

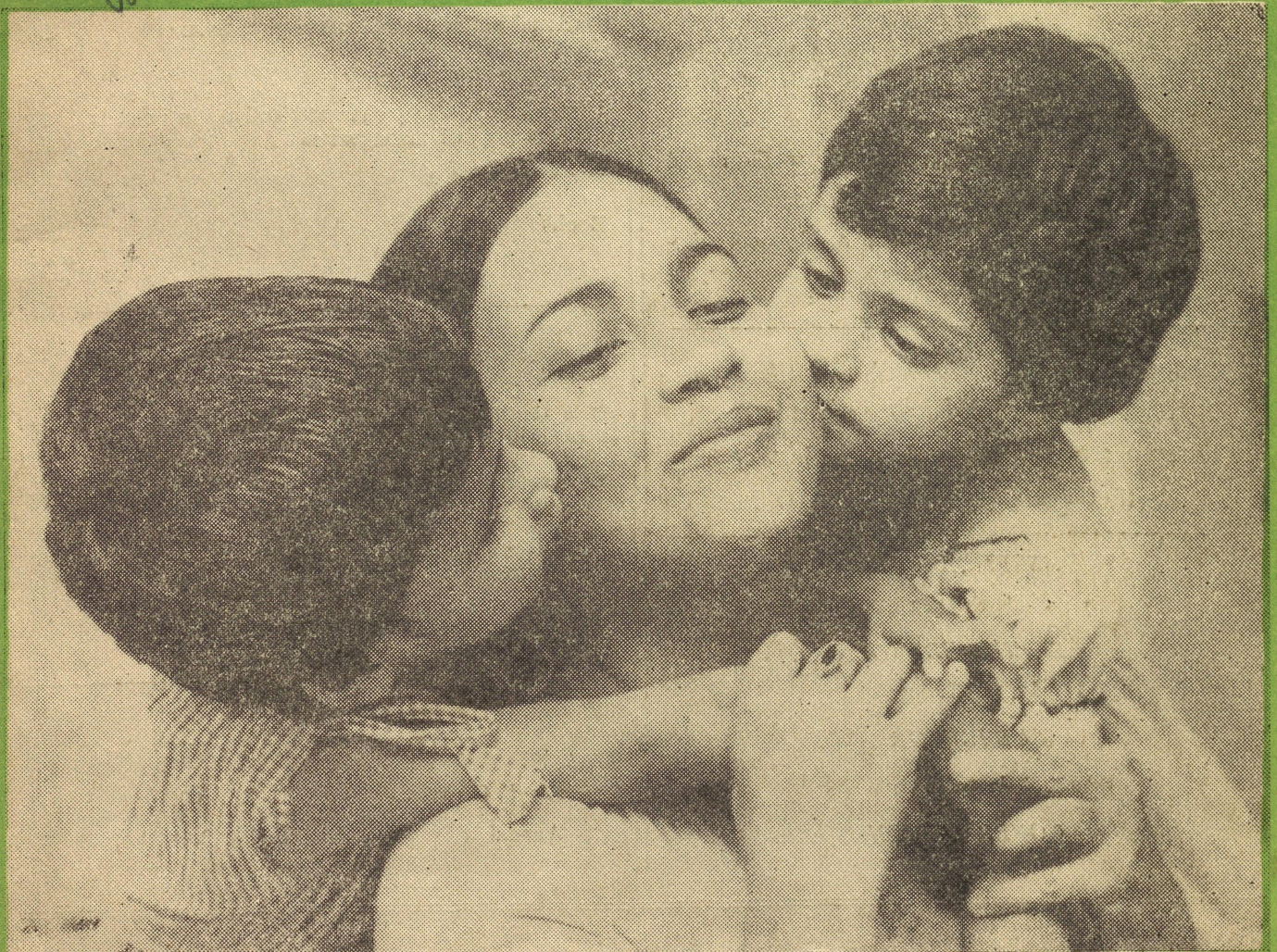
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OBJECTIVES

Swasth Hind (Healthy India) is a monthly journal published by the Central Health Education Bureau, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, New Delhi. Some of its important objectives and aims are to :

REPORT and interpret the policies, plans, programmes and achievements of the Union Ministry of Health and Family Welfare.

ACT as a medium of exchange of information on health activities of the Central and State Health Organizations.

FOCUS attention on the major public health problems in India and to report on the latest trends in public health.

KEEP in touch with health and welfare workers and agencies in India and abroad.

REPORT on important seminars, conferences, discussions, etc., on health topics.

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Articles on health topics are invited for publication in this Journal.

State Health Directorates are requested to send reports of their activities for publication.

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1917—1984

We deeply mourn the sad and sudden
demise of Smt. Indira Gandhi,
the Prime Minister of India,
on 31 October, 1984.



HEALTH MINISTERS' CONFERENCE

India wholeheartedly supports the objective of Health for All

—Smt. Indira Gandhi

The year 2000 is less than 200 months away. We must have a detailed assessment of the progress made so far, the effectiveness of the strategies adopted and the further steps to be taken. Our policies must be resilient and sensitive to constantly changing circumstances.

"...The countries of our region have long had historical ties of culture and commerce. Many of our economic and social problems are similar in nature. Cooperation amongst us would be a big step towards their solution and would also contribute to the meeting of the larger challenges which confront the world as a whole.

Of all resources, the human is the most valuable. So total fitness of body and mind is essential and both inextricably related. Today's world is not in the best of health—either physically or figuratively. Perhaps, the worst crisis is the spiritual one leading to all others. The peoples of weaker nations, who form the majority of humanity are bedevilled by ignorance of certain basic rules and the conditions of poverty.

Our Successes

Diseases which have disappeared from other countries persist in our region. But we too have had our successes, like the eradication of smallpox, which was no mean achievement. We must redouble our efforts to get rid of the numerous gastric ailments from which we still suffer. Infantile diarrhoea is of special concern, as are diseases like polio, which are easily preventable through medication or comprehensive vaccination programmes. We Indians were congratulating ourselves on the elimination of malaria when it suddenly erupted in more serious forms. In some measure, this was due to slackness in continuous monitoring, but also because mosquitoes, as indeed other harmful insects, are becoming increasingly immune to available pesticides. Similarly, tuberculosis and other grave diseases call for timely detection, urgent and combative action.

The teaching of health and hygiene should not be a mere ritual in schools and institutions but should emphasise sanitation and cleanliness, nutrition and proper habits as a normal everyday way of life. We need to introduce some structural changes in the curriculum of under-graduate medical education. This would ensure better family doctors and well-trained para-medical staff. International cooperation in the pharmaceutical industry will help to provide less expensive and more reliable medicines for all sections of the people.

Leprosy—an ancient enemy

An ancient enemy which must be eradicated is leprosy. In India we have undertaken a national cam-

paign. Our scientists along with colleagues elsewhere have participated in developing a multi-drug regimen which has had noticeable impact. But fear and social prejudice still conspire to prevent large numbers from seeking treatment. In this the time factor is all-important. Research must be intensified to find a prophylactic. The disease must be permanently consigned to the limbo of history.

Habits and patterns

Even in affluent nations, a certain number are deprived because of the increasing costs of doctors and medicines which are now beyond their means. Some illnesses are brought on by habits and patterns of consumption, which ignore the tenets of good sense and science. In our countries, malnutrition means inadequate diet. For richer people, it can mean over-eating of the wrong kind of foods which create metabolic disturbances. Progress has increased various kinds of cancers and ailments of stress. Road accidents are among major killers. There is a surge of fitness systems, but I have read that several are not free from certain health hazards.

An ancient enemy which must be eradicated is leprosy. Research must be intensified to find a prophylactic. The disease should be permanently consigned to the limbo of history.

Population stabilisation

India attaches the highest priority to the stabilisation of population. Families will be more willing to have fewer children if they are certain of their survival. Hence the control of diseases of infancy and childhood is important as part of the overall programme to control population. People tend to overlook the fact that increase in population is the first consequence of extended health benefits and other programmes for the people. Ironically, this has become the biggest challenge to health care programmes. Uncontrolled population growth prevents the benefits of economic progress from reaching all sections. It retards the availability of basic nutritional and health facilities to mothers and children, and comes in the way of raising standards of living.

Need for technical cooperation among developing countries urged

The fourth meeting of Health Ministers of South-East Asia region of the World Health Organization (W.H.O.) called upon the member-countries to foster technical co-operation among developing countries through short and medium term projects.

The Health Minister Shri B. Shankaranand, who briefed the press on 27 September, 1984 on the deliberations, said the Conference urged member-countries to formulate short term project on training, exchange of expertise and information by the end of 1984 so that they could be implemented by 1985. It also called upon these countries to foster health agreements for medium-term projects and suggested such projects be formulated at least by the end of 1985.

Among other recommendations of the Conference are monitoring and evaluation of the Health for All by 2000 AD, strategies and activities in order to assess the progress made and incorporate the necessary changes in strategies.

The three-day conference was held in New Delhi from 25-27 September, 1984, under the auspices of the World Health Organization. The Prime Minister, Smt. Indira Gandhi inaugurated the Conference on 25 September, 1984, (See page 285 for inaugural address). Besides India, the countries which attended the Conference were Bangladesh, Burma, Bhutan, the Democratic People's Republic of Korea, Indonesia, the Maldives, Mongolia, Nepal, Sri Lanka and Thailand.

The Conference urged that the non-governmental organisations could play an important role in making W.H.O.'s 'Health for All by 2000 A.D.' programme a reality.

The member-countries were also urged to prepare inventories of non-governmental organisations and their activities and decide the pattern of their involvement in the delivery of health care within the respective national policies and strategies for health development.

Shri Shankaranand said the Conference also requested the Regional Director of W.H.O. to provide support to

member-countries in formulating projects, mobilising third party support and exchanging information wherever feasible.

The deliberations centred round cooperation among these countries in several areas which had been identified in the earlier conferences of health ministers.

India, Shri Shankaranand said, had offered to collaborate with these countries in various fields—manpower development with Thailand, Nepal, Bhutan, Mongolia and Sri Lanka; infantile diarrhoea control with Mongolia, Nepal, Sri Lanka and the Maldives; immunization programmes with the Maldives and Nepal; epidemiology with Mongolia; and quality control in vaccines with Mongolia, Sri Lanka, Thailand, Burma and Nepal.

Referring to Smt Gandhi's reference in her opening address on 25 September, 1984 to the need for changes in the curriculum for undergraduate medical courses, Shri Shankaranand said a committee had already examined the proposition and its report would be made public before year-end.

