system was 55 per thousand. In localities without a water supply system, the rate was 212.7 per thousand. The availability of drinking-water thus cut the incidence of acute diarrhoea by about 74%.

Rates were greater in the localities without a water supply system in each of the three regions included in the study. The seventh region stands out as having shown the highest rates for both kinds of locality.

A system of continuous registration of data is now under study; this will allow for the monitoring of additional indicators, including typhoid fever and infectious hepatitis. □

How to succeed in communication

Among those who must be classified as successful in fully investigating their target-group and understanding how to communicate with them are the commercial manufacturers. Their advertising campaigns have revolutionized consumption habits and life-styles across the world. They have saturated the media with advertising carefully researched to gauge the concerns of their audience, and have succeeded far better in changing behaviour than have consciously designed development programmes. In most third world countries, companies marketing agricultural products have reached remote farming communities with weed killers, fertilizers and insecticides. But try asking the same villagers if they know what is the best remedy for diarrhoea.

— Salim Lone, *UNICEF News*, Issue 114, 1982.

Donald Sharp & Michael Graham

New design for a village handpump

If the target of the International Drinking Water Supply and Sanitation Decade is to be met, an estimated 20 million or more new handpumps may be needed to bring an assured supply of safe water to the millions of rural inhabitants in the world at present without one. These pumps must be able to withstand the use and abuse of the many who depend upon them for their daily water supply.

When a water handpump breaks down and remains out of service, the economic loss is considerable. The possibility of vandalism and pilfering if the pump is out of operation for more than a few days and the need for replacement parts result in considerable cost, not to mention the hardship and inconvenience to those who have to walk long distances to obtain water. One solution to this problem is to focus efforts on the development of locally fabricated handpumps that are inexpensive to manufacture and can easily be repaired in the village itself with a minimum of expertise.

The Waterloo pump, developed in 1976, is just such a design. The piston and foot valve are produced from polyvinyl chloride (PVC), a material that is readily available in most developing countries, and their design is such that the two parts are interchangeable. This greatly reduces the number of spare parts needed for repair or replacement. Another advantage of the Waterloo design is that it incorporates polyethylene piston rings, similar in design to those in an automobile engine. These can be replaced easily when worn. Finally, the cylinder section (the place where the piston slides up and down) is the riser pipe itself, which is also made of PVC. If the section becomes worn, the piston can simply be moved to a new position in the riser pipe. A smaller diameter PVC pipe is used for the piston rod. The above-ground components are of local design, using locally available materials. These designs vary from the direct-action type to more complex steel lever-action arrangements. Inexpensive concrete pedestals were used in one pilot project, a concept that deserves further investigation.

Research on the Waterloo design, which was developed and tested with support from the International Development Research Centre, Ottawa, Canada, clearly indicates that no one design will function adequately under all conditions with all user groups. Moreover, it was not the intent of this research to find such a design. Although the basic principle of the pump remained the same in each of the pilot projects, there were individual variations and modifications. The research brought to light the fact that this technology, or any other handpump technology, must first be tested under local conditions and modified according to the needs and opinions of the user group, environmental conditions, available materials, and level of expertise of those expected to adopt it and maintain it. Without this testing, the technology cannot be expected to meet the long-term needs of the target group.

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Once successfully field-tested, there must be a concerted effort to sensitize and educate all users not only on how the pump works but also on its limitations. If one of the components of a handpump malfunctions, the entire system breaks down and water is cut off. Therefore a thorough understanding of how the pump functions, what can go wrong, and what components are likely to wear out soonest is essential for adequate maintenance. This understanding is also essential for preventive maintenance, an aspect of handpump technology that has unfortunately been neglected.

The concept of using inexpensive plastics for pump components has been successfully demonstrated. However, large-scale commercial production by means of injection moulding has yet to be investigated. The feasibility of small-scale production through cottage industries must also be fully examined. Research must continue on the use of new materials and modified designs and various options for low-cost above-ground components must also be tried and tested.

More importantly, however, if this technology is to be applied at the village level, efforts must be focused on obtaining feedback from the "end users", the villagers themselves. Sociological and economic studies must be carried out in all locations where the pump is to be installed, and a scientific approach must be used to develop common methodologies for these studies. In addition, training programmes for rural people must be implemented, and supported by the development and testing of learning materials suitable for use by village workers.

Finally, appropriate infrastructures must be established or strengthened and management techniques developed that are not only geared towards encouraging village-level operation and maintenance but are also capable of providing follow-up through continuous monitoring services and educational programmes for users.

Mass-production techniques should substantially reduce the cost of the PVC Waterloo pump; however, this has yet to be tested. Dr Goh Sing Yau of the University of Malaya has proposed a project that will address this question, as well as some of the others already mentioned. His idea, which is intended to bridge the gap between developmental research and commercial production, is to investigate various manufacturing processes in detail by developing a small-scale fabrication unit. The project would also seek to:

- understand thoroughly the manufacturing processes and the actual costs involved in producing each component;
- develop the necessary expertise required to consult with manufacturing units on production procedures;
- conduct cost assessments of various manufacturing options (for example, subcontracting versus manufacture at point of assembly);
- establish quality control guidelines and standards;
- test mass-produced pumps in the field;
- develop manuals for transferring the technologies to other interested groups; and
- support complementary projects by providing prototypes, training, and technical assistance in solving any problems that may occur.

This project is expected ultimately to result in the establishment of a research and training centre that could be the focal point of a network of projects aimed at investigating such concepts as village-level maintenance schemes, community financing schemes, community acceptance strategies (social marketing), and the various options for manufacture and assembly.

Evidence so far suggests that the PVC Waterloo pump may be the answer for many thousands of rural communities for many years to come.

Evidence so far suggests that the PVC Waterloo pump may be the answer for many thousands of rural communities for many years to come. However, it is only one of many technical choices, all of which have their place in

the long list of options. In some places the PVC pump may serve as an interim technology, until something better comes along. In other communities, circumstances may mean that it will not be acceptable at all. In still other communities, a more sophisticated level of technology may be more suitable.

For the many millions of the world's rural population who do not have an option, this technology is a beginning, a contribution to the target of clean water for all. But the future of the Waterloo design now depends upon the interest of researchers in investigating the problems of implementation. In this age of limited resources, it is becoming increasingly clear that the future of handpump technology lies with the villagers themselves. One question remains: how can this technology best be transferred to those who need it? □

Vital drugs only

Worldwide pressures on public funds, the escalating costs of running health services and the growing strength of the consumer movement are fuelling the pressures for new drug policies. A growing body of professional and consumer opinion would like to see human need, rather than market opportunity, become the key determinant both of research and development into new drugs and of existing drug production; if no better convergence between human need and profit is found, it is the Third World poor who will continue to pay the heaviest price...

