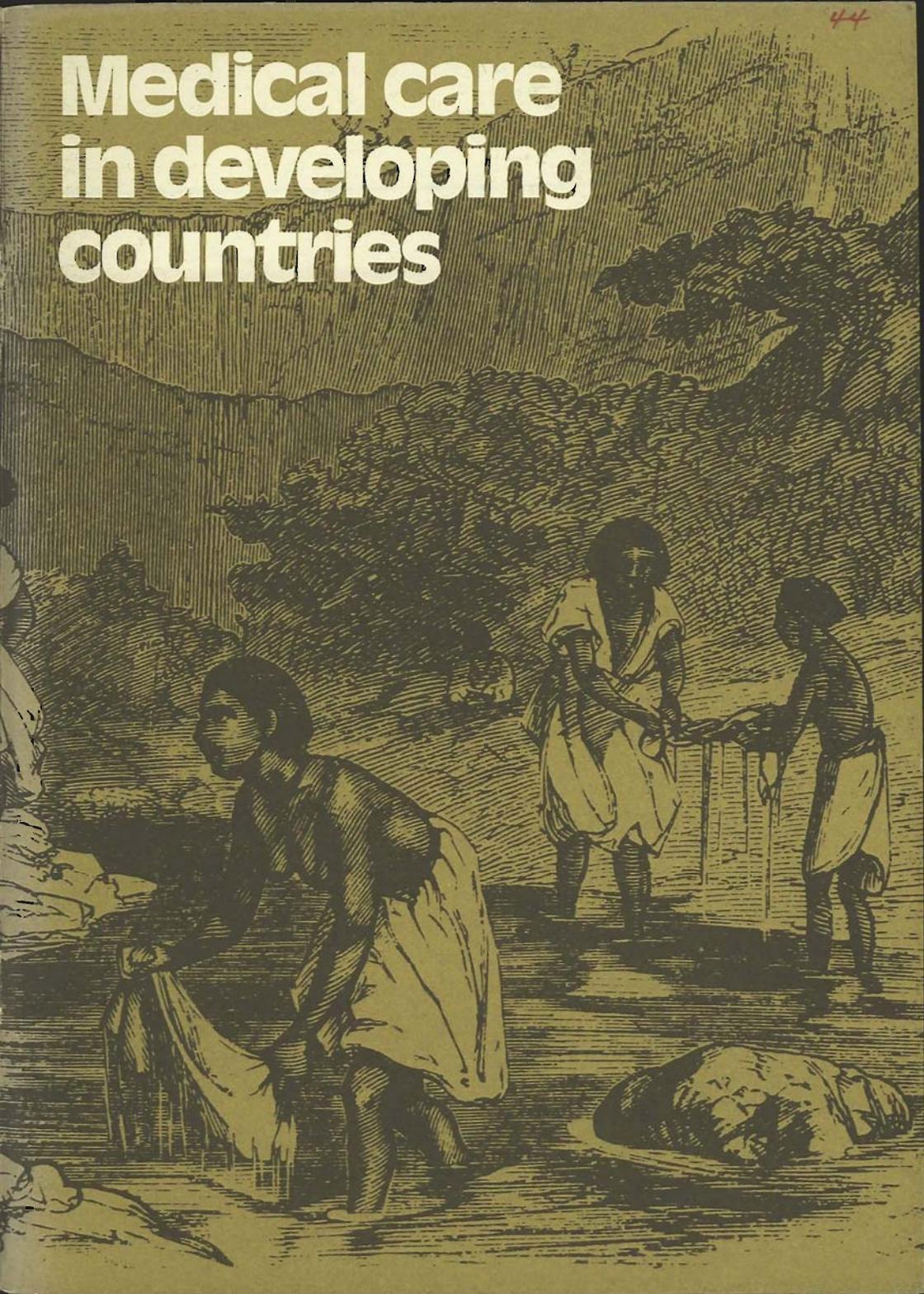


# Medical care in developing countries





Quem faz as necessidades fora da privada, pode soltar junto ovinhos de vermes.

When someone opens his bowels outside in the open little worms eggs can also be with the stools.

Quando vêm as águas da chuva aqueles ovinhos são arrastados até os rios, lagos e córregos.

When the rain comes those eggs are carried away to the rivers, ponds and small streams.