Earlier in his welcome address at the inaugural function of the Conference on 25 September, 1984, Shri B. Shankaranand, Union Minister of Health and Family Welfare said "Our struggle has been to provide a minimum level of health services for our people. We are trying to learn from each other's experience to improve the quality of life for the people of the Region. We have been happily able to identify certain definite areas for technical cooperation amongst the member-countries....."

He said, "we have been able to identify our health goals, build up relevant strategies and considered plans to achieve them in the region. The strategy is now set for more organised efforts for ready exchange of health information, experience and expertise. I believe that we have successfully crossed the doors of perceptions and today we are more obligated than ever before to put our shoulders together for timely implementation of our collective decisions. Let posterity not accuse us to having faltered or failed after gaining enlightenment". △

We await a breakthrough in methods of contraception. In India we have developed a network of facilities to provide services to all sections of the public. But the methods now in use are not entirely dependable, convenient or safe. Also, they throw the burden of responsibility mainly on women. Family planning is an area where sustained research and education are essential, as is the involvement of the general public.

Emphasis on preventive education

Health is intrinsic to development. Any people who are physically below par cannot give of their best. In the charter of the World Health Organisation, health care has been defined as much wider than merely the absence of disease or infirmity. The establishment of health care centres and training facilities is only a partial answer. The best cure, as the old saying goes, is prevention, for which we must bring about

We have developed a network of facilities to provide family welfare services to all sections of the public. But the methods now in use are not entirely dependable, convenient or safe. It is an area where sustained research and education are as essential as the involvement of the general public.

changes in attitudes towards public and personal hygiene. This is the real challenge to health planners. Most countries represented here have advanced in establishing hospitals and medical facilities and in training personnel. Many serious diseases are easily avoidable by simple precautions; others can be cured in the initial stages without recourse to expensive medication. The emphasis must now be on preventive education and communication, particularly in rural areas.

Indigenous systems of medicine

Our countries have a rich heritage of indigenous systems of medicine. In India, Ayurveda, Unani, Siddha and Yoga have been serving our people for centuries. The advent of modern medicine has supplanted and sometimes even ridiculed these systems. Denied resources, they have fallen behind in adaptability and research. Yet millions continue to have faith in them and indeed would choose no other. In fact, modern medicine itself is making use of many of these herbs and other systems. It is sound sense to test the practices and remedies of these systems and to incorporate them in modern medicine. The objective of health within the reach of all would be better served by giving all these systems a recognised place in the health care organisation. This would also eliminate their misuse unknowingly by well-meaning citizens or knowingly by charlatans.

Voluntary organisations

The medical profession is one of the most highly respected. Doctors are regarded as saviours and givers of life. The ability to cure is one of the greatest gifts that the human being can develop. Unhappily, the materialistic climate of contemporary civilisation often lures members of the profession to minister to the few rich rather than those masses who need them most. Here, we have the problem of doctors and nurses being unwilling to serve in rural or hill areas. Improving the health of all citizens is an endeavour in which every section of the community must feel involved. Doctors

are leaders in this movement. But ultimately it is the people's cooperation which counts. The importance of voluntary organisations cannot be over-emphasised. I am glad that your agenda includes a discussion on the role of non-governmental organisations in the promotion of health care. Voluntary agencies should be enabled to contribute their fullest share to complement governmental efforts.

International understanding

Each country has special problems and must devise its own strategies. But there is also a range of activities in which the facilities and experiences, accumulated by individual countries, can be useful to all. A number of international forums are now encouraging cooperation in health and medical research. Amongst developing countries themselves there is a strong desire to take up projects of technical cooperation. The Government of India supports such programmes and will do whatever is possible, and is agreed upon, bilaterally and multilaterally.

We wholeheartedly support the objective of Health for All by 2000 A.D. which has been enunciated by the World Health Organisation. 2000 A.D. is less than 200 months away. We must have a detailed assessment of the progress made so far, the effectiveness of the strategies adopted and the further steps to be taken. Our policies must be resilient and sensitive to constantly changing circumstances.

The discoveries of science open out new avenues for deeper international understanding and for prosperity for all. But our use of science depends on the wisdom of the world's leaders and the choice of its peoples. Our future lies in our own hands. We are all part of the world community. Cooperation at every level will bring about the understanding necessary to ensure a future which is free from fear and in which knowledge and its benefits are within the grasp of all people..." △

CONTINUED PROGRESS TOWARDS "HEALTH FOR ALL"

The unflinching commitment of Member States to the universal goal of "health for all by the year 2000", has resulted in concerted efforts, at the national level, to translate this goal into meaningful reality. This is stated by the WHO Regional Director for South-East Asia, Dr U Ko Ko, in his Annual Report for 1983-84, presented to the 37th session of the Regional Committee which was held in New Delhi from 18-24 September, 1984. We publish below the highlights from the Report.

IN his review of health developments in the Region, Dr Ko Ko expressed satisfaction at the good beginning made but cautioned that there was still a long way to go before reaching the goal in the relatively short time available.

The active involvement of national health administrations in the work of WHO had been a source of strength and direction, helping in the formulation and implementation of WHO's supportive actions. Member Governments were assuming greater responsibilities for WHO programme management for which appropriate mechanisms had been refined and streamlined.

The Report referred to the efforts made by the countries to streamline health planning concepts and methodologies and consequent improvement in the health planning process. This had resulted in the establishment of health planning cells in the Ministries of Health in most countries of the Region. There was, however, an obvious weakness in these cells as most did not have a core group of multidisciplinary experts, including a health planner, economist, operational research specialist, systems analyst and social scientist. WHO's collaborative programme was aimed at bridging this gap by training appropriate personnel to build up this essential core group.

National managerial process for health development

With difficulties regarding primary health care implementation getting better defined, it was becoming more evident that the national managerial process for health development will also have to tackle, on a priority basis, such apparently routine problems as inadequate service, staff performance and staff supervision, poor logistic systems, weak reporting systems and inadequate communication and feedback between various echelons of the health services. Considering that these apparently simple problems were seriously jeopardizing health programmes, which often failed to produce a health impact commensurate with the level of resource inputs, the Report highlighted the importance of appropriate training in day-to-day handling of managerial problems.

Community involvement

Stressing the importance of community involvement in primary health care, the Report referred to the health activities planned and managed by the communities themselves in some countries of the Region. In this regard, the village-managed drugs supply co-operatives in Burma and Thailand and the health insurance scheme managed by communities in Indonesia were good examples. There was, however, a need for continuing effort through health services research to devise ways and means for ensuring community involvement in primary health care development.

Malaria

The Report stated that there was a perceptible decline in the number of cases of malaria in the Region as a whole, where nine countries were affected. The overall incidence had come down to one-third of what it was five years ago. The reduction however, had been at the expense of vivax malaria since control of more malignant falciparum malaria was often impeded by its tendency to become resistant to the usual anti-malaria drugs.

Plasmodium falciparum resistant to chloroquine was now present, widely or focally, in many districts of every malarious country of the Region except Maldives (where only *P. vivax* survives, to a very small extent), Nepal and Sri Lanka. In Thailand and parts of neighbouring countries, falciparum malaria was resistant also to the combination of pyrimethamine and sulpho-namide. While trials in Burma and Thailand were demonstrating that the new drug, mefloquine, was effective, it was imperative, the Report added, to control its production and use in order to prevent this promising compound becoming useless like its predecessors due to indiscriminate use.

As a step towards achieving the HFA/2000 goal, special attention was being paid to the control of malaria through the primary health care approach. The Report stated that the malaria control strategy, criteria and guidelines for integration and the training needs of the primary health care workers had been deliberated upon and a consensus reached through intercountry and national level workshops.

Diarrhoeal diseases

Though diarrhoeal diseases continued to be one of the common causes of death among infants and young children in the Region, the Report stated that control programmes had been implemented in 10 countries in the Region through the use of a simple, effective and inexpensive treatment—oral rehydration salts (ORS). The Organization had collaborated with the countries in planning the programme, in managing the implementation, in producing oral rehydration salts and in epidemiological surveillance.

Three regional training centres in Dhaka, Calcutta and Jakarta have been established to undertake extensive training activities in different aspects of the programme, namely epidemiology, laboratory diagnosis, clinical management and operational and management methods and practices.

Tuberculosis

The disease continued to be a major health problem among the chronic infectious diseases, affecting a wide range of different age groups in the Region. A new operational impetus had been provided to the control programmes by the progressive introduction of multi-drug, short-term regimens, which not only facilitated better supervision of the treatment at the community level through primary health care workers, but was

W.H.O. REGIONAL COMMITTEE OFFICE-BEARERS

The 37th session of the WHO Regional Committee for South-East Asia elected the following as office-bearers:

Chairman:

Shri C. R. Vaidyanathan
Secretary
Ministry of Health and Family Welfare
Government of India.

Vice-Chairman:

Dr S. D. M. Fernando
Director-General of Health Services
Ministry of Health, Sri Lanka

Dr H. Mohammad Isa, Director-General of Medical Care, Ministry of Health, Indonesia, was elected Chairman of the Technical Discussions which will deliberate on, "Innovations in primary health care within the community".

The Sub-Committee on Programme Budget of the Regional Committee elected as its Chairman, Dr Uthai Sudsukh, Deputy Permanent Secretary, Ministry of Public Health, Thailand.

cost-effective as well. The Report stated that this new treatment regimen was likely to raise the rate of cure of infectious cases close to 95 per cent. Already, this innovative treatment strategy had been introduced in Bangladesh, India, Indonesia, Nepal and Thailand in the national tuberculosis programmes integrated with basic health care delivered at community level. Further efforts, however, were needed for the improvement of early detection of new cases through direct sputum-smear examination and monitoring of treatment efficacy.

Leprosy

Of an estimated 11 million patients in the world, more than 5 million were in the WHO South-East Asia Region. The Report indicated that the prevalence rate in the Region was 5-15 per 1000 population. The registered patients accounted for 3.4 million, of whom nearly 60 per cent were taking regular treatment.

Social stigma continued to be one of the main obstacles preventing patients from reporting to leprosy clinics. Another problem was dapson resistance. WHO was continuing its collaboration with Member Countries to strengthen national leprosy services and in developing a revised strategy for programme delivery, including case-finding activities. The Report commended the fact that multidrug therapy as the most

effective treatment regimen and as a measure against dapsone resistance was increasingly being accepted by the Member Countries and introduced in areas where leprosy was prevalent.