If people in the Third World are to get the drugs they need, there is no substitute for political will on the part of Third World governments. Thus, the most significant recent event in the drugs field is without doubt the new drugs policy introduced in Bangladesh in June 1982. The government decreed the phased withdrawal of 1700 inessential, wasteful and unnecessarily harmful drugs from a total of about 4000 on the local market.

This was the crucial first step towards eliminating wastage [and giving] priority to production of 150 essential drugs...

One new development is clear and encouraging: manufacturers are taking the Third World drugs issue a great deal more seriously than they did a few years ago.

— Dianna Melrose, in *Development forum*, Vol. XI, No. 5, June-July 1983.

John M. Hunter, Luis Rey, & David Scott

Man-made lakes—man-made diseases

The vast expansion of water development schemes in Asia, Africa, and Latin America constitutes a far greater threat to health than has been envisaged.

It is now widely known that economic development activities that introduce radical changes in the relationships between man and his environment may also disrupt disease patterns by creating new areas of prevalence, new foci, and often serious outbreaks of disease. Indeed, there are very few newly introduced economic activities that are entirely free of adverse repercussions on health. Ironically, economic activity under the banner of "development" often creates ill health.

The construction of dams, the formation of man-made lakes, and the development of irrigation projects in tropical areas are particularly implicated because, apart from the evident benefits brought to the economy of a country, they tend to cause some degradation of the environment through the destruction of forest galleries, increased soil erosion, and the production of biotypes more favorable than before to intermediate hosts or vectors of parasitic or infectious diseases. The series of ecosystem disruptions thus set off interferes profoundly with parasitic and infectious disease transmission cycles.

At a local level, the former inhabitants of submerged lands are affected by economic and social disturbances even when resettlement programs have been implemented to minimize these problems. Population migrations, induced by actual or possible opportunities for work provided by the water development projects, can aggravate the local conditions of life through housing difficulties, overcrowding, rising costs of living, commercial speculation, prostitution, and other social problems as well as the introduction of new sources of diseases or new diseases. Furthermore, immigrants tend to be immunologically susceptible to the endemic diseases prevailing in the area of development.

Given the present rate of water impoundment and the huge expansion planned for the immediate future, the spread of parasitic and infectious diseases in Africa, Asia, and Latin America could become exponentially more serious and a "shock" situation could be in prospect for millions of people unless the necessary preventive measures are taken. The question arises: what should be done? Coordinated planning for the prevention or minimization of health hazards emerging from water impoundment schemes depends on full recognition by governments of the essential comple-

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Table 1. Increased prevalence of schistosomiasis due to *S. haematobium* following construction of large dams

		Infection rate	
		before dam	after dam
Egypt	Aswan Lower Dam[a]	2-11% (early 1930s)	44-75% (1937)
Ghana	Akosombo Dam (Lake Volta)	5-10% (children, early 1960s)	90% (children 10-14 years, a year after dam reached maximum height, about 1969)
Sudan	Sennar Dam	1% (1924-44)	21% adults, 45% children (1952)

[a] The Aswan High Dam has also resulted in change in schistosomiasis transmission patterns.

mentarity of economic development and health and on the integration of health prevention measures with water development projects from the beginning.

Before examining a policy solution in greater detail, we propose to look briefly at water-related diseases and their spread in relation to water impoundments in Africa, Asia, and Latin America and to give some idea of the scale of construction of dams at present in progress in these countries.

Ecological Disruption and Disease

The risk of spread of parasitic infections associated with water resources development schemes has been stressed on many occasions, yet there are few instances where a direct comparison can be made between the infection rates before and after the construction of the water impoundment in a particular area. This is partly because the data available are inadequate and partly because of a reluctance on the part of governments to publish reports indicating that development projects have had any adverse effects on health. This latter situation in itself suggests the need for a systematic study of the health hazards associated with new water schemes.

The conditions listed as being most apt to spread in tropical zones are schistosomiasis, malaria, bacterial and helminthic intestinal infections, and arbovirus and other specific infections that have a regional distribution (e.g., filariasis, trypanosomiasis, and dengue haemorrhagic fever). Of these, schistosomiasis has claimed prior attention for a number of reasons. The infection is endemic over much of Africa, and an increased prevalence associated with greater use of water in the endemic areas has been a common experience. The increases, often very great, are relatively easy to detect; a public outcry has frequently accompanied a dramatic sign of the infection, namely, an intense hematuria in many children. Table 1 illustrates the devastating spread of schistosomiasis following the construction of large dams in Egypt, Ghana, and the Sudan.

In Ghana, further proof of the impact of a lake on the spread of schistosomiasis was afforded by a study of hinterland communities, situated some distance away from the lake, in which a progressive fall in prevalence of the infection was related to a decreasing degree of dependence on the lake for domestic water needs.

While in Africa schistosomiasis clearly represents the greatest single immediate threat to health in the development of water resources, in Asia it does not yet constitute so great a scourge and ranks lower in the scale of endemic diseases with potential for spread in water development schemes. These include in order of importance, malaria, dengue, hemorrhagic fever, Japanese B encephalitis, filariasis, helminthiasis, schistosomiasis, trematode diseases, cholera, and dysentery.

In Latin America malaria, leishmaniasis, and yellow fever are endemic, and aggravation of health risks due to changes in the ecosystem are of major concern.

Poor living conditions, overcrowding, scarcity of water in the houses, absence of sanitary facilities, poor feeding, and high food costs for workers in water development schemes have all contributed to an increased incidence of respiratory infections and a relatively high rate of tuberculosis, to an exceptional frequency of enteritis and other diarrheal diseases, and to a lowering of nutritional status and increased susceptibility to infections. A predominance of single men in the labor population has encouraged prostitution and produced high frequencies of venereal diseases, particularly gonorrhea and syphilis. If these risks have not

resulted in dramatic situations in most of the dam construction areas in Latin America, it is largely because of the existence of preventive health services and their active engagement in control measures.

What emerges from the information available is that a general acceleration of disease transmission has occurred in the wake of water impoundments and irrigation schemes in Africa, Asia, and Latin America. Old foci of infection have been greatly enlarged and exacerbated and new diseases sometimes introduced. Even in non-endemic areas, the risk of rapid spread of schistosomiasis from isolated foci is considerable. Indeed, the patterns of disease intensification that have emerged reflect man's efforts to change the environment for economic purposes.

Prospect: A "Shock" Situation

The great expansion of water development schemes is undoubtedly aimed in part at bringing more agricultural land under irrigation to meet the urgent food demands of the rapidly growing populations in the developing world. Present estimates indicate that by 1985 a further 23 million hectares of irrigated land over and above the existing 50 million hectares will become available, thereby allowing for an enormous increase in the production of food (*1*). Moreover, since only 22% of Africa's potentially arable land is said to be cultivated and a mere 11% of South America's, it is likely that millions more hectares will be irrigated in the years to come (*2*).