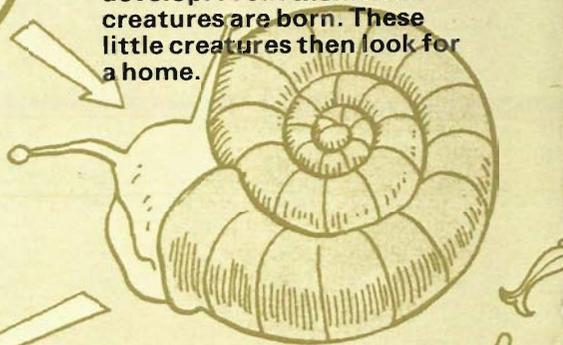


Nestas águas os ovinhos crescem. Nascem deles uns filhotes. Estes filhotes procuram uma casa.

In these waters the eggs develop. From them little creatures are born. These little creatures then look for a home.

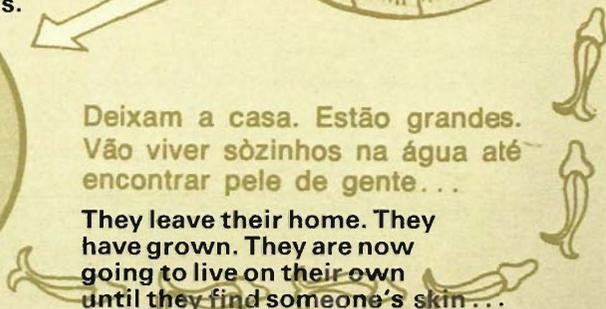
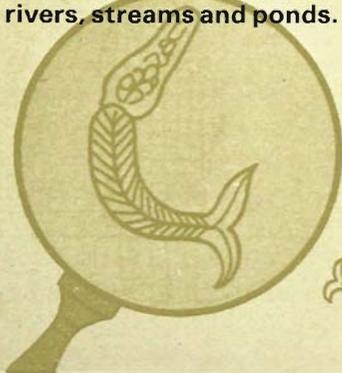
Encontram essa casa no caramujo pretinho, que vive nas águas dos rios, córregos e lagos.

They find their home in the black snail who lives in the rivers, streams and ponds.



Deixam a casa. Estão grandes. Vão viver sòzinhos na água até encontrar pele de gente...

They leave their home. They have grown. They are now going to live on their own until they find someone's skin...



# Medical care in developing countries

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**Office of Health Economics**

162 Regent Street London W1R 6DD

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*Front cover:* Washing day – Abyssinia circa 1860

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## Office of Health Economics

The Office of Health Economics was founded in 1962 by the Association of the British Pharmaceutical Industry. Its terms of reference are:

- To undertake research on the economic aspects of medical care.
- To investigate other health and social problems.
- To collect data from other countries.
- To publish results, data and conclusions relevant to the above.

The Office of Health Economics welcomes financial support and discussions on research problems with any persons or bodies interested in its work.

During the course of the past hundred years countries such as Britain have seen a very marked change in their patterns of morbidity and mortality. For example, between 1848 and 1872 it has been estimated that over 32 per cent of all male deaths in England and Wales were caused by infectious diseases and that only 6 per cent were the result of cancer and diseases of the circulatory system. By 1970 the respective figures were 0.6 per cent and 56.6 per cent.<sup>1</sup> In 1848-72 mortality between the ages of one and four has been estimated at 36.5 per 1,000, while in 1970 it was under 1.1 per 1,000 (males). Today about 3 per cent of the total deaths experienced by the population of Britain occur in children under five whereas a century ago they accounted for over 40 per cent. (Logan 1950, Annual Abstract of Statistics 1971).