Referring to the efforts being made under the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases for an immunizing agent, the Report stated that the actual introduction of a vaccine may take at least another 10 years. Under the circumstances, multidrug therapy was the best weapon against leprosy at present.

Dengue Haemorrhagic Fever (DHF)

Although the vector and other epidemiological factors conducive to transmission existed in other countries of the Region, DHF was endemic in Burma, Indonesia and Thailand only, but with potential risk of spreading to Bangladesh, India, Maldives and Sri Lanka. The Report stated that the Organization was supporting efforts of the WHO Collaborative Centre for Dengue Vaccine Development in Bangkok, to produce, test and eventually apply in humans a protective vaccine that will reduce both morbidity and mortality caused by the disease. The candidate vaccine was currently undergoing its first human trial in Thailand, and the initial results were expected to be assessed by the end of 1984.

Non-communicable diseases

Referring to the growing problems of oral and lung cancers in several countries of the Region, the Report stated that the smoking and chewing of tobacco has to be controlled more effectively. An important element in the development of this programme was the participation of the community through the primary health care approach. In India, Sri Lanka and Thailand, effort had been initiated using primary health care workers for the early detection of oral cancer and referral of suspected cases to appropriate centres for diagnosis and treatment.

In Burma, pioneering work on the prevention of primary liver cancer through the vaccination of high-risk infants and children against the hepatitis B-virus had been undertaken. The secondary prevention of

cancer through early diagnosis of the tumour, specially applicable to cancers of the oral cavity and the cervix uteri, was being carried out in India and Thailand. The use of chemotherapy against a number of malignant tumours and pain-relieving drugs in advanced cases of cancer had also been practised in a number of countries.

The importance of healthy life-styles—including abstention from smoking, intake of low-fat diet, regular physical exercise, avoidance of obesity, control of hypertension—in the prevention of ischaemic heart diseases had been recognized and steps taken to disseminate such knowledge throughout the Region. A programme on the prevention and control of rheumatic fever/rheumatic heart diseases was also being developed.

The programme for the prevention of blindness had gathered further momentum. Many Member Countries had carried out population surveys on the prevalence and causes of blindness as a preliminary step to the formulation of national plans. The Report stated that while curable blindness caused by cataract, which continued to be the major blinding disease in the Region, was being tackled through the eye-camp programme, steps to prevent other eye-health problems like blinding malnutrition, infections including trachoma and the emerging problem of posterior segment blindness including glaucoma, were being intensified.

Looking forward

Though the problems facing the Member Countries in their health development activities were enormous, the Report was optimistic that with the enthusiasm and commitment that existed in the countries, all obstacles would be successfully overcome, provided that necessary support was forthcoming from appropriate national and international sources. In this context, special mention was made of the support received from the United Nations agencies like UNDP, UNICEF and UNFPA, several multilateral and bilateral organizations and a number of non-governmental organizations in helping the Member Countries in their march towards health for all. Δ

INDIA AND INDONESIA TO REPRESENT ON HEALTH RESOURCES BODY

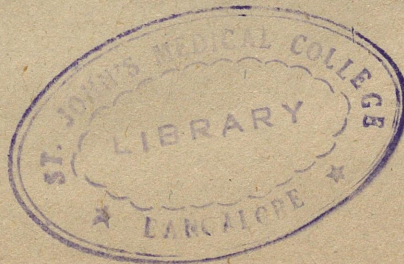
India and Indonesia have been nominated to represent the countries, which participated in the Regional Committee meeting of South—East Asia Region of W.H.O., on the Health Resources Group of the World Body. This decision was taken by member countries in the 37th Meeting of the Regional Committee for S.E.A.R. of W.H.O. which was held under the auspices of the Regional Office of the W.H.O. at New Delhi.

The Health Resources group is responsible for highlighting the resource needs of the health sector within the total resource requirements of the region, for the Aid Consortium which reviews aid requirements for aid pledging.

Strategy to generate and mobilise all possible resources—human, material and financial—including the international transfer of resources forms an inseparable part of the global strategy for Health for All by 2000 A.D., which was adopted in May 1981 by the Thirty-fourth World Health Assembly at Alma Ata. The Health Resources Group works to support developing countries in the mobilization of resources for health development, through assistance in preparing proposals for external funding for health and taking appropriate measures to identify external resource requirements in support of well-defined strategies for health for all, in matching available resources to such needs, and in rationalising the use of such resources. —PIB

December 1984

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Research helps to tackle field problems faced by programme officers. Research and programme cannot, therefore, function in water-tight compartments and have to go hand in hand in their pursuit of Health for All.

Coordination between research and health, nutrition and family welfare programmes

C. R. VAIDYANATHAN

THE role of science in poverty alleviation is well recognised. Scientific research is the means by which science can be applied for solving the problems of growth and development. Our plans aim at an integrated or comprehensive development with a view to raising the people's standard of life. This implies development in the social sector also of which Health is an important component. The target of "Health for All by the year 2000 AD" was unanimously adopted by the Thirtieth World Health Assembly, and the Alma Ata Declaration of 1978 stressed the importance of primary health care in attaining this goal. Our own National Health Policy which was approved of by Parliament in 1983 echoes the World Health Assembly's call and the 'Alma Ata Declaration' in as much as it not merely identifies the health indicators but specifies the targets to be achieved in respect of the various health indicators by different dates such as 1985, 1990 and 2000. Health does not merely connote an absence of illness but signifies a positive state of health, physical, mental and social, in which every individual would find it possible to lead a meaningful and purposeful existence. Our National Health Policy, therefore, aims at the provision of promotive, preventive and rehabilitative health care to the people through the Primary Health Care approach. The National Health Policy, in this sense brings about a shift in emphasis from the hospital based medical cure to the rural oriented health care and in short, from the urban to the rural health services. Our research efforts should therefore be attuned to the attainment of these objectives. The

research must be goal-oriented and need-based in order to yield results in the short term. It is useful to recall, at this juncture, the distinction that is commonly drawn between basic or fundamental research and applied research, since this has obvious implications for the interaction between the national research institutes and the State Governments or State research organisations. Resources not being unlimited, we have to see that the research efforts are so organised as to optimise the gains. This would imply that unnecessary duplication should be avoided, particularly in basic research which can be best done in the national research institutions. But applied research needs to be carried out widely indifferent socio-cultural conditions and the State institutions are, therefore, to render a very useful and necessary service in this regard.

Science and technology

Indian Council of Medical Research (ICMR) is our principal Research Organisation and the ICMR has set up a number of specialised institutes as well as regional institutes or centres. Special mention must be made of the National Institute of Virology, Pune, Institute for Research in Reproduction, Bombay; National Institute of Occupational Health, Ahmedabad; National Institute of Pathology, Delhi; National Institute of Cholera and Enteric Diseases, Calcutta; Tuberculosis Research Centre, Madras; the Vector Control Research Centre, Pondicherry; the Malaria Research Centre, Delhi; the Central Jalma Institute for Leprosy, Agra and the Cyto-



The National Health Policy has brought about a shift in emphasis from the hospital-based medical care to the rural-oriented health care.

logy Research Centre, New Delhi. ICMR has also set up Regional Research Centre at Bhubaneswar, Dibrugarh, Jabalpur, Belgaum, Jaipur and Port Blair, besides a Desert Medical Research Centre at Jodhpur. There is a close coordination between the Ministry of Health and Family Welfare and the I.C.M.R. The problems faced by the Health Programme Officers and the State Governments are posed to the I.C.M.R.

which furnishes the expert advice to the Ministry and the State Governments for tackling particular situation. It would be worthwhile recalling at this point the outbreak of Shigellosis in West Bengal and a few other States and the help rendered by the National Institute of Cholera and Enteric Diseases in isolating the strains and in identifying their characteristics, such as drug resistance, responsiveness, etc.

Similarly, the National Institute of Virology, Pune helped the Government of Karnataka in dealing with the outbreak of Kyasanur Forest Disease and in developing a vaccine against this disease as also the Government of Gujarat in tackling the outbreak of Viral B. Hepatitis in an epidemic form. I would, therefore, wholeheartedly support the call that the State Governments may activate their Science and Technology Councils to coordinate research and health programmes and give an impetus to the science and technology activities in the States.

Against this background, I would like to delineate the principal areas which require attention on the part of the Central and the State Governments.

Research in terminal methods

Population stabilisation is amongst the high priority items of the Ministry of Health and Family Welfare. The National Health Policy sets the goal of achieving a Net Reproduction Rate (NRR) of 1 by the year 2000 A.D. by ensuring a birth rate of 21 and a death rate of 9 per 1,000 population resulting in an annual growth rate of 1.2%. The National Health Policy sets an intermediary goal of a birth rate of 27 per 1,000 population and a death rate of 10.4 leading to an annual growth rate of 1.6% by the year 1990. Terminal methods of sterilisation like vasectomy, Tubectomy and laprascopy as well as spacing methods including the I.U.Ds, oral pills and condoms constitute the range of services that we have so far provided for ensuring the effective couple protection rate of 60% by 2000 A.D. and an intermediary goal of 42% by 1990 which are expected to result in the targetted birth rates. As time passes, we would have to rely more and more on spacing and reversible methods rather than on the terminal methods. In this context, scientific research in other countries have given us a further lead in the shape of long acting injectables and sub-dermal implants. I.C.M.R. is presently conducting research into one kind of long acting injectable, namely, Net-En and this is likely to be introduced in the Family Welfare Programme during the current year. The Ministry is requesting the ICMR to conduct research into the other kind of long acting injectable, namely DMPA also, in view of the fact that DMPA has been widely accepted and is being used in more than 80 countries of the world. Similarly, sub-dermal implants which can give protection to the women from 3 to 5 years are also under study by the I.C.M.R. The National Institute of Immunology under the Department of Science and Technology is engaged in the development of a contraceptive pill or vaccine for the male.

Maternal and Child Health

The extent of acceptance of the small family norm would be a function of the rate of child survival. Infant mortality rate which was more than 200 per 1,000 live births in the pre-independence era, has now come down to 114 per 1,000 and the target is to reduce it further to a level of not more than 60 per

1,000 live births by the turn of the century. The maternal and child health services are, therefore, an integral part of the Family Welfare Programme and the two principal constituents of the MCH programme are the supplementary nutrition and the immunisation programme. Presently, our immunisation programme covers only 5 diseases, namely, Diphtheria, Pertussis, Tetanus, Poliomyelitis and T. B. Central Council of Health has recommended the inclusion of measles also in the immunisation programme and this is expected to be given effect to within the course of a year.