In practical terms this means that the construction of dams of all sizes and for a variety of purposes (multipurpose dams for hydroelectric power, irrigation and flood control, dams primarily for hydroelectric power and still others for irrigation only) is being greatly accelerated, and growth trends generally are following an exponential curve. Thus, whereas only three "megadams" (impounding lakes with a surface area exceeding 1000 km^2) existed before 1950, eight were built between 1950 and 1959 and 21 between 1960 and 1969 (*3*). Large dam construction in Africa, Asia, and South America is equally dramatic, as revealed by a comparison of the numbers existing before 1950 with those constructed in the following two decades (Table 2).

Furthermore, 350 dams with a height of over 15 m come into existence each year, adding to a current inventory of 10 000 to 12 000 such dams (*2*).

The scale on which small water impoundments are being built is no less impressive. Ten thousand small ponds were dug in Nyanza Province, Kenya, with the aim of increasing fish production (and this led to a considerable breeding of malaria vectors); 120 are in construction in Ghana, 57 in the northern region of the United Republic of Cameroon, and 50 in Mali, with the object of promoting vegetable growing. In the Philippines a 1978 inventory includes a total of 861 dams and in the northeastern part of Brazil alone some 800 small and medium-sized impoundments have been built for irrigation and other purposes.

One of the reasons for the rapid development of small impoundments is that, in addition to government-supported agricultural projects, village communities and farmer cooperatives in the tropical world can now undertake the construction themselves on their own initiative. Even churches, missions, and voluntary agencies have participated in this activity. Since there is no central control or registry, full information about these impoundments is difficult to obtain.

Table 2. Rate of construction of large dams

	Pre-1950	1951-60	1961-70	1971[a]
Africa				
29 countries	26	28	38	28
Asia				
Indonesia	13	2	8	—
Malaysia	2	1	8	—
Philippines	2	3	2	—
Thailand	—	9	27	10
Latin America[b]				
Argentina	22	13	16	15
Brazil	119	111	97	93
Chile	34	7	10	15
Cuba	2	2	17	28
Colombia	—	5	18	42
Mexico	75	45	132	7
Peru	35	5	13	23
Venezuela	9	10	22	25

[a] Figures according to information gathered up to 1972 but including projects for the future.

[b] The numbers here represent, in general, only a fraction of the projects planned or the dams under construction.

Source: *ICOLD World Register of Dams: second updating, 31st December 1977*. Paris, International Commission on Large Dams (1979).

The agricultural benefits of small multipurpose projects, such as those for fishing, water supplies, livestock watering, irrigation, and flood control, cannot be denied. Yet population and animal contact with water is high and the risk of disease transmission probably exceeds that of large dams. This is especially so for schistosomiasis, since the intensity of cercarial infestation and of water contact per unit of shoreline and per unit volume is greater in small impoundments than in large lakes. Proliferation of vegetation, which provides a habitat for the intermediate snail hosts of schistosomiasis, also tends to be correlated with size of water habitat.

A multidisciplinary eco-epidemiological team, with a voice at decision-making level, should form part of every water resources development project from the beginning.

The net effect of all water impoundment schemes, large and small, is that man/water contact, vector populations, and disease incidence will predictably rise faster than could ever have been envisaged. This will truly result in a "shock" situation. It may be depressing, but probably not unrealistic, to say that developing countries have just reached the "foothills" of this problem and that the "mountains" lie ahead.

Considerations of Policy

It is argued that economic development and health are wholly interdependent; indeed, they are indivisible. Economic growth through the dissemination of production benefits should promote good health rather than create illness and disease, for increasing illness can only jeopardize economic development in the long run. Yet continuing experience in the tropical world shows that in the case of water impoundment and irrigation schemes the Ministry of Health may not even be informed by the Ministry of Agriculture of the existence of such schemes.

However, there is no question that economic development planning and health maintenance *can* be made complementary; and to make them so is the basic and urgent challenge. Nor do time-lag effects minimize this responsibility. Schistosomiasis is of particular note in this regard because of the long time-lag between the onset of infection and the onset of disabling sickness. Public awareness emerges slowly, and peasant stoicism, compounded by ignorance of etiology and an absence of politicization, generally prevents public outcry. The community demand for health services is accordingly muted and the proliferation of new irrigation schemes continues often without regard for future health risks. Here the role of health agencies is to help prevent a "shock" situation by creating an informed body of opinion that will insist on the inclusion of adequate health-care infrastructures in all future schemes of water impoundment and irrigation.

Another important consideration often overlooked is the regional asymmetry of benefit and risk. Whereas people at the lake-side suffer from increased disease and are often worse off than before, those living in towns and participants in the wider national economy enjoy electricity, employment, and other economic benefits generated through the water development scheme. Water impoundment schemes thus exaggerate social and economic inequalities in different parts of the country. Environmental degradation in the lake area stands in stark contrast to improvement in the quality of life elsewhere.

What Must be Done?

The principle should be established that economic development shall not create sickness. Water development projects should take into account health protection through all stages of planning, design, building, and subsequent operation of a project. This would ensure that developmental interventions were evaluated in their ecological entirety so as to avoid or minimize the negative consequences to human health. We present some of the priorities to be considered in the implementation of such a policy.

1. A national water development authority should be created with responsibility for setting national goals and priorities for water impoundment and irrigation schemes, including economic interests and health maintenance. It should draw on the expertise of physicians, public health specialists, parasitologists, microbiologists, engineers, biologists, ecologists, agriculturalists, economists, and other relevant professionals and administrators. The authority would be administratively superior to the individual departments responsible for public works, power, agriculture, education, health, and transport and in a position to advise and guide the more narrow sectoral interests.

2. A multidisciplinary eco-epidemiological team, with a voice at decision-making level, should form part of every water resources development project from the beginning of the enterprise. Such a team would:

- initiate surveys prior to every proposed project, with analysis and evaluation of the potential impact upon health as well as the economic outcome;
- identify the unintended negative effects on health and carry out a cost-benefit analysis of prevention, treatment, and control measures;
- recommend essential changes in the plans of the water resources development project or in the organization and use of land under the influence of the future lake in such a way that risks would be eliminated or their consequences minimized;
- implement programs for prevention or control of actual disease risks;
- respond rapidly to problems as they arise, using information provided by a program for monitoring changes in the flora, fauna, hydrology, agriculture and human, social, and health conditions. In view of the increased risks posed by small water impoundments, it is recommended that "future risk" research be directed towards the problems of disease transmission in these impoundments in particular.