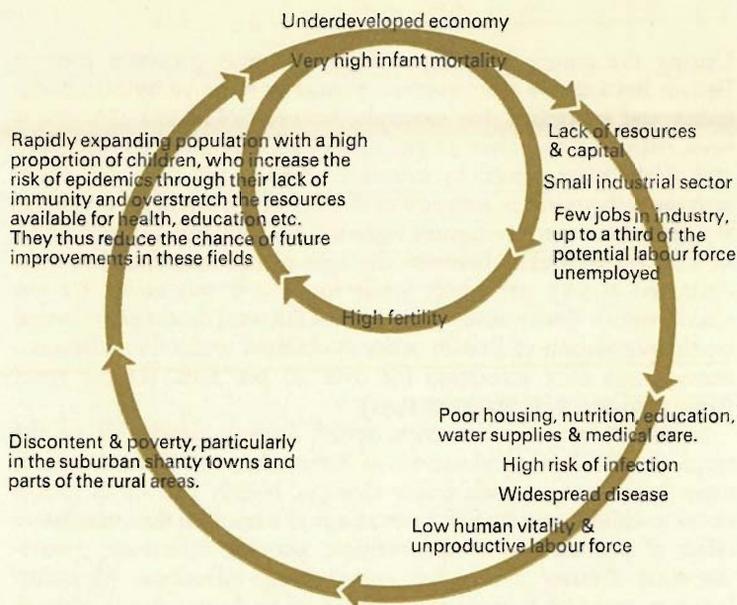
In the developing countries, which include nearly all of the tropical and sub-tropical nations of Africa, Asia and Latin America, there have been no such major changes. Nearly half of all deaths occur in children under five years of age as a result of the cumulative effect of protein-calorie malnutrition, parasitic infections, gastrointestinal diseases and other supervening infections. Mortality between one and four years of age is up to forty times higher in developing than in developed areas.

The transmission of infectious diseases which, with malnutrition, present the most important health hazard to the people in the developing countries is related to a complex of social, economic and environmental factors. These include high fertility and the consequently large proportion and continually increasing number of children in the population, overcrowding, poor sanitation, unpurified water supplies and a lack of educational facilities for providing even the simplest knowledge about the causes of diseases and their elimination. (See Figure 1.)

That such factors are extremely significant in determining patterns of ill-health is demonstrated by the history of England and Wales. It is widely accepted that it was not until after the First World War that therapeutic services began to have a direct effect on the vital statistics in any part of the United Kingdom (McKeown & Lowe 1966), although vaccination was of some significance. Yet between the 1860s and the end of the first decade of the twentieth century it has been estimated that mortality from infectious

<sup>1</sup> Figure adjusted to exclude deaths from cerebrovascular disease. Figure comparability only approximate.

**Figure 1** *The cycle of ill-health in the developing countries*



diseases dropped by well over 40 per cent amongst males under one year old and by nearly 60 per cent in the one to four years old age group (Logan 1950). These changes can only be explained by alterations in environmental conditions and the behaviour of the population.

This paper is concerned with the health problems of the developing countries of today and with the examination of the role of medical care in their alleviation, given the resources available. It begins with a brief examination of some relevant demographic and socio-economic factors before discussing questions more directly concerned with medical care and assessing the importance of the role of such services in improving health standards.

## Some demographic aspects of the developing world

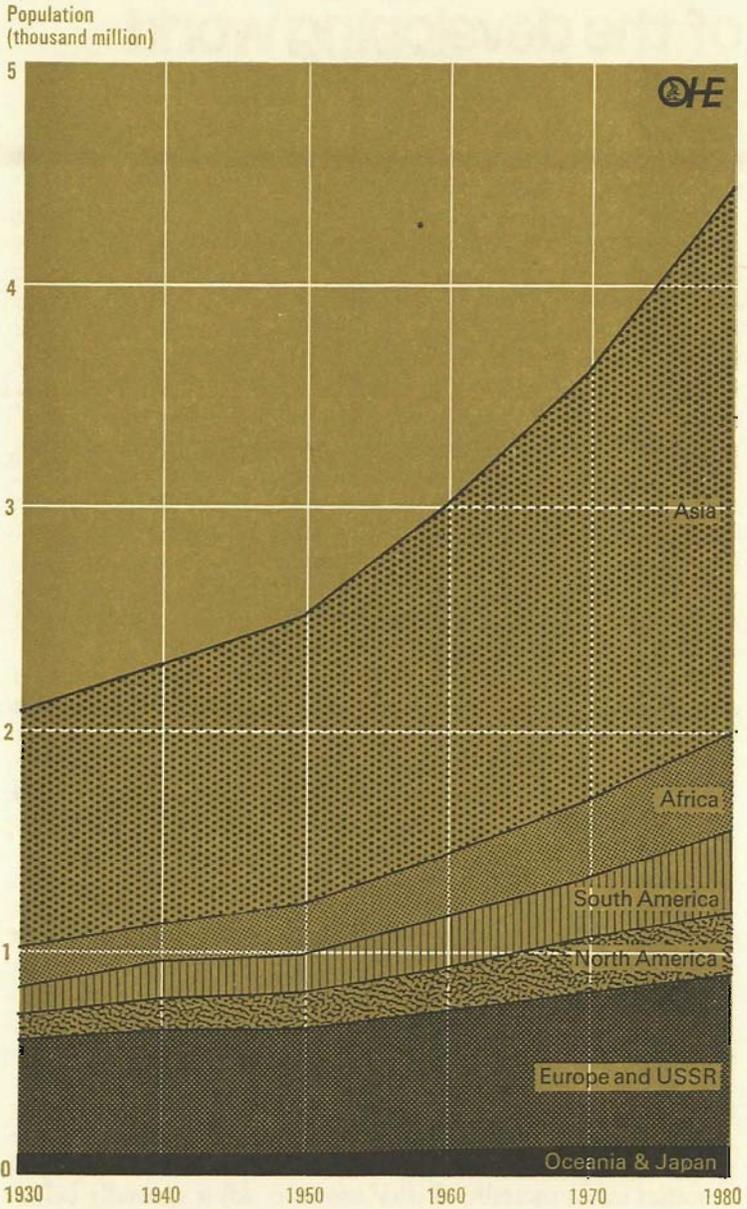
Figure 2 and Table 1 indicate that, of the world's present population of 3,750 million, less than a third live in the developed world and that, by 1980, this figure will have fallen to one quarter.