Iron and folic acid tablets for the pregnant mothers who suffer from chronic anaemia and the administration of Vitamin 'A' to the children to prevent visual impairment form an important part of the MCH programme. The Ministry of Social Welfare has other nutrition programmes for the children to make good the deficiency in calories and nutrients.

Talking about the immunisation programme, we have to take into account the need to adopt modern technology for self-reliance in vaccine production. Cell technology has now come to be accepted for large scale vaccine production to meet the requirements of universal programme of immunisation. The production of antirabies vaccines based on viro cell technology has been established at the Pasteur Institute of India, Coonoor, on a laboratory scale. This has now to be upgraded for commercial production through the acquisition of zonal centrifuge and other equipments. The Department of Science and Technology is also seized of the question of setting up a new centre for vaccine production based on cell technology. We, therefore, expect that we will be self-reliant in vaccine production by 1990 by which time we hope to cover all the children upto 12 months of age in our programme of universal immunisation.

National Programmes

Control of Communicable Diseases is another major thrust area. We have identified a number of diseases and chalked out control/eradication programmes over the successive plan periods. Successful implementation of the programmes, coupled with introduction of appropriate health care delivery system, have resulted in eliminating certain diseases like small-pox and plague and bringing down the incidence of certain diseases like malaria and diarrhoeal diseases. However, inspite of this, there are a large number of communicable diseases which are responsible for considerable morbidity and mortality. Mention may be made in this connection to the communicable diseases like tuberculosis, leprosy, filaria, guinea-worm and sexually transmitted diseases as well as certain non-communicable diseases like goitre, blindness, cardiac diseases, etc. National Programmes have been launched for the eradication for Leprosy and for control of T.B. Blindness and Malaria. In order to implement these programmes successfully it is necessary to launch operational research in collaboration with all the States and the Union Ter-

Swasth Hind

State Governments may activate their Science and Technology Councils to coordinate research and health programmes and give an impetus to the science and technology activities in the States.

territories in areas like organisation, delivery of services, manpower development, alternative strategies, etc. Very recently we had done a review in our Ministry about the manner in which such programmes are continuing and what should be our approach during the Seventh Plan period. It is our view that the On-going diseases control programmes like malaria, filaria, tuberculosis, leprosy, diarrhoeal diseases and poliomyelitis, etc., should be continued and strengthened to benefit a large segment of population who are affected by such diseases and the possibilities of introducing innovative measures and appropriate technology in such control programmes should be examined. We also feel that diseases which could be eradicated or reduced to a great extent with the existing technological knowledge, e.g., guinea-worm, goitre, etc., the intervention programmes should be taken up on a wider scale. Scientific research has shown and there is an increasing awareness that we should depend more on environmental engineering to control malaria and filaria than on chlorinated hydrocarbons or organo-phosphorus compounds. Similarly, steps are afoot for iodisation of 100% of the edible salt manufactured in the country since that is the least expensive and the surest way of doing away with Goitre. To keep track of such diseases and to take appropriate preventive and curative action, it would be necessary for the States to evolve a system of epidemiological research and services and use them for effective implementation, monitoring and evaluation of various diseases control programmes. These again are areas where the technical inputs from the States would be most valuable.

Health Services Research

There is a great need of improving the health services themselves by undertaking special studies to provide for appropriate health manpower development. This can only be done if we undertake special health services research not only in the production of proper health manpower but by conducting research in the logistic of the delivery of health services. This is referred to as health service research and appropriately so since health service research must form an integral part of the health services both at the Centre as well as in the State.

Public Health Engineering

Lastly, there is a vast inter-action between public health and engineering sciences and that it would be of immense value to explore this interface through carefully selected studies. Public Health Engineering is a well-known area which needs to be considerably strengthened in our country in view of its relevance to the solution of several of our major public health problems. The whole field of environmental sanitation and provision of safe water supply would be dependent on technologies that will be low in cost, will depend upon local materials and skills and will address directly to our practical problems in rural and urban areas. There is yet another aspect to the interface between the public health and engineering sciences. This relates to the health implications of certain major developmental projects like irrigation projects or hydro-electric projects, requiring the impounding of vast quantities of water. This may, if precautionary steps are not taken, tend to create conditions conducive to the breeding of vectors transmitting major parasitic and virus infections. In our country today we are witnessing major changes in the epidemiology of these water-related diseases. Therefore, this is yet another area where we have to focus our attention and coordinate the efforts between the State and the Central agencies.

Health is a vast and an expanding area. During the course of implementation of the programmes, a number of problems are bound to crop up which could either delay or impede the progress implementation. New problems tend to emerge as the old ones are solved. A continuous monitoring is, therefore, essential and while the programmes are being monitored, the issues that come up are required to be solved in the field situation. For this purpose, it is essential that the health services are adequately geared to undertake operational research in the field. Research helps to tackle field problems faced by programme officers. Research and Programme cannot, therefore, function in water-tight compartments and have to go hand in hand in their pursuit of Health for All.

—Based on a speech delivered by the Secretary, Ministry of Health and Family Welfare, at a meeting held to discuss the Development of Science and Technology in the States on 30 August, 1984, in New Delhi.

NEWER METHODS OF BIRTH CONTROL —which is best for you?

PROF. VERA HINGORANI

INCREASING number of people are beginning to realise that for the welfare of the family and the nation; the family should be of small size. Welfare of the family should include good health, good living and good education.

What should be the optimal size of the family?

Our slogan "we two and our two" appears to be appropriate irrespective of the sex of the children. Our constitution does not discriminate between the two sexes and we all should collectively endeavour and see that this discrimination between the sexes that exists in our social system is removed.

How to keep the family of a small size?

Just as we protect ourselves from nature, i.e., from rain, heat and sun with umbrella, clothes and house, the same way we can protect ourselves from unwanted children by using effective and reliable methods of birth control which are available now.

What should be the age of marriage?

For the girls, age between 20-25 years is appropriate for marriage as by then growth is fairly complete. Though some, who for academic reasons have delayed it further, may not have really suffered much because of the delay.

What is the best age to have the children?

Between 20-30 years is the best time for women to have their two children and preferably the first one should be born between 20-25 years, as everything is favourable for the first delivery during that time, though for any particular reason if it is to be postponed, then with good care, results can be almost as good.

What to use to delay the first child?

When a woman gets married around the age of 20 years and does not want to have the first child for a few years, what will be the best contraceptive? If she is interested to have something that is foolproof and practically 100% effective, then she should take the oral contraceptive pill regularly, i.e., a three weeks

course of one pill daily, starting on the 5th day of the menses. After three weeks course she has to stop it for one week. During that time she will have the menses and then she starts again on the 5th day of menses. She has to strictly follow this schedule, as forgetfulness to take a pill can lead to conception. This risk can be reduced if missing a single pill is made up by taking two pills the next day. However, for all women this method may not be advisable as a blanket precaution as there may be certain contraindications to the use of the pills in the following conditions:

- (1) Known cases of heart disease or epilepsy.
- (2) Recent Jaundice.
- (3) Patients with diabetes or high blood pressure or kidney disease.
- (4) Patients with history of thrombosis.
- (5) Patients with menstrual disorders—heavy or scanty or irregular periods.
- (6) Any malignancy.
- (7) Any other major medical or surgical problem.

It is advisable to have a consultation with a Gynaecologist before starting this contraception (the pills) and then see the doctor periodically, i.e., yearly. Periods tend to become scanty after the pills, and if they stop altogether then doctor should be consulted and another method may be adopted.

What is the alternative method available for the persons for whom the pill is not suitable and also for those who may not be keen on 100% effective method? Such couples can practice the use of the conventional methods, i.e., condom for man with spermicidal jelly for the wife, or use of diaphragm for the woman which is used alongwith the spermicidal jelly. These methods when used in safe period with practice of abstinence in the dangerous (fertile) period, can be highly effective contraceptive methods. Since the use of condom does not require doctors to do the fitting, as is required by diaphragm, condom therefore remains the most common though least effective method of contraception. In Western countries, where there is lot of promiscuity, even smaller

intrauterine devices have been developed for use by women wishing to postpone the first pregnancy. We do not recommend this, and advise this only to women who have proved their fertility with at least one child, because of the small risk of infection which is associated with the use of this device. This may sometimes cause infertility.

What contraceptive to use after the first child or after any delivery for purpose of spacing?

Breastfeeding is encouraged for all mothers as it is not only good for the mother but also for her baby. Breastfeeding apart from reducing the risk of cancer breast and cancer body of the uterus, also works as effective contraceptive method for initial 3-6 months, specially for mothers whose babies receive only mother's milk and are fed frequently (2-3 hourly). However, to play safe, contraceptive protection is required and for practical purpose intrauterine contraceptive device, inserted 8-10 weeks after delivery, will give her good protection. This is considered as best contraceptive at this time, as while she is breastfeeding, she may not be menstruating and by the time she weans the baby or starts her periods after delivery, the device has nicely settled down and does not cause excessive bleeding which otherwise is one of the common side effects of intrauterine device. Alternatively, if she prefers to have hormonal contraception, she can take the pills but only after the baby is six months old. She could also take two monthly *Net* injections which are available at large centres after she has resumed the menses. Condoms with cream or diaphragm with cream, available at all centres, may be used during the time before intrauterine contraceptive device (IUCD) is fitted or hormonal contraceptive is started, or may be used only as a third choice.

Vasectomy or Tubectomy—Terminal Methods of Contraception

For all practical purposes, vasectomy is a simpler, smaller operation done under local anaesthesia as outdoor procedure when a man can walk in for it and walk out after it. World Health Organisation (WHO) studies have shown that the men who had vasectomy performed 10-20 years earlier were in better health than the control group of men of the same age, who had not had this procedure. In spite of

these facts, in our country, except in 1976, more woman who menstruates regularly i.e., every 28 days, are highly motivated to go through it, as it is they who suffer the inconvenience and the risks of unwanted pregnancy. The operation can be done after delivery or after abortion, or as an interval method. As an interval method or when combined with the abortion procedure, laproscopic operations have been quite popular.

Safe period or 'Belling Method'

Idea of safe period is based on the fact that in a woman who menstruates regularly i.e., every 28 days, her ovum is formed around 14th day from the 1st day of the menses. Since ovum can live only for 24 hours and if she can avoid sex for a period of one week, that is *three days before and three days after the ovulation*, perhaps she may escape getting pregnant, even though she has sex at any other time without using any other contraceptive method. In Belling Method, she begins to recognise the formation of the egg which is associated with clear mucoid vaginal secretion. This method has *rather high failure rate* as, firstly, it calls for abstinence during the critical period. Secondly, some common vaginal infections can effect the nature of vaginal discharge. In highly motivated women good results have been claimed in "Belling Method."