3. Planning of the area that is geographically and economically influenced by the lake (e.g., for the establishment of new settlements, industrial, agricultural, and other activities) must be carried out to ensure protection of the environment and the greatest longevity of man-made lakes, to maintain the quality of the water, and to avoid most of the health risks. Through integrated multisectoral planning, the interests of power production, agricultural production, and health can be effectively balanced. This should include integrated sectoral planning for agronomics, ecology, economics, environmental monitoring, health services, clinics, health surveillance, housing, hygiene, hydrology, limnology, social activity, vector biology, and wildlife ecology as well as integrated regional planning between areas above and below the dam, around the impoundment, in the different parts of the watershed and also beyond watershed boundaries.

4. National registers of all water resources development projects, with data on numbers, size, and other specific features, including engineering, hydrological, agronomic, and human health characteristics, should be collected on a continuing basis. Water-related ecological phenomena of significance to human diseases, zoonoses, and vectors need to be identified. The proposed register would assist in this respect and in specific problem recognition. Since the size of lakes is of medical significance and small water impoundments potentially more dangerous in aggregrate than large lakes, registration according to six size groups has been proposed.

There is a reluctance on the part of governments to publish reports indicating that development projects have had any adverse effects on health.

5. National regulations should be formulated for:

- planning activity;
- integrated planning strategies for preventive health measures and for the continued evaluation of the impact of the impoundment schemes after their construction;

- small water impoundments, modified and adapted from those formulated for major impoundments;
- grants or applications for funds.

6. Capital costs of the necessary health care infrastructures (such as clinics and outpatient facilities in rural areas) should be included in the capital costs of the water impoundment scheme. The cost of recruiting and training the necessary teams of professional health care personnel for rural areas should be included in the initial "start-up" costs. Recurring costs for health services, screening, treatment, regular health surveillance and evaluation, health education, vector control, and environmental monitoring should be included in the standard budget planning for recurrent operational costs of the scheme as a whole and should be derived directly or indirectly from the gross income of the scheme. In some instances it may be necessary to adopt an equivalence approach based on a proportion of the income from power generation or agricultural production.

Ironically, economic activity under the banner of "development" often creates ill health.

7. A communications network for water development schemes in relation to the consequences for health would be of considerable value. The first objective would be to establish a constantly updated international register of current and projected water development schemes and to provide appropriate guidelines for such a register so that it will assist in identifying priorities and needs in the promotion of health services and of disease research at the international level. The network would also promote worldwide monitoring of the health and ecological status of water schemes in the register. This would provide a data base that would aid research design and research strategies. If it can be demonstrated that a water impoundment registry and data bank are useful in agricultural planning and management and are beneficial for ecology and health monitoring, then the active cooperation of governments will be more readily forthcoming, despite the difficulties of data collection.

* * *

Although the evidence presented above is necessarily selective and incomplete, it is well known and clearly established that water development projects aggravate health risks in the tropical world. Furthermore the rapidly increasing rates of construction of impoundments, both large and small, offer a dismaying prospect for continued serious deterioration of health in the future.

Major decisions of policy and implementation need to be formulated by governments to ensure that health services are integrated into all water development projects from the beginning and that all operational costs for health are incorporated in the budget.

Hitherto, medical services have been left to cope on a curative basis, where possible, with the disease outcomes of development schemes. This is no longer enough. Recognition of the complementarity of economic development and health is essential if the serious risk of spread of diseases is to be prevented. □

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Chen Jing-li, Huang De-yu, & Shen Gong-yong

Eradicating schistosomiasis in Shanghai county

Experience in Shanghai county indicates that a comprehensive programme involving elimination of reservoir snails, as well as identification and treatment of patients, can succeed in eradicating schistosomiasis from a hyperendemic area.

Until the early 1950s schistosomiasis due to *Schistosoma japonicum* was hyperendemic in much of Shanghai county. After an epidemiological survey in 1953 defined the extent of the problem, a comprehensive control programme was conducted during the next 20 years. As a result, no new infections have been discovered in the previously endemic regions since 1974, and no live reservoir snails have been found since 1978.

Little is known about schistosomiasis in Shanghai county before 1930, when Chen Fang-zhi et al. reported the discovery of *Oncomelania* snails. In 1937, Su De-long found and treated late stage schistosomiasis patients, and in1953 a preliminary investigation revealed a high density of reservoir snails in two areas of the county. The prevalence of schistosomiasis in one area is shown in the table. A survey of 2159 animals, primarily cattle and rats, indicated that the prevalence of infection was 18.71%.

In 1955, the schistosomiasis programme was established with a two-pronged approach: finding and treating cases of schistosomiasis, and eliminating the snail intermediate host, *Oncomelania herpensis*. At that time, the endemic area involved portions of all 18 communes of the county, two of the five county-affiliated towns, and 123 of the 238 production brigades.

There was no tap water in towns and only a few wells in villages. Nearly all the country dwellers used river water for drinking, and cleaned their chamber pots and farming implements in the river. This pattern of repeated exposure to infected water and repeated contamination of water with infectious stools led to an overall prevalence rate of schistosomiasis in the county of 26.3%, with some variation depending on age.

More than 1000 urban medical personnel were mobilized from the city of Shanghai and dispatched to rural areas to carry out health education, screen for and treat cases, and ensure appropriate management of drinking-water and faeces. Through screening of stools, 32 016 cases were discovered and treated, originally by using intravenous injections of antimony potassium tartrate (tartar emetic) over a period of 20 days.

Prevalence of schistosomiasis, Qi-bao area, 1953

	No. examined	No. infected	Prevalence (%)
Town residents	992	222	22.4
Rural inhabitants	1372	714	52.0
Outpatients	283	104	36.8
Middle school students	380	180	47.4
Primary school students	390	94	24.1
Preschool children	17	7	41.2
Total	3434	1321	38.5

More than 20 000 residents of Shanghai municipality, in addition to those living in the endemic areas, were mobilized to assist in the snail eradication effort. Snail elimination activities included diverting water channels from infested rivers and canals, scraping the banks of these channels to clear all vegetation, and burying snails under at least 1 metre of earth. Additionally, river banks were straightened, vegetation was burned, molluscicides (benzene hexachloride and calcium arsenate) were applied, and in some areas individual snails were

The authors are with the Health and Anti-Epidemic Station of Shanghai County. This article is adapted from a paper in the *American journal of public health*, **72**, (Suppl): 50-51 (1982).

collected with chopsticks and killed. Over a period of three years, every river and canal underwent more than 10 cycles of these snail eradication procedures. As a result, the area infested with snails declined by 58%.