Figure 3 shows the age structure of the population of a developing as opposed to that of a developed country, the main contrast between them being the larger proportion of children in the former areas. For example, in Africa in the late 1960s 43 per cent of the population were under fifteen as compared with 24 per cent in Europe. Taking extreme cases the figures for Sweden and Venezuela were 21 per cent and 47.4 per cent respectively (WHO 1971). The chief cause of the distinctive age structure of developing countries' populations is their high fertility rate, around 40 per 1,000 population, as opposed to that in the developed, below 20 per 1,000. High fertility constantly widens the base in population model 2, in figure 3, giving it its characteristically stepped triangular formation. In addition, where environmental improvements and personal health services have been effective in reducing death rates there has been a proportionately greater effect in the younger age groups and so the base of the age structure has become even wider.

Despite the greater proportion of those aged over sixty-five in developed regions the variations in age structure still mean that whereas about two thirds of the population in the developed areas are in the economically active age groups the proportion in the developing countries is little more than half. This in itself may be of some economic significance. Far more important is the fact that the number of children in the developing countries is continuously increasing and hence more and more resources have to be diverted into their care and education. This throws a constant strain onto the economies of the developing countries and leaves them little chance of devoting capital to ends which are going to raise, rather than merely maintain, the standards of life.

Recorded crude death rates in the developing countries vary considerably. Because of the 'young' age structure of such regions and the effects of modern medical intervention they are now quite frequently less than those for the developed areas (about 10 per 1,000) although in some areas they are well over 30 per 1,000. Age specific rates provide a better basis for comparison. In developed countries infant mortality (below one year old) is generally below 20 per 1,000 live births to as low as 13 per 1,000 in Sweden (1968).

**Figure 2** *World population 1930/80 (assuming current growth rates)*



Source UN Statistical Year Book 1971

**Table I** Ratio developed/developing world population 1960 (1:2) 1980 (1:3 approx.)

Country	1800		1850		1900		1950		2000*	
	Pop.	% T	Pop.	% T	Pop.	% T	Pop.	% T	Pop.	% T
Africa	95	10.5	98	8.6	120	7.5	222	8.8	720	10.8
North America	6	0.6	26	2.3	81	5	166	6.6	345	5.2
South America	21	2.3	33	2.9	63	3.9	163	6.5	667	10
Asia	596	65.4	699	61.8	915	56.9	1381	54.9	3944	59
Europe**	192	21	274	24.2	423	26.3	572	22.7	963	14.5
Oceania	2	0.2	2	0.2	6	0.4	13	0.5	36	0.5
Total	912	100.0	1132	100.0	1608	100.0	2517	100.0	6657	100.0
Growth rate (approx.)	0.45% p.a.		0.7% p.a.		0.9% p.a.		2% p.a.			

\*Assuming current growth rates.

\*\*including USSR.

Source OHE calculations based on various sources

**Figure 3** *Age structures of populations in developing and developed countries*



(After Wrigley 1969)

In some regions of Africa, Asia and Latin America it is as high as 200 to 250 per 1,000. (Historically it is noteworthy that Rowntree found an infant mortality rate of 247 per 1,000 in York in 1898 amongst the poorest classes and one of 94 per 1,000 amongst the richest.)