New methods in contraception presently under trial

These are likely to be available for general use in near future.

1. Net INJECTION—monthly or two monthly.
2. NET with Estrogen injection—monthly.
3. NORPLANT—expected duration of use 3-5 years.
4. Hormone containing vaginal rings for use—1-3 months.
5. Hormone containing IUD.
6. IUD with larger amounts of Copper than Copper T device to last longer and IUD with silver.

New methods that may be available in distant future

1. Vaccine for female.
2. Vaccine for male.
3. Hormone preparation for male.
4. Hormones to be administered in minute doses by nasal spray for both male and female.
5. Device in vas for male. △

HEALTH AND FAMILY PLANNING

—Some facts

Poor health of women, complications of pregnancy and childbirth, low birth weight as well as general malnutrition and infection are to blame for globally high levels of newborn, infant, early childhood, and maternal mortality and morbidity. All these conditions are strongly affected by fertility patterns. They do not occur in isolation, but in the context of poor socio-economic situations with scarcity of education, health and other social services. Family planning through appropriate timing, spacing and limitation of number of pregnancies, can promote the health and well being of the family, and also reduce the risk of ill health and death for mothers and children.

WOMEN are the main victims of unregulated fertility. Maternal mortality rates—the risk of dying from pregnancy—related causes—vary greatly in different parts of the world. In Europe today, the rates are as low as six per 100,000 live births compared to rates up to 1,000 per 100,000 live births reported in parts of Africa and Asia. Moreover, not only do women in the world's poorest countries undergo the highest risk of dying from a given pregnancy—due to their own poor health and to the lack of appropriate care—but they also undergo this risk more frequently and over a longer period of their lives than women in developed countries. Without family planning they will continue childbearing for 20 or even

25 years, while women in industrialized countries typically have two or possibly three children spaced over five or ten years. Unregulated fertility, high rates of illegal abortions, and partial or total absence of care during pregnancy and childbirth are main reasons for the fact that every year over half a million women in developing countries die during pregnancy and childbirth, leaving at least one million children motherless. Most of these maternal deaths are preventable and family planning has a crucial role to play in this prevention.

Family planning and maternal health

One of the indicators of women's health status is nutritional anaemia.

About one half of non-pregnant and two thirds of pregnant women in developing countries (excluding China) suffer from nutritional anaemia, a syndrome often caused by a combination of malnutrition, infection and almost continuous childbearing. Too closely spaced births do not allow the woman's body to recover from the strain of pregnancy, childbirth and breastfeeding. Furthermore, a short interval between births means that the woman will have to care for three or occasionally even four children under five years at the same time—with deleterious effects on her and the whole family.

Family planning decreases deaths from illegal abortion

Illegal abortions kill up to 200,000 women a year and permanently injure the health of countless more. When couples have access to effective methods of contraception, women do not need to resort to dangerous illegal abortions in order to control their fertility.

Birth spacing reduces child death rates and improves child health

Recent findings in several developing countries confirm that children



Family Planning plays a crucial role in reducing the risk of ill health and death for the mother and the child.

born after intervals of less than two years have a significantly higher mortality than children born after longer intervals. Children born less than one year after the end of their mother's last pregnancy are more than twice as likely to die than children born after an interval of two years or more. Estimates for developing countries show that if all births were spaced at least two years apart, infant mortality could be re-

duced by an average of ten per cent and one-to-four years child mortality by around 16 per cent. A significant proportion of infants born in developing countries are disadvantaged from birth through low birth weight, caused by the poor health and nutritional status of the mother whose condition has been aggravated by repeated childbirth. Infants born after a short interval since the mother's previous pregnancy are par-

ticularly prone to low birth weight. It is estimated that out of approximately 125 million annual births in the world, roughly 20 million are low birth weight (i.e. one in six births), with a higher risk of death and a lower potential for healthy growth and development.

Family size and the outlook for the health of mother and child

The number of children a woman conceives affects her chances of having safe and successful pregnancies and deliveries. From the sixth child on, prospects become less favourable with each additional pregnancy. Birth order is clearly related to infant and young child mortality. Children of birth order seven or more have mortality rates one-third higher than those of birth order two or three. Children of high birth orders are likely to be born to mothers who are older and physically exhausted. They will have to compete with older brothers and sisters for food, attention and love, and are often cared for by someone other than the mother, often an older sister. Children from large families often have more frequent illnesses and grow more slowly than those from smaller families.

Early and late childbearing have their dangers

Infant and maternal mortality are highest among teen-age mothers. Women who become pregnant while they are still adolescent have a much higher risk of complications during pregnancy and childbirth. These complications can injure their health or even cost them their lives. Fatal deaths are least common among children born to women between the ages of 20 and 35. Children

born to women who are teen-aged are at increased risk of premature birth and those born to women older than 35 run a much greater risk of birth defects and a higher risk of infant and maternal mortality. In some countries a considerable proportion of first births occurs to young women under 20. Postponing the first birth—whether by marrying at a later age or by suitable family planning—will greatly improve a woman's health status, pregnancy and childbirth become less hazardous, and give baby a healthier start in life, and mother a chance to mature physically, mentally and emotionally.

Breastfeeding helps to regulate fertility

In addition to its physiological and psychological advantages for the newborn baby, breastfeeding delays the return of fertility and thus lengthens the interval before the next pregnancy. In rural and traditional societies in the developing world, breastfeeding, especially 'on demand' feeding, actually plays a major role in spacing births. If it were to decrease greatly or disappear, the contraceptive services needed to compensate for that loss would be considerable. For example, if in one developing country with almost universal breastfeeding, the pattern of breastfeeding were to change to that typical of industrialized countries a few years ago to maintain fertility at current levels, a more than five-fold increase in contraceptive use, from nine per cent to about 52 per cent, would be required. Regarding individual families wanting to space or limit pregnancies, traditional methods such as breastfeeding have however to be complemented by the use of technically and culturally appropriate contraceptive methods.

Family planning also serves the infertile couple

In some parts of the world infertility affects a large number of couples, causing deep unhappiness. Family planning, as part of maternal and child health, has a role to play in enabling such couples to become parents. The purpose of family planning is not merely contraception, but is to help the couple to have the number of children they want, when they want them. This means also helping the infertile couples.

Family planning and the status of women

The status of women and in particular their level of education is closely related with fertility and mortality patterns. Quite apart from the possible health effects of family planning, the ability of couples to regulate their own fertility has opened the way for women to achieve the full and equitable participation in social and economic development that is their due.

The unmet need for family planning services

About 95% of the people in the developing world live in countries which provide some form of public support to family planning programmes, generally as part of maternal and child health programmes. Despite this, it has been estimated that there are about 300 million couples who do not want any more children but who are not using any method of family planning, chiefly due to inadequate access to services in the developing world especially in rural areas and urban slums. As always the poorest layers of the population are the last ones to be provided with social services. The primary health

care movement provides a unique opportunity to extend essential health care, including maternal and child health and family planning, to all families and communities and thus it enables millions of couples who would like to plan their families to avail themselves of the necessary advice and care. To be effectively used, modern methods of contraception not only need to be relevant to socio-cultural beliefs, customs and patterns but also have to be backed up by the health and medical services and supervision which primary health care services can provide, together with trust and confidence in health workers.

The unmet need for improved methods of fertility regulation

If women the world over were able to have the children they say they want, the crude birth rate would range between 16 and 28 per 1,000 population rather than the present range of 28 and 40. In many countries, couples use no method of contraception at all or resort to traditional methods and illegal abortion. Many modern contraceptive methods have some side effects, both real and perceived, but the health risks of unwanted and unplanned pregnancies to the mother and the child might be far greater than the risk of the side effects of these contraceptives. Nevertheless, many couples and some health workers are reluctant to use or recommend existing contraceptive methods. Accordingly, there are unmet needs for new and improved contraceptive methods, including improved oral contraceptives, long acting agents, vaginal rings, new barrier methods, modern male methods as well as improved methods for natural family planning. Δ

National Malaria Eradication Programme

The National Eradication/Control Programmes in respect of Leprosy, Malaria, Tuberculosis and Filaria are in operation in the country. We publish below the highlights of the achievements made during the Sixth Five Year Plan for implementation of the National Malaria Eradication Programme and the National Filaria Control Programme.

MALARIA continues to be a major public health problem. With the successful implementation of National Malaria Eradication Programme (NMEP) in

1958 the incidence came down in 1965 to only one lakh cases and deaths due to malaria were completely eliminated. Due to various factors, these achievements could not be maintained and in 1976 country reported 6.46 million cases.

Keeping in view the resurgence of malaria the Government of India decided in October 1976 on a modified plan of operation for NMEP to control the disease and the same has been implemented from April 1977.

Since the implementation of the modified plan of operation there has been a gradual downward trend in the case incidence in the country as evident from the following table:

Year	Blood slides examined (in million)	Total incidence	<i>P. falciparum</i> cases	No. of deaths
1976	55.98	6467215	753713	59
1977	57.01	4740900	461484	55
1978	60.46	4144385	548567	74
1979	61.42	3064697	558423	198
1980	66.98	2896000	586438	207
1981	67.30	2679795	583268	170
1982 (prov)	62.64	2160447	538640	187
1983 (prov)*	55.06	1677954	420436	175
1984**	57.41	1987015	460963	

*As report received upto 31-1-1984

**Corresponding period.

From the above table it will be seen that there is substantial reduction in both malaria incidence in general and *P.falciparum* type of malaria in particular. However, a few States and Union Territories have shown some increase in total incidence as well as *P.falciparum* in 1983 in comparison to the previous year according to reports received upto 31 January, 1984.

There is an overall decline of 15.56% and 8.80% in total cases and *P.falciparum* cases respectively during 1983 over the the corresponding period of 1982.

However, there is a decline of 74.05% and 44.22% in the total cases and *P.falciparum* cases respectively during 1983 as compared to 1976.