At the same time, proper management of drinking-water and faeces was established. This included encouraging inhabitants to move faeces vats away from the river, persuading peasants not to wash their chamber pots in the river, sinking wells in the villages, and using properly disinfected water for drinking. By 1958, 78.6% of production teams had centralized and controlled their faeces vats.

The "mass movement" activities of 1956–58 had a major impact in reducing the occurrence of schistosomiasis in Shanghai county. However, the effort slackened during 1959–62, and some of the previously cleared areas became reinfested with snails. A second phase of activity began in 1964, when new efforts were made, primarily using professional teams, to carry out comprehensive control measures focused on eliminating snails. These activities further reduced the occurrence of schistosomiasis and laid a foundation for eradication of the disease from the county. By 1968, the total area infested by snails had been reduced by more than 99% compared with 1956.

In 1970, eradication goals were established. Between 1970 and 1977, more than 1000 health aides looked for snails, river by river. By the end of 1977, each river had been checked 30 times, and all were found to be free of *Oncomelania* species. No *Oncomelania* snails have been found in Shanghai county since 1977. Continuing case-finding efforts and treatment of cases found have led to the virtual elimination of schistosomiasis in Shanghai county. No new cases have been detected since 1978, although 25 persons with active (later stage) disease were known to be present in 1980.

The total identified direct expenditures on schistosomiasis eradication from 1953 to 1978 was 4 670 000 yuan.[1] This figure includes direct costs for medical care (including costs of drugs and surgery) and molluscicides, and salaries for personnel. The figure does not include the value of efforts expended by the thousands of persons mobilized to work in the campaign, which is estimated to be approximately 8 million yuan. The total cost of the schistosomiasis eradication programme in Shanghai county can thus be estimated to have been approximately 12 million yuan. The programme resulted in the identification and cure of more than 52 700 patients. Thus, the government-borne expenditure was less than 100 yuan per patient, and the total cost was approximately 240 yuan per patient. Based on the degree of disability suffered by patients with schistosomiasis, it is estimated that the income lost due to the reduced labour power of a patient suffering from schistosomiasis is much more than 100 yuan per patient per year. Taking into consideration the amount of income that would have been lost by all the treated patients in the past 10 years had they not been treated, the monetary benefit of identifying and treating these patients is in excess of 50 million yuan. In addition, the endemic area would probably have expanded, and the economic damage would hare been correspondingly greater. □

[1] At the time this paper was written, 1 yuan was approximately equivalent to US $0.60.

J. A. Muir Gray

Health for all elderly people by the year 2000

Much interest is being shown in the problems of old people, but vague statements of good intent are insufficient. We need to agree on objectives and on ways of monitoring progress.

In 1982 the United Nations convened a meeting in Vienna to review the needs of elderly people. Unfortunately, there is a danger that the recommendations of this meeting, like so many before them, will never be translated into action. What is needed is, firstly, agreement on a small number of specific objectives; secondly, development of programmes to achieve these objectives; and, thirdly, a choice of indicators that will allow progress to be monitored.

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We need national agreement on aims and objectives and local agreement that these should be adopted as the basis for planning. Furthermore it is very desirable that all health and local authorities should adopt the same objectives, so that their services for elderly people can be compared.

The participation of elderly people themselves in setting objectives is essential if the programmes are to be relevant to their needs. Three examples of policy aims and specific objectives are shown in the table.

Four types of indicator that can be used for monitoring progress have been suggested by the World Health Organization (*1*): indicators of health policy (for example, proportion of resources devoted to elderly people); social and economic indicators related to health; indicators of provision of health care; and indicators of health status and quality of life. The last two are of particular relevance to health professionals.

Aims and objectives

Policy aim	Specific objectives
To keep old people at home as long as possible	To reduce the average duration of stay of people in long-stay psychiatric and geriatric hospitals and of those in permanent places in old people's homes
	To reduce the proportion of elderly people in long-stay accommodation
	To provide services that will allow a person who wishes to die at home to do so while being well cared for, and to minimize the proportion of deaths in hospital
To prevent disability and handicap	To encourage physical activity in old age
	To encourage those who are helping older people to let them do as much as possible for themselves
	To provide treatment services that can increase or maintain mobility — namely, services that mitigate the effects of arthritis, stroke, visual impairment, Parkinson's disease, heart and lung disease
To support relatives looking after elderly people	To prevent harm to the health of people looking after elderly relatives
	To prevent marital problems and family disputes in families looking after older people
	To encourage families to continue to care for elderly relatives as long as possible

Health service indicators may be levels of service provision, activity rates, or simple measures of outcome, such as the proportion of elderly people living in long-stay care or the mean duration of long-stay care. They should always be expressed with respect to the total population served — not simply the numbers of people attending day hospital or undergoing hip replacement, but the age-specific rate. These are indicators that can be measured without bias, from available data. At present, such data collection is, by and large, haphazard. What is needed is agreement on a small number of health service indicators that can be used to monitor progress, and for each health and local authority to collect and publish this standard set of data annually.

Health and quality-of-life indicators. The prevalence of disability and handicap, and satisfaction with life at home or in residential care are the true measures of outcome. However, the assessment of any of these variables is time-consuming and prone to subjective bias. Valid data can ony be collected by trained staff working to a protocol. It is therefore not feasible for every health or local authority to attempt to collect them, but they should certainly be collected on a national sample.

We need to express our indicators not simply as numbers but as rates, just as we use rates (vaccination rates, infant mortality rates) to monitor child health. Futhermore, it is not enough for any health authority to consider its own rates in isolation. To monitor progress over a period of time is useful, but more telling is a comparison of progress with that in other areas and other countries. Let us act now to set a baseline, agree on objectives, and audit our services for elderly people as a means of improving effectiveness and efficiency and, most important of all, the quality of life. □

REFERENCE

1. Development of indicators for monitoring progress towards health for all by the year 2000. Geneva, World Health Organization, 1981 ("Health for All" Series, No. 4).

Books

Options for health and health care: the coming of post-clinical medicine

By Alfred E. Miller & Maria G. Miller. John Wiley, New York, 1981, 478 pp. $39.85.

The title of this book should be "Options for health and health care in the USA" although it deals with problems also encountered in other developed countries. The extensive bibliography is limited to American and British authors. Written by a physician and a biologist well qualified in medical sociology, it should be an excellent textbook for advanced students.

The book is divided into three sections. The first is a historical review of the health care system and the factors that have led to the current mismatch between health needs and available health care. Among the factors emphasized are the decline in incidence of infectious diseases—resulting not only from technological advances but also from improvements in standards of living, nutrition, housing, and sanitation—and the increase in chronic degenerative disorders. For the majority of these chronic diseases, no definitive care is available or seems likely to be developed; so they require continuing care and support. The authors use a term not in common use, "post-clinical medicine", and state that it implies "an *expansion* of need for supportive maintenance, patient management, and new kinds of preventive care".