The process of demographic transition from high fertility and high and fluctuating mortality rates to relatively low fertility and low and stable mortality took place in the countries of Western Europe over two or more centuries. In Eastern Europe rates fell more dramatically during the first half of the twentieth century, and in Japan the process of transition was still more accelerated. There the gross reproduction rate<sup>1</sup> dropped from 2.2 in 1937 to 1.8 in 1950 to 1.1 in 1955 (Taeuber 1960). In both areas abortion has been mainly responsible for the rapidity of the lowering of the birth rate. The main point to be drawn from this information is that the experiences of the already developed countries cannot necessarily be expected to be repeated in the presently developing world. Differing cultural structures and newly available technologies could cause them to take different courses.

<sup>1</sup> G.R.R.=No. of female births per woman in her entire reproductive life derived from the age specific fertility rates current in the population.

### Birth control and health

High fertility is in itself a major cause of ill-health. Mothers are exhausted by repeated, closely spaced births which lead to the 'maternal depletion syndrome' and which frequently result in early death. Children of large, poor families are often ill-fed and deprived of adult attention and care. Also, a high proportion of children in a population, because they are less likely to be immune, increases the risk of epidemics of infectious diseases, particularly of those due to viruses such as measles. All the socio-economic problems related to health such as sanitation, the supply of pure water and adequate nutrition discussed in the following section are made more acute by a rapidly increasing population. Eventually the effect of unchecked population growth could lead to an overall lowering of standards and even a Malthusian situation of population control through widespread famine, although this prospect does not appear to be as close as is sometimes predicted.

There may seem to be a basic contradiction between the recognition of high fertility and fast population growth as a cause of ill-health and the acceptance of the desirability of the extension of medical care to sections of the population of the developing world whose present rates of growth are very high and only checked by high mortality, especially amongst children. This is not, in fact, so. Various studies, including a recent one by the WHO in eight countries of the developing world have found that family planning teaching has an enhanced effect when closely linked with maternal health and child care programmes. (*The Work of the WHO* 1971.) Although birth control programmes are of value alone it seems probable that they will be most productive when mothers are given reason to believe that their children are likely to survive beyond their earliest years. Even if it is accepted that one of the highest priorities of a social care system in a developing country is to reduce the population growth, now standing at about 3 per cent per annum (i.e. doubling every twenty-four years) in many areas it seems that the extension of effective medical services to the mass of the population, or at least to mothers and their children, will be an essential stage in the process of full acceptance of birth control. This is a major argument for the extension of medical care in the developing world today.

In the history of the now developed world the process of demographic transition has usually been associated with the industrialisation of communities, a marked increase in material wealth and the emergence of large urban centres of population. But the experience of the population of France, which virtually stabilised at the end of the eighteenth century demonstrates that it is possible for predominately rural populations to restrict their growth if

sufficiently motivated. There the introduction of new inheritance laws under the Code Napoleon and, earlier, the Edict of Nantes, forbade the practice of primogeniture and consequently threatened land holdings with fragmentation on the death of a father with several offspring. The physical benefits of birth control may today be underlined by the simultaneous provision of curative medical services and thus populations in rural areas of the developing world may be helped to understand the future benefits of restricting fertility. The success of some birth control programmes in smaller communities is shown in Figure 4, although it is very difficult to estimate how much of the fall in birth rate in the areas shown is due to birth control programmes and how much to other pre-existent social trends.