Steps to control malaria

To contain the transmission of malaria indoor residual insecticidal spray has been carried out in areas where Annual Parasite Incidence (API) is 2 and above (2 cases or above per 1000 population per year). Stress has been laid on regular fortnightly surveillance in all malarious areas of the country. To deal with vector resistance to insecticides, entomological teams in the zones are engaged in finding out alternative solution to the problem. Laboratory services have since been decentralised at Primary Health Centre level for prompt examination of blood smears and institution of treatment without any time lag. Early detection and treatment of malaria cases and to prevent death due to malaria, number of drug distribution centres and fever treatment depots are functioning. Surveillance and spray staff have been/are being augmented as per increase in the mid-year population.

In the last Malaria, Filaria Workers Conference held in New Delhi on 28, 29 and 30 December, 1983, the States were requested to take prompt remedial measures wherever there is abnormal increase in the malaria cases. In the deliberations, State representatives were requested for effective implementation of Modified Plan of Operation in case finding and treatment and particularly good residual insecticidal coverage in time, to control *P.falciparum* containment programme with the help of SIDA/WHO assistance.

Research

Six monitoring teams are working in several parts of the country to identify the *P.falciparum* sensitivity to chloroquine. One team is working to undertake testing of alternate drug wherever resistance to chloroquine has been detected in the *P.falciparum* strain. In established *P.falciparum* chloroquine resistance areas the drug regimen has been changed and cases are now being treated with alternative drug like combination of Pyrimethamine and long acting sulpha.

People's cooperation

Under the modified plan of operation, health education has been made an integral component to seek public cooperation. The Village Health Guides are already involved fully in the anti-malaria work.

Training

To implement the modified plan of operation training in malariology has got paramount importance. The National Institute of Communicable Diseases, Delhi, is conducting Malariology and Malaria Entomology courses for the officers engaged in anti-malaria work in the district and above. Short course of 10 days re-orientation training under group educational activities has been organised from 16 January, 1984 at NICD for the Senior Officers of the States and other organisations like Railways, Armed Forces, etc.

Budget

On the decision of National Development Council during 1979-80 NMEP which was a 100% Centrally Sponsored Scheme (Category I) since IV Five Year Plan, was made as Category II Centrally Sponsored Scheme, 50:50 fund sharing basis between the States and Central Government. The programme has suffered due to this strategy of funding in the proper implementation in some of the States due to inadequate provision of matching share for purchase of insecticides, vehicles and spray pumps, etc., resulting in inadequate spray operations. Constant vigil by concurrent and consecutive supervision of spray, case detection and treatment could not be made effectively because the mobility of the supervisory staff was restricted for want of roadworthy vehicles.

Realising the difficulties of the States for the procurement of costly insecticides like malathion, the Government of India has decided to provide the entire quantity of malathion to the States and the cost of which will be 100% liability of the Central Government.

According to the revised pattern of sharing of budget 50:50 between the Centre and the States, all imported insecticides, anti-malarials, equipment, DDT, BHC, Malathion, Diazinon Drugs and Microslides are to be procured by the Centre whereas the State Governments will have to meet from their share of allocation for entire operational cost, sprayers and vehicles.

Urban malaria scheme

While intensive efforts are initiated for the control of malaria at the national level, the present plans are not adequate for the control programme in urban areas. Analysis of information in respect of the recent past years reveals that the rate of malaria incidence in urban areas is high. Activities necessary for adequate control of malaria in the urban areas could not be carried out by the local authorities due to shortage of manpower and lack of adequate training, equipment, appropriate operation strategy and funds.

It has also been observed that the incidence rate in urban areas is high among the labour force, who are basically seasonal and consisting of rural people migrating to urban areas for employment in various developmental activities like industries, constructions, etc. As a result of periodic migration of these people, urban/rural transmission of malaria exists. This created a malaria problem in the urban areas of the country since 1965.

Therefore, the control of malaria in the urban areas was thought of an important strategy as a programme complementary to the National Malaria Control Programme for rural areas.

Under the modified plan operation, it was decided to initiate anti-larval and anti-parasite measures to abate the malaria transmission in urban areas. This scheme was approved and covered under the scheme in a phased manner.

The expenditure on this scheme is treated as plan expenditure in centrally sponsored sector. The Central assistance under this scheme initially was treated 100 per cent grant to the State Government in kind and cash. However, from 1979-80, the expenditure on this scheme is being shared between Centre and State Governments on 50:50 basis.

The total number of towns sanctioned till now under this scheme is 131 and this scheme covers a population of 553.19 lakhs.

National Filaria control programme

Filaria is major public health problem in the country. All the States/Union Territories except Jammu & Kashmir, Himachal Pradesh, Delhi, Chandigarh, Punjab, Haryana, Meghalaya, Arunachal Pradesh, Sikkim, Rajasthan, Tripura, Mizoram and Manipur are endemic for filariasis. Present estimates indicate that a population of about 304 million is living in known endemic areas of which about 82 million are in urban areas and the rest in rural areas.

(Contd. on page 312)

Ultrasonic Tissue Characterisation in Cancer Diagnosis and Management

DR J.C. BAMBER

This article presents a personal view of some of the work conducted at the Institute of Cancer Research at the Sutton branch of the Royal Marsden Hospital, London, towards the development of ultrasonic tissue characterisation methods and the investigation of their use in the diagnosis and management of cancer.

ULTRASONIC tissue characterisation (UTC) is a term that has most commonly been used to classify the area of research that seeks to enhance the identification of tissue abnormalities by the processing of received ultrasonic data, often by means of established signal and image processing methods. In the approach described, the use of ultrasonic signal processing to aid diagnosis represents one method for, and one possible consequence of, providing a description or histogram of tissue structure or function in terms of ultrasonically measurable characteristics.

The description, or "characterisation", may then be used to improve diagnosis or for various other aspects of clinical management of malignant disease—such as assisting in staging, making a prognosis, or predicting and monitoring response to treatment.

Much of the work has been directed towards improving the quality of images and data, and developing ideas for the objective classification and remote study of tissues. This has required parallel efforts, first in making basic measurements and developing a theoretical framework for a better understanding of the physics of the interaction of ultrasound and tissues; and secondly in the clinical implementation and trial of UTC procedures.

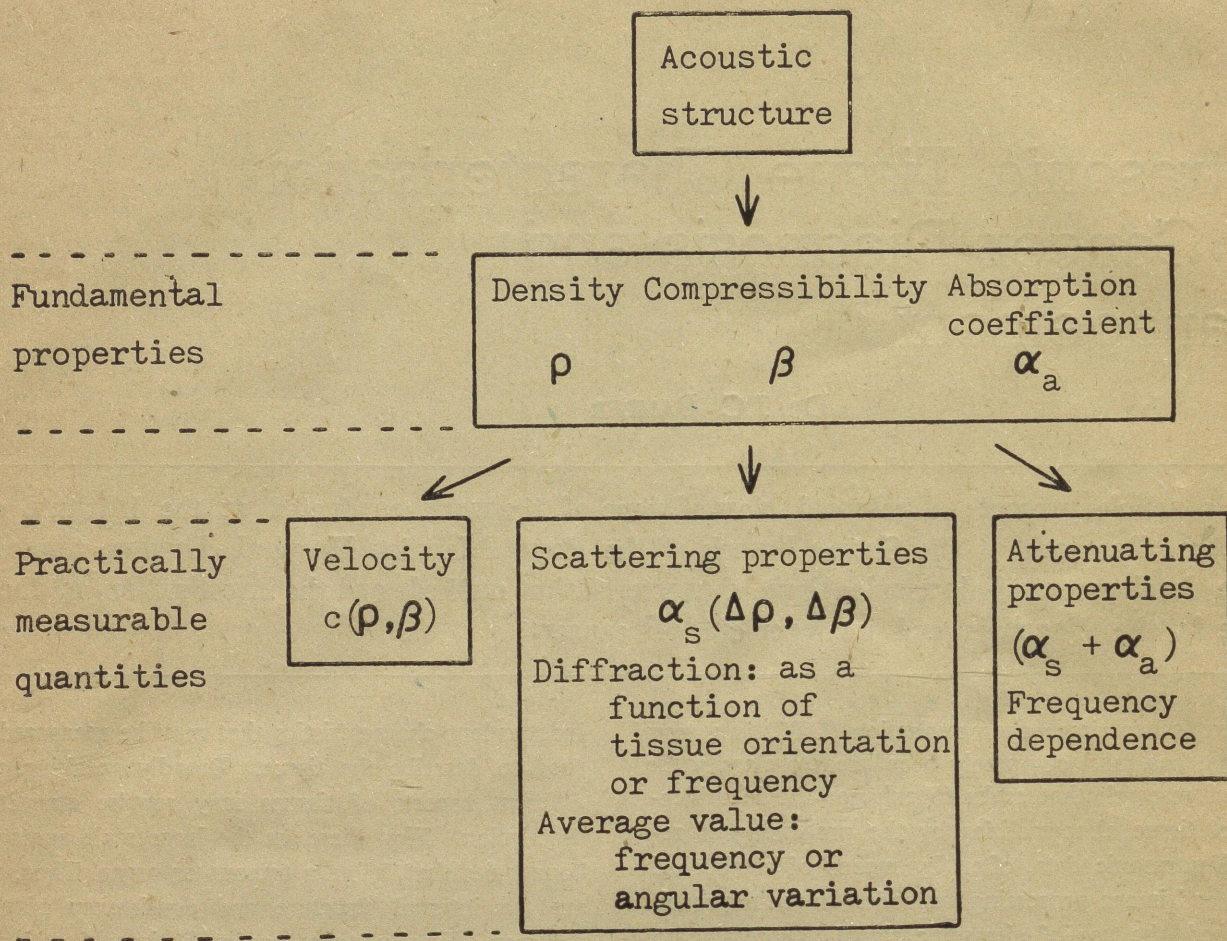
Ultrasound is a remarkable technique for the remote study of the body because of the number of relatively

independent characteristics that may be measured and used to describe the tissue. Broadly speaking, three different aspects of tissues may require quantitative description. First there are the large scale anatomical boundaries that define a tumour or organ. Then, there are the internal structure and consistency of tissue volumes. Finally, there are such tissue functions as the blood supply to an organ or tumour or the pattern of movement for an active structure—for example the heart. I shall first consider the problem of specifying the internal structure of organs and tumours, and return later to the other two aspects of UTC.

Components and their organisation

Structure may be generally defined as including both the components of the material that is under investigation and their organisation. The particular aspects of the tissue structure observed will depend on the radiation used for observation—particulate, electromagnetic or acoustic—its wavelength and amplitude, various external physical variables such as temperature, and the propagation characteristics selected. It is reasonable, therefore, to speak in terms of an acoustic (as opposed to optical) structure, referring to all aspects of the tissue structure that may be observed by means of sound waves.