The second section of the book deals with the organization and behavior of the health care system and attempts to answer the question of why health care has failed to adapt to the changing needs of society. There is a good review of the evolution of medical education, with its current technological and disease orientation and specialization. It seems unlikely that changes in the curriculum will change physicians' attitudes or behavior. Medical students and young physicians imitate their elders, and restructuring the organization of practice would have greater influence.

The central role of hospitals in the current health care system is emphasized. They have become the symbol of medicine's ability to intervene effectively against disease yet are also the focus of much criticism because they play the key role in the escalation of the cost of health care. The evolution from charitable and custodial hospitals to the complex, highly structured institutions of today is well covered.

There has been a parallel change in the structure of the medical profession, in which the American Medical Association played a major role. From its founding in 1847 to about 1920, it pursued a liberal, public interest policy and fostered such reforms as the Pure Food and Drug Act, workers' compensation for injury, and the upgrading of medical education. Subsequently, under the influence of conservative physicians, it became primarily interested in serving as a protective guild and its influence diminished. At the same time, general practitioners were gradually replaced by specialists.

The high cost of medical care and the failure of the health system to meet public expectations have forced policy-makers to seek new strategies for reform. Planning and development strategies approach the health system as a public service that must ensure the availability of necessary services to the entire population. The maternal and child health program, for example, provided subsidies to States to improve prenatal and child care; and the Hill-Burton program provided subsidies for hospital construction in under-served areas. More recently, comprehensive health planning agencies and their successors, health systems agencies, attempted—with limited success—to examine the entire range of health services in defined areas and develop master plans. Regulatory strategies seek to protect consumers' interests by overall supervision of the system and enforcement of rules. These include licensure of professionals, accreditation of facilities, and certification of drugs. Strategies for reorganizing parts of the delivery system such as the development of prepaid group practices, show promise of overcoming the fragmentation of services and achieving cost savings through more efficient use of hospitals. Financing and insurance strategies, such as Medicare for the elderly and Medicaid for the poor, provide subsidies to enable individuals to pay for existing services. All these strategies are critically reviewed.

The third section deals with financing and the cost of health care. It attempts to explain how economic and financing mechanisms reinforce and intensify the organizational mismatch and are responsible for uncontrolled cost increases. The authors comment pessimistically that "proposals for national health insurance, like those for cost containment, divide into those favoring free market, those favoring public service, and those favoring

regulated utility approaches. The deep-seated ideological differences embodied in these approaches make it extremely difficult to work out compromises."

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Manual of primary health care: its nature and organization (2nd edition)

By Peter Pritchard. Oxford University Press, Oxford, 1981, 203 pp. £6.95.

This is a very good book focusing on all aspects of first-level health care. Although it is based on experience in the United Kingdom's National Health Service, the analysis of primary health care should provide a stimulus to thought for all those involved in this field, whether in developed or developing countries. The book is easy to read and contains valuable tables, diagrams, and flow charts. It is aimed at trainee general practitioners, but deserves a wider audience.

The author starts by discussing what primary health care is, and its main functions and objectives. He proceeds through the roles of the various categories of personnel involved in a health care team and describes the team's functions. The general practitioner's technical role is fully discussed in an open, undogmatic way which I found valuable and stimulating. This role is, by extension, the focus of the relationship between the members of a health team and the patients, and of their interaction with one another. The description could as easily apply to health teams in the developing world as in the United Kingdom. The service as viewed by the patient is also discussed.

The places where primary health care is administered—in clinic, home, school, or surgery—are contrasted and compared. Factors affecting the design of each are given in a checklist and the pros and cons of the different locations are presented. The approach of the book is thoughtful and analytical, and the contents well documented.

A field that should invite more study and investigation is the relationship of the primary health care team to hospital services. The book does not go into this area in depth. The patient's need for continuity should be given priority and there should be some experimentation to find the most appropriate links between the primary health care team and the hospital staff. To achieve good communications between these two groups will be difficult, perhaps because present deficiencies in the relationship are not perceived as being important.

The chapter on management of the primary health care team is particularly valuable. Management in health services is something most professionals shy away from, tending to deny responsibility for it, and not realizing that they are *de facto* in charge of considerable resources, material, and equipment, frequently having a supervisory role over other categories of health workers. The techniques of management are simply and clearly set out, and it should be mentioned again that the overall approach of the book in not dogmatic. Instead, the various possibilities are presented, leaving open the decision as to what type of management is best in a particular situation.

There is a separate chapter on support services for primary health care, such as office organization, medical records, and diagnostic indexing.

When assessing how a system of primary health care is working and whether standards of care are being maintained or improved, one can look at structures, process, or outcome; so suggestions on these criteria are given. There is also a revealing table showing the qualities of a "popular doctor" compared with those of a "good doctor".

Training for primary health care also receives attention. A systematic approach to the content of general practice has been formulated and the objectives are defined in behavioural terms. Teaching takes place in the practice, in group teaching, and by audiovisual methods. Day release courses are recommended and books and journals are, of course, essential. Emphasis is placed on the training of receptionists, who represent the "shop window" of primary health care. Continuing education for all staff is also considered highly desirable.

The book concludes with a chapter on research in general practice—which is fortunately an expanding field—and a chapter entitled "Where are we going?"

Throughout the book, the author stresses the importance of change and adaptation in the modern conditions of primary health care. Medical technology, drugs, and patients' attitudes are dynamic, and adaptability of medical practice is essential if we are to cope not only with the present but also with the future.

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The treatment and management of severe protein-energy malnutrition

World Health Organization, Geneva, 1981, 47 pp. Sw.fr. 8.—.

Many severely malnourished children are brought for help to the hospitals and health services of developing countries. They represent a small part of an enormous problem—a total of between 200 million and 400 million children who have some degree of protein-energy malnutrition. The problem has implications far beyond the limited resources of the health professions, but meanwhile the individual children require care and are literally crying out for help. Without prompt and effective use of medicines and concentrated nourishment, many of them will die.

This booklet will be an invaluable guide for those caring for the severely malnourished. It is short and practical. The sections on the management of the severely ill child, on the associated conditions, and on those who fail to respond to treatment are all good. The annexes provide valuable information on how to prepare concentrated milk-based mixtures and on what medicines are best for different infections.