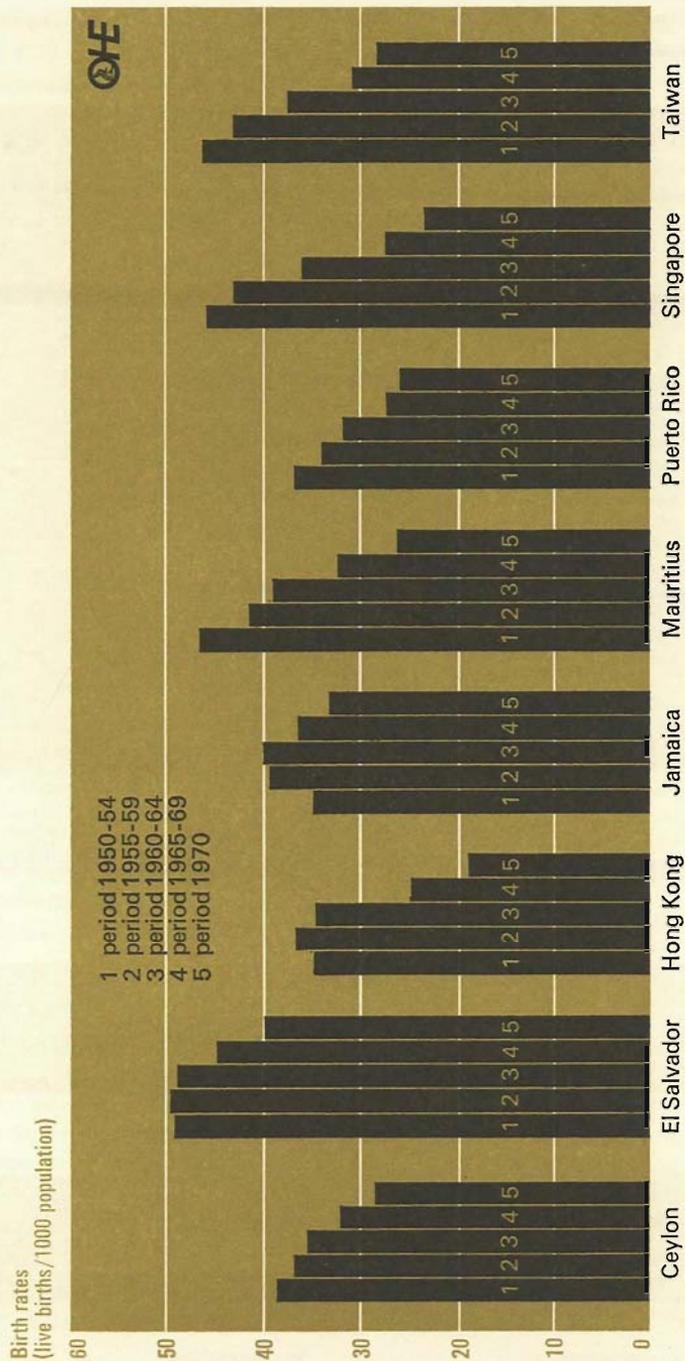
## The economic environment and health

The economy of a community is related to its health through both the general availability of medical services and the standards of nutrition, housing, sanitation and education which it can achieve. The occurrence of the most prevalent communicable diseases and the way in which they are transmitted will be discussed in the following section. In this it becomes clear that environmental factors such as the availability of pure water to a community are far more significant in determining the community's general health standards than is the availability of curative medical services. In this section, following a brief look at income levels and health expenditure in developing countries, the problems associated with urbanisation, sewage disposal and water supply will be discussed and then the effects of malnutrition and the world food situation will be examined.

### Wealth

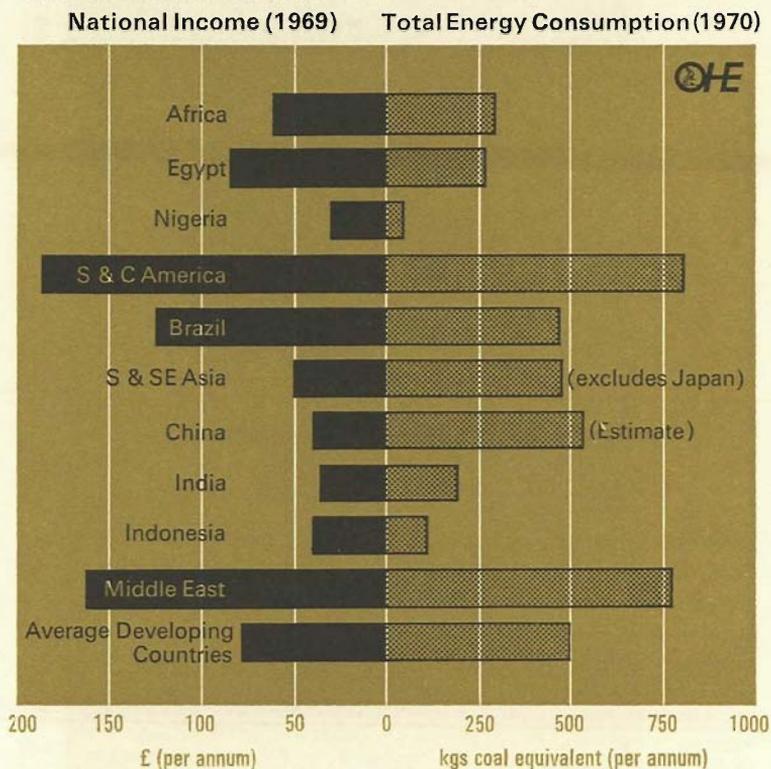
Figure 5 gives some idea of the magnitude of the gap between the material standards and consumption levels of the developed and the developing world, although the considerable disparities of distribution of income within the latter areas are not, of course, shown by national averages. In Latin America in the mid 1960s an estimated 40 per cent of the total of all incomes was received by the top 10 per cent of earners whilst the poorest 40 per cent received only 10 per cent of the total. In countries such as Peru, Chile, Panama and Venezuela the richest 5 per cent of the population