Fundamentally, if the sound is assumed to propagate in a linear fashion, the acoustic structure should be



Schematic illustration of the relationship between measurable ultrasonic characteristics of tissues and the true acoustic structure.

specified in terms of the spatial variation, in density, compressibility and absorption coefficient. In practice, however, the most basic ultrasonic propagation characteristics amenable to direct measurement in vivo are the speed of sound, governed by density and compressibility; the scattering properties resulting from variations in either the density or the compressibility, which together embody the impedance function; and the attenuating properties, governed by absorption and scattering, of the medium (Figure above).

Each of these has the potential for providing information about, and for creating an image of, the tissue structure. Prior to the introduction of ultrasonic imaging, clinical experience had been chiefly concerned with tissue structure as observed by electromagnetic radiation at both optical and X-ray frequencies. Nevertheless, people quickly learned to interpret grey scale ultrasound B-scans, partly through experience but lar-

gely due to the fortuitous fact that differences in optical structure often correspond to differences in acoustic structure. Sadly, this is not always true. As shown by some in vitro studies of B-scan appearances and acoustic scattering and attenuating properties of metastatic carcinoma of the liver, a significant number of such lesions may well be missed on routine clinical investigation because there is insufficient acoustic contrast between the tumour and the background.

One of the main functions of research in UTC is to provide the data for establishing these processes, in terms of the acoustic structure, which will make it possible to recognise and monitor changes in tissues and their diseased states. A second major task involves the development of techniques to make the required measurements in vivo. Indeed, in the above mentioned in vitro studies, it was found that the most useful characteristic for distinguishing secondly car-

cinoma from normal liver was the speed of sound, but methods for producing images of this parameter in the liver are not clinically available.

Systematic studies

Another important question to be answered for various tissues and propagation properties involves defining the particular tissue components, and the aspects of their organisation, that are of greatest importance in determining the measured properties. Systematic *in vitro* studies, which we are still pursuing, have shown that the average back-scattering cross-section per unit volume, sound speed and attenuation coefficient of normal and abnormal liver tissue are all determined predominantly by the water content (being inversely related to the total protein), to a lesser extent the fat content, and to a very small extent the collagen content.

The nature of the dependencies observed, however, is such that much better structural classification would be achieved from the use of sound speed on the other two parameters, than by using any one parameter alone. For breast tissues, however, the proportion of fat and the number of fat/non-fat interfaces are the major determining factors. Furthermore, speed of sound values appear to map the fat content, while the attenuation and scattering parameters tend to map the number density of tissue interfaces, highlighting two relatively independent aspects of the tissue structure. These data also suggested that, depending on the frequency and temperature at which the observations are made, selective enhancement of specific aspects of the tissue structure may be possible.

The manner in which the spatial organisation of the structural components of tissues affects their ultrasonic properties and images has been a central aspect of our work. The present understanding of the physics of acoustic wave propagation in human tissues is relatively limited, largely by a lack of information regarding the acoustic microstructure of the tissues. We have developed possible theoretical descriptions of the acoustic scattering structure of tissues based on an inhomogeneous continuum model, which is a general model used in theoretical physics in the modelling of wave propagation in random media. With this model the spatial characteristics of statistical variations in compressibility (density fluctuations have been, rightly or wrongly, most often neglected) are described by an autocorrelation function, and the

magnitude of the variations is described by a root mean square deviation of the compressibility away from its average value. The form of the autocorrelation function defines the characteristic dimensions of the scattering inhomogeneities and the degree of regularity that is present within the structure.

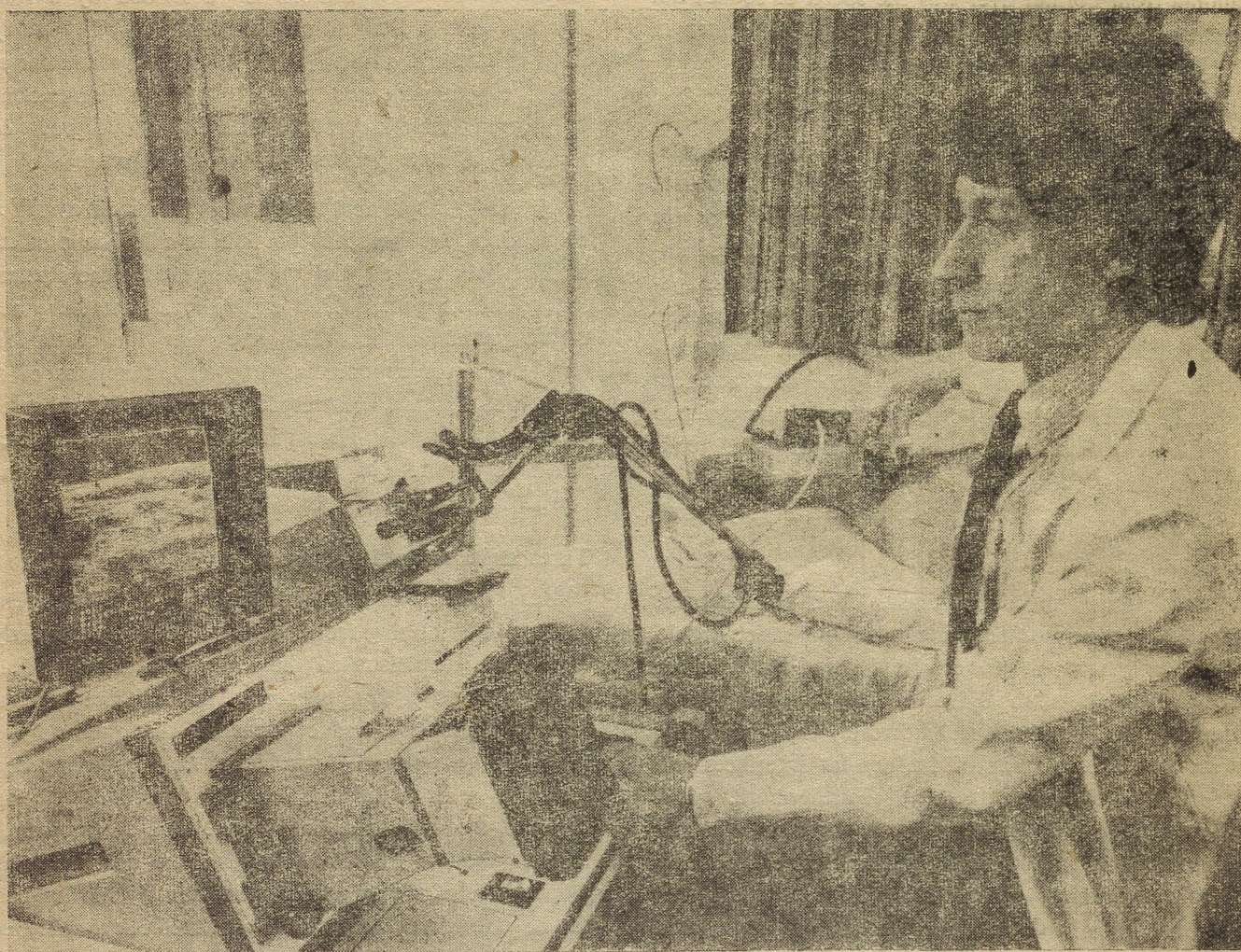
By using simple mathematical expressions as autocorrelation functions, it is possible to calculate predicted frequency and angular dependencies for the scattering of ultrasound. Two expressions that have received attention in this way are the Gaussian ($\exp(-r/l)^2$) and exponential ($\exp(-r/l)$) functions of r , the radial distance with respect to some arbitrary reference in the tissue. Here l is a measure of the characteristic separation of inhomogeneities, known as the correlation length.

Three superimposed structures

Measurements of the frequency and angular dependencies of scattering from various tissues, particularly liver, have demonstrated that, although these models are useful for certain purposes, they are not correct. The next simplest kind of structure that predicts the observed properties involves three superimposed structures with correlation lengths respectively of the order of the size of cells (10 to 30 μm), organ parenchyma (about 1 mm), and larger structures such as blood vessels. It also appears that density fluctuations should not now be neglected in the theoretical analysis.

Other experiments have shown that the interference of sound waves back-scattered by tissues may give rise to diffraction patterns that are both characteristic of the tissue viewed and suggestive that a degree of regularity exists, within a number of tissues, on a scale of about 1 mm. This finding implied that a direct equivalence between points in object and image space was not to be expected for the conditions of pulse-echo investigations, and that the fine structure of echo images would be determined by diffraction. At the same time, the underlying phenomenon held promise as the basis for the development of analytical techniques that are loosely analogous to X-ray crystallographic methods of analysing structure.

By combining data from our model of an inhomogeneous scattering continuum with a theory for the image forming process, we were able to develop a computer simulation for predicting the appearances and properties of the texture of B-scan images. This, in combination with appropriate experiments with tissue



Ultrasonic equipment at Royal Marsden Hospital

mimicking phantoms, is helping us to gain a better understanding of the nature of pulse-echo images. As a consequence of this we hope, for example, to be able to define more precisely the limits of system and tissue parameters within which it is possible to reliably relate differences in the appearances of the images with changes that may have taken place in tissue structure. This is particularly important for approaches to UTC based on image analysis because the derived features, unlike those mentioned earlier, are highly dependent on instrumental factors and contain a large contribution from the coherent speckle artefact.

Using special methods of acoustic microscopy developed in collaboration with University College, London, we hope to be able to check our current models of the acoustic microstructure of various tissues—as deduced

from the above data on bulk acoustic properties—by making direct observations of density and compressibility on a microscopic scale. If successful, this should bring about a big step forward in our progress towards a firmly based theory of ultrasonic interaction with tissues, and should improve our understanding of the mechanisms by which UTC methods can identify particular types of histo-pathological changes.

Clinical implementation

Over a number of years, we have built instrumentation for clinical data acquisition and developed techniques of analysis for a variety of approaches to UTC. Some arose out of our fundamental laboratory studies, while others were tried in a purely empirical manner by the application of established signal and image processing methods to data derived from standard clinical

cal instruments. In this brief report it is possible to provide only a few examples to illustrate the range of application of these techniques. I shall do this with reference to the three basic aspects of measurement—size and shape, internal structure and consistency, and function.

Due to the difficulty of measuring therapeutic response in clinical practice, data on radiation dose response for human tumours are scarce. Such data are required for, among other things, testing radiosensitizers and unorthodox radiotherapy fractionation regimes. Animal radiological studies have demonstrated that the characteristic of the change in tumour volume most clearly related to the infliction of injury on a tumour is the regrowth delay period. Measurement of this characteristic requires precise measurement of tumour volume on a serial basis.