The booklet is concerned with severe cases of protein-energy malnutrition, for which the hospital is the commonest place for treatment. However, more than 20 years ago Bengoa observed that many malnourished children successfully treated in hospital returned home only to die from a recurrence, and he suggested alternative approaches. Despite a section on nutritional rehabilitation, there is not enough emphasis on involving the family, the mother in particular. Because of the emphasis on severe cases, there is heavy reliance on high-energy milk-based formulae, but the instructions for preparing them are not always clear. The differences between standard mixtures and high-energy feeds could be set out more clearly, with a table not only for the concentrated but also for the standard formulae. In Table 4 the two columns showing the protein content of the mixtures are under the wrong headings and should be transposed. Milk speeds up recovery in severe cases of malnutrition, but in many tropical countries there are still inadequate supplies of local or powdered milk, let alone K-MIX2.

The potential role of local foods for therapeutic nourishment does not receive the attention it deserves. Indeed it is suggested that ordinary foods are not introduced until the third week. This undermines the concept of nutritional rehabilitation—a practical training through the involvement of parents in feeding their children back to health using a suitable diet prepared from local foods. The educational impact of their participation using dietary items available in their homes, their gardens, or the local market can be considerable. Economic improvement would obviously benefit the nutrition of a family, but such an intervention is beyond the scope of a health service. However, an educational component should be added to the treatment, since involving relatives in the therapeutic process can have a significant influence on a child's long-term prospects and those of the family in general.

The management of dehydration caused by acute diarrhoea in the malnourished is described in detail and is generally clear. Fluid is needed both to replace abnormal losses and to maintain metabolism. To repair the abnormal deficits from past or continuing diarrhoea, special formulations of sugars and electrolytes are indicated. Fluid is also required to maintain the metabolic processes, and for this purpose water, breast milk, and fruit juices are all appropriate. The requirements of these fluids are not specified, however. For oral therapy, oral rehydration solution recommended by WHO receives the emphasis it deserves, as it is the most widely tested of all rehydration fluids. It should be available in all hospitals and health centres, but there is no mention that a simple sugar/salt solution can be a valuable substitute when oral rehydration packets are in short supply, or when glucose and potassium chloride are unobtainable.

Intravenous therapy is particularly hazardous for malnourished children. There is a danger of sodium retention, particularly when treating kwashiorkor. Anaemia is commonly associated with protein-energy malnutrition, and sometimes transfusion is essential, but overload and cardiac failure are easily precipitated. Infusions demand greater caution than is indicated in the manual and should, if possible, be given with a fast-acting diuretic. A couple of additional points of practical advice may be added. Firstly, when an intravenous drip is not working, one should check not only the tubing but also the needle site for local swelling and inflammation. Secondly, an important way to prevent hypothermia is for the malnourished child to sleep in direct contact with its mother.

Oral iron supplements are valuable in cases of anaemia, but apart from the UNICEF tablets containing iron and folic acid, no suggestions are given about alternative or liquid preparations that might be appropriate for children. No mention is made of the role of trace elements such as magnesium or

zinc, which some workers believe are important in speeding up the recovery process. Many regimes recommend the use of magnesium chloride (0.5–1 g per day) and potassium chloride (1–3 g per day) dissolved and mixed in the milk preparations.

Despite its limitations, this little booklet will be of great value to middle-level health personnel in hospitals and health centres where malnutrition is prevalent. Severe protein-energy malnutrition is a complex condition. The early days of treatment are hazardous. At this stage the sick child is on a knife edge: too little nourishment and he slips further down the slope of negative nitrogen and energy balance; too much or too rapid feeding and diarrhoea compounds the problem. Every child will respond differently, but this booklet is a useful guide in this uncharted sea. All governments should make this practical publication available to those who need it—the health workers near the base of the service pyramid who struggle daily to treat this dangerous disorder.

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Malaria

Edited by S. Cohen. *British medical bulletin*, **38**: 115–218 (1982). Special publication for the British Council, Churchill Livingstone, London, 1982, 104 pp. £9.50.

The *British medical bulletin* recently devoted a whole issue to malaria. This series of articles illustrating recent progress in malaria research is edited by Professor S. Cohen, of Guy's Hospital Medical School, London, and most of the contributors are British scientists. All the authors have meticulously summarized the progress made in different areas of malarial infection and the issue is a very good source of reference for malariologists in the laboratory and in the field.

Reviewing the life cycle of primate malaria parasites, R. S. Bray & P. C. C. Garnham relate the most recent developments on hypnozoites—sources of relapses in benign tertian malaria. From a practical point of view, this is the most important article, having immediate relevance for malaria control. Contrary to the widely held view that *Plasmodium falciparum* malaria is the main obstacle to combating the disease, it is *P. vivax* malaria that is causing considerable difficulties practically everywhere, except in Africa south of the Sahara. The epidemiological approach in malaria control in most areas with a relatively short season of transmission can hardly be successful without an understanding of the relapsing pattern of *P. vivax* infections circulating locally.

Differences in strains of plasmodia belonging to the same species have long been observed epidemiologically in terms of the requirements of an antimalarial drug (quinine) for their treatment or in the failure of mosquitos from one geographical area to support the sporogonic cycle of a species from another. D. Walliker, in reviewing the subject of genetic variations, takes us through different approaches to the establishment of genetic markers of epidemiological importance. Perhaps we have had too much hope that the techniques so far developed would have predictive value in the early detection of drug resistance in different areas and of compatibility with vector species in the development of the sporogonic cycle. It is clear now that much more research is required before techniques used in establishing genetic markers can offer practical solutions.

In vitro cultivation of malarial parasites followed a very painstaking development process. Some 70 years have passed since Bass achieved a multiplication of plasmodia *in vitro*. Thanks to the perseverance of Trager over a period of 30 years, the continuous *in vitro* cultivation of *P. falciparum* became a reality and has facilitated much subsequent research on the biology of the malaria parasite.

G. Pasvol & R. J. M. Wilson have ably reviewed the intricate interaction of malaria parasites with red blood cells, including recognition and attachment preceding invasion, the question of receptors, and the modification of the parasitized erythrocyte membrane. One of the final chapters of this article deals with red-cell disorders implicated in the protection of individuals against *P. falciparum* malaria, updating our knowledge on the role of haemoglobin S, C, F, and E, thalassaemia, glucose-6-phosphate dehydrogenase deficiency, and hereditary spherocytosis and ovalocytosis.

Reviewing the new knowledge of parasite morphology, L. H. Bannister & R. E. Sinden remind us of the completeness of plasmodia as living organisms, indicating at the same time the potential this knowledge has in furthering understanding of the interaction of the parasite with the host's tissues and cells.

The anaemia accompanying malaria has long intrigued scientists since it is clear that the mere

destruction of erythrocytes by the bursting of mature schizonts could not fully account for it. The suggestion made some 16 years ago by Zuckerman that at least part of the haemolytic component of the anaemia of *P. falciparum* malaria is caused by immune destruction of erythrocytes has further stimulated scientists to investigate this phenomenon. Yet, as D. J. Weatherall & S. Abdalla state in their contribution, there is still a long way to go before we have a reasonable picture of the pathophysiology of the anaemia of *P. falciparum* malaria.

Considerable progress has been made in the past 15 years in our understanding of immune phenomena involved in malarial infection. The knowledge accumulated so far is ably reviewed by J. H. L. Playfair, while W. P. Weidanz discusses the alterations in immune reactivity in the course of malarial infection, a fascinating subject that requires further attention from general epidemiologists dealing with communicable diseases. Whereas the immune-depressive effect against concomitant infections that can be caused by malaria parasites may be frightening, studies of this phenomenon indicate that antibody responses are more susceptible to suppression than cell-mediated responses; that ongoing immune responses are less susceptible to suppression than newly initiated ones; and that immunosuppression is most pronounced during heavy infection. Termination of parasitaemia is usually followed by a return to normal immunological reactivity.

Much has been said and written in the past 10 years about the prospects of developing a malaria vaccine. Some health administrators may even be disappointed with the slow progress in this field, despite tremendous efforts by several groups of scientists. S. Cohen systematically reviews the scientific progress made so far using the different stages of development of plasmodia. In spite of all the difficulties, the author rightly states that scientific progress has demonstrated the feasibility of isolating, or producing by synthesis or recombinant DNA technology, specific protective antigens from defined stages of human malaria parasites for evaluation as vaccines.

The immunodiagnosis and sero-epidemiology of malaria have received considerable attention in the past 15 years, and this work is summarized in detail by A. Voller & C. C. Draper. Although immunodiagnostic tests cannot replace the microscopic examination of stained blood slides for the detection of patent parasitaemia, they still have considerable practical importance in the epidemiological evaluation of changing situations within the population, as has been shown by a number of studies. On the other hand, the insistence of numerous scientists on the development of antigen-detecting tests may bear fruit in the not-too-distant future.

W. Peters discusses in detail the increasing problem of antimalarial drug resistance, and R. E. Howells reviews the advances made in chemotherapy. The resistance of *P. falciparum* to a range of antimalarials in South-East Asia and Latin America, as well as more recently in East Africa, has received much publicity. It is no doubt a major problem, particularly for the protection of non-immune individuals by chemoprophylaxis. Drug resistance has a different effect on semi-immune populations in endemic areas, which may be one of the reasons why antimalarials are not used more rationally in daily practice. Professor Peters rightly states: "The history of drug resistance among the malaria parasites that afflict man is a sobering one. Man's own misuse and abuse of drugs is even more sobering." This is very true. But what other option is there for a general practitioner or a malariologist working in the field and often lacking any means of control other than drugs? Consequently, antimalarials are used as a temporary solution by many peripheral health services for the relief of fever. Caution is being repeatedly and publicly advised by individual scientists and international organizations such as WHO, but not much change has so far been observed towards rational use of antimalarials. As pointed out by both Peters and Howells, the newly emerging drug mefloquine will suffer the same fate if not used rationally.

The problem of imported malaria is reviewed by L. J. Bruce-Chwatt with his usual erudition. No doubt greatly increased international travel has inevitably been accompanied by an increased number of imported malaria cases, which have contributed to the resurgence of the disease in many countries. A very serious aspect of imported malaria is its nonrecognition by local physicians in Europe and other areas free from the disease, resulting in a relatively high mortality rate. WHO has made numerous attempts to persuade countries to include more extensive teaching of the clinical aspects of malaria and its diagnosis and treatment in medical school curricula; although this may be done in many medical schools, failure to diagnose malaria in time still occurs. There remains one consolation, however: no secondary infections have occurred so far in Europe that could lead to the re-establishment of malaria endemicity.

G. Davidson reviews developments in vector control, including the problem of insecticide resistance. He assesses chemicals available for either house spraying or larvicidal use and provides information on alternatives. The author rightly concludes that the trend in control of malaria vectors must be away from sole reliance on chemicals and towards integration with other methods—environmental, biological, genetic, therapeutic, and educational.

The issue ends with an account by G. B. White of studies on malaria vector ecology and genetics. Many more studies on the bionomics and behavioural genetics of malaria vectors are required for the more successful control of the disease. However, there is not much entomological expertise capable of undertaking such studies in malaria-affected countries.

Taken together, these articles provide a comprehensive picture of the complexity of malarial infection, indicating how closely linked are the different aspects of morphology, life cycle, interaction of parasite with host cell, immune response, and chemotherapy. Clearly, there remain many gaps in our knowledge, requiring further research. It is a pity that this issue does not contain an account of the present status of malaria control in the world, or an article on the changing epidemiological pattern of the disease after more than 20 years of eradication activities.

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Organization and management of community-based health care

By Miriam K. Were. Published for the Kenya Ministry of Health by UNICEF, 1982, 146 pp.

This book provides a very comprehensive and detailed report on the Kenya national pilot project on community-based health care which was sponsored by the Ministry of Health, with assistance from UNICEF.

As stated in the preface, "community-based (primary) health care has many unanswered questions". The project attempted to identify and resolve some of these and focused attention on three main areas.

- What interest do people have in participating in their own health care?
- Can an organizational framework be established at the community level that would enable people to participate in their own health care?
- Can organized community efforts take place within the context of the formal health system?

In considering these three questions, other issues arose, including the training and subsequent activities of a community health worker, and the logistics of drug supply at this level.

Since its subject is a national project, the report is somewhat specific to Kenya and the first half of the book is devoted to background information on the local scene, the problems of the community, and the organization of the project. This could nevertheless prove valuable to those in other areas contemplating operational research on similar topics.

For the reader interested in the general experience gained from the project, chapters 5 and 6, entitled "What the people have achieved" and "Synopsis of project experiences", provide the main substance. These chapters cover, among other subjects, community funds, community meetings, identification of problems, ordering of priorities, and identification of the causes of disease. Seventeen pages devoted to the setting of objectives provide excellent checklists of the activities necessary to solve identified health problems. A further 10 pages outline the changes observed in the communities under study, with regard to the environment, family planning, breast-feeding and bottle-feeding practices, home food production, improvement of health status, and trends in infant mortality, among other things.

The synopsis of experiences includes a section entitled "Some unexpected observations", which not only provides interesting reading but also gives a warning to others who are planning similar projects.

Chapter 7, covering specific recommendations for the future, is essentially for the benefit of Kenya, but chapter 8 considers the ultimate objective of community-based health care, namely its contribution to the policy of health for all by the year 2000, which the report suggests is a realistic target for Kenya. This project earned the UNICEF Maurice Pate Award for 1978, and on reading this report by Miriam K. Were, one can appreciate why.

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