An ultrasound technique has been developed specifically for this purpose and is proving to be of considerable routine value in improving the accuracy and precision of measurement, and in extending the proportion of patients with measurable nodules. Series of parallel B-scans at regular intervals through a tumour are recorded semi-automatically from a specially adapted real time scanner interfaced to a microcomputer. The tumour margin on each image is then manually indicated to the computer, which calculates the tumour volume and some simple features associated with the shape of the nodule. Various tests on phantoms and human tumours, which were subsequently excised for true volume measurement by a water displacement method, have shown the method to be able to measure tumour volumes as small as 0.4 ml with an acceptable precision of $\pm 10\%$. The accuracy of the measurement is proving particularly valuable for tumours that change shape during therapy.

Three clinical approaches to ultrasonic diffraction analysis of tissue structure have been implemented. In the first, a specially constructed scanning arrangement permits the recording of the amplitude of electronically filtered echoes from a particular volume of tissue, while progressively varying the angle of incidence of the ultrasonic pulse-echo beam. In the other two devices the approach is broadly similar, but their designs attempt to overcome some of the limitations of the first. In one a phased array real time scanner was modified to gather limited angle diffraction patterns from across its aperture, fast enough to avoid movement artifacts. In the other, a more complicated scanning arrangement permits diffraction data to be gathered in two dimensions rather than one, which increases the chances of characterising any anisotropy of structure.

Liver and thyroid

Computer analysis of the resulting patterns yields features that, in empirically based clinical trials, have been shown to be usefully correlated with diseased conditions in the liver and thyroid. For example, a 96% success rate was found for the ability of the

method to discriminate between normal and malignant liver tissue. The method would appear to be especially valuable for characterising diffuse hepatic abnormalities known to be difficult to diagnose by subjective observation of B-scan image texture.

B-scan image analysis is used to find quantitative, statistical features of image structure that are useful for identifying diseased conditions or for monitoring changes in histological structure. A number of research groups in the United States of America and elsewhere are working with similar procedures. Our data capture systems consist of a home built, general purpose B-scanner and a recently constructed, dedicated, automatic breast scanner. In both cases the images are stored temporarily on an analogue scan converter for visual observation and selection of a region of interest to be digitised. Standard methods of computer image processing and pattern recognition have been used to define a series of features—for example from the grey level co-occurrence matrix and the two dimensional Fourier transform—and combine them in a discriminant analysis on data obtained from particular groups of patients.

In a preliminary series of 38 cases of diffuse liver disease, on which biopsy data provided a definitive diagnosis, an overall correct classification accuracy of 88% was achieved (Table 1). The method also appears to be of value in assessing tumour response to therapy. Measurable changes in the internal tumour echo characteristics of hepatic neoplasms have been observed to occur at an earlier stage than changes in tumour volume.

TABLE 1

Computer classification according to B-scan image features versus the definitive diagnosis from liver biopsy for diffuse liver abnormalities.

ULTRASOUND CLASS	BIOPSY CLASS				
	N	C	H	F	C+H
NORMAL (N)	47				
CIRRHOTIC (C)	5	16			1
HEPATITIS (H)	1		4		1
FATTY (F)				2	
C WITH H	1	1			6

Reproduced with the permission of D. K. Nassiri.

Tissue movement analysis is a new method of quantifying tissue consistency on the basis of its relative movement in response to a stimulus either deliberately inflicted or occurring naturally—as in the case of a pulsating artery. In this form of remote ultrasonic palpation it is not the movement of discrete structures that is being considered but rather that of the mass of the tissue at the level of structure that gives rise to the coherent speckle mentioned earlier. Thus measures of movement are statistically based and tend to quantify the rate of decorrelation of the echo interference pattern for a stationary ultrasonic beam. The clinical applications of this technique have yet to be explored.

Vascularity and blood supply

As a result of work done primarily at Bristol General Hospital, it is clear that ultrasound has the potential to be used to study an aspect of tumour function—the pattern of its vascularity and blood supply. Our own interest here was initially prompted by the desire of clinical colleagues to find sensitive and prompt indicators of the response of tumours to therapy. Most of our work to date has been confined to the use of a 10 MHz, continuous wave, Doppler system for studying the vascular physiology of the breast, particularly in relation to the response of inoperable breast cancer to endocrine treatment.

Initial studies of patients undergoing treatment with tamoxifen and/or aminoglutethimide have indicated that the major variations in the Doppler characteristics of breast tumours correspond to changes in tumour volume, although the blood flow variations may slightly precede the volume changes. In confirmation of work reported from Bristol, we have found that the characteristics of Doppler signals from untreated malignant breast tumours were always different from those obtained from the normal breast in the same patient. Exciting possibilities may exist for tumour diagnosis based on the use of Doppler features for UTC, particularly if they are combined with the pulse-echo features mentioned earlier.

In longitudinal studies of normal female volunteers we have been able to clearly document that the blood flow in the breast fluctuates periodically during the menstrual cycle and increases continually with gestational age during pregnancy. The timing of these fluctuations is consistent with the timing of known variations in total circulating levels of hormones that act on the breast. This knowledge may be of use in the future for reducing the variance of data from premenopausal patients, for optimising the timing of administering therapeutic agents and, if the presence of a tumour were to alter the cyclic fluctuations, for early diagnosis of breast cancer based on monitoring breast physiology rather than anatomy.

The machine based techniques described in this report are intended to form part of an objective approach to UTC that is complementary to the subjective observer-based methods by which ultrasound cancer investigations are currently performed. As more experience with quantitative methods is gained, it is becoming clear that no single feature or technique is likely to make the dramatic impact that was once hoped of UTC. The way forward lies in a multi-parametre approach, combining quantitative measurements of independent characteristics of tissue structure and function.

Courtesy : London Press Service (BIS)

(Contd. from page 306)

The National Filaria Control Programmes (NFCP) was launched as a large scale pilot programme in 1955-56 for the control of *Bancroftian-filariasis*. Since July 1978, the operational component of NFCP has

been merged with Urban Malaria under the Directorate of National Malaria Eradication Programme, and research and training continue to be with the National Institute of Communicable Diseases.

PHYSICAL TARGETS AND ACHIEVEMENTS

	Targets for 1981-82	Achievement 1981-82	Targets for 1982-83	Achievement 1982-83	Targets for 1983-84	Achievement till date (83-84)
Control units	10	8	10	1	5	4
Survey units	5	—	5	4	1	1
Clinics	50	12	27	3	30	12

Present set-up

The following is the present set-up in 12 endemic States and 4 Union Territories :

Control Units	178
Survey Units	27
Clinics	103
Rural Filaria Control Projects	3

Progress

At present about 27 million Urban population is being protected through anti-larval measures by 178 control units. Another 5 million rural population is being protected by three Rural Filaria Control Projects through detection and treatment of Filaria cases. —From the statement given in Lok Sabha by Smt. Mohsina Kidwai, the then Minister of State for Health & Family Welfare

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BOOKS

NEW MANUAL FOR DIAGNOSING TROPICAL DISEASES

Medical Laboratory Manual for Tropical Countries: Vols I & II, Monica Cheesborough FIMLS Tech RMS, Tropical Health Authority Ltd, 14 Bevills Close, Doddington, Cambridgeshire, England PE15 OTT.

A laboratory manual published in Britain could have an important effect on improved standards of primary health care in tropical countries.

The manual, for laboratory technicians and health workers, has been compiled by Monica Cheesborough who spent 12 years as a laboratory technologist in district hospitals in Africa. It is believed to be the first text book to be specifically written for developing countries and concentrates on appropriate diagnostic techniques using durable, low-cost equipment.

Care has been taken to ensure that the tests and methods described are relevant to the health needs and facilities available in developing countries in order to permit rapid, accurate diagnoses at regional laboratory level, and the text has been written in easy-to-understand English with high quality illustrations.

The manual also gives advice on how to prevent the occurrence of tropical diseases, and covers the syllabuses for laboratory training requirements in developing countries.

"I think the whole question of bringing in laboratory support for primary health care is very important", adds the author, "since unless we have a reliable diagnosis in the first place, patients are not going to receive the correct treatment at an early stage of their illness which means they may have to go into hospital later on, and this in turn increases the cost health care.

"Equally, a laboratory diagnosis is important if we consider the control and prevention of disease.

"We must know what diseases are really endemic and prevalent in an area so that health authorities can plan for the future."

The first volume, dealing primarily with Parasitology, was published in 1981 and Volume II dealing with Bacteriology appeared in July 1984. A third volume on Haematology is due to appear in 1985. Volume II is available at a subsidized price to developing countries of £4.90 with an additional charge of £1.50 to cover packaging and surface mail postage.

—BIS

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Prevention of neonatal tetanus. New Delhi, WHO Regional Office for South-East Asia (SEARO Technical Publications, No. 3), and Alexandria, Egypt, WHO Regional Office for the Eastern Mediterranean (EMRO Technical Publications, No. 7), 1982, 94 pages + 10 tables and 6 figures.

Neonatal tetanus remains one of the major public health problems in the developing world. This publication reports on a meeting on the prevention of neonatal tetanus held in 1982 in Lahore, Pakistan. The meeting, sponsored jointly by the WHO Regional Offices for the Eastern Mediterranean and South-East Asia, reviewed the magnitude of the problem of neonatal tetanus as well as experiences in the control of the disease in the countries of the two Regions and formulated strategies for its prevention. This publication contains a detailed account of the strategies used for the control of neonatal tetanus, the constraints and obstacles to be overcome, and recommendations regarding general strategy on immunization, surveillance, improved maternal and child care, public participation, and research. The target recommended by the meeting is less than one death per 1000 births by 1990, and zero deaths by the year 2000.

In anticipation of this meeting, most of the countries attending organized special surveys to collect reliable data on neonatal tetanus. Brief country reviews are included in this publication, summarizing these data. The methods used in organizing the surveys and the difficulties encountered are described.

This publication is intended for health authorities, professional associations, and all those involved in activities of the Expanded Programme on Immunization.

The two series are available respectively from the WHO Regional Office for South-East Asia, World Health House, Indraprastha Estate, Mahatma Gandhi Road, New Delhi-110002, India, and the WHO Regional Office for the Eastern Mediterranean, P.O. Box 1517, Alexandria-21511, Egypt, to which requests should be sent directly. △

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