**Figure 4** Birth rates 1950/70, selected countries

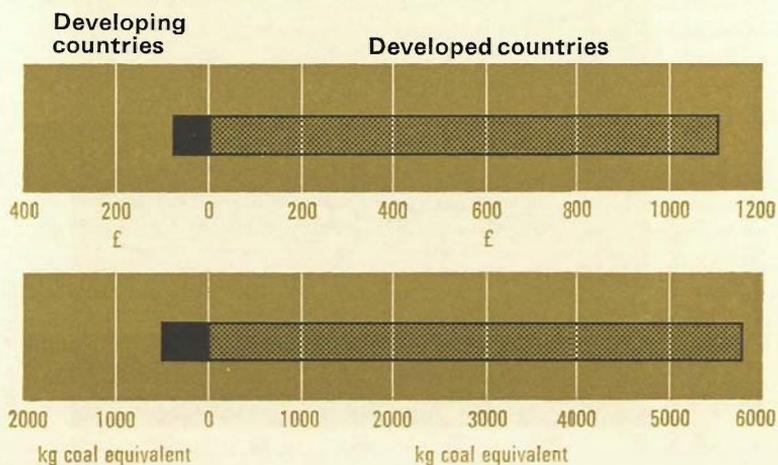


Source: IEPF 1971

**Figure 5** *Energy consumption and national income on a per capita basis. Selected areas and countries*



*The developing and the developed world*



Source UN Statistical Year Book 1971

received nearly forty times as much as the poorest 20 per cent (UN 1971). Similar figures apply to the majority of African and Asian countries, although income statistics can be misleading as measures of resource distribution. For example, in the industrialised countries more than 70 per cent of the national income is expressed through wages whilst in the developing about 50 per cent is so. This figure falls to about 30 per cent in many parts of rural Africa and Asia (UN 1971). Goods and services produced and exchanged at subsistence level generally do not enter into national accounts and hence the real incomes of perhaps a quarter of the developing world's population may be subject to misrepresentation. It is also difficult to estimate true conversion rates between the various national currencies and it is probable that the overall availability of goods and services in developing countries is underestimated because of this factor.

When considering the levels of national income given in Figure 5 the significance of lower labour costs in the less developed areas should not be ignored, although in the case of medical services the market value of trained workers is strongly influenced by international conditions. Only where the mobility of doctors and other workers is controlled can medical labour training and costs be orientated to the conditions of a particular economy. In the 'free world' there is a consequent drain of medical staff to the richest areas. The magnitude of this effect is underlined by the fact that most governments in developing countries allocate only 1 or 2 per cent of their countries' gross national product to medical care, (Abel-Smith 1967), representing in many cases a per capita expenditure of between 25p and £1 per annum. By contrast developed countries devote more of their larger gross national products (between 5 per cent and 9 per cent) to health services. Expenditure from both public and private sources is running at about £45 per capita in the UK and £125 in the USA (1971-2).

### Urbanisation

The significance of the developing countries lack of economic resources and the consequent effect on health is clearly demonstrated in the rapidly expanding urban areas, which are growing because of high fertility within the towns themselves and as a result of a population drift into urban areas from the rural ones. The people are attracted not by the availability of jobs but by the hope of escape from the poverty of the countryside. The result is, in many cases, the formation of huge, semi-urbanised shanty towns on the periphery of the cities. Rates of urban population growth of up to 10 per cent per annum are commonly reported and some are as high as 15 per cent, for example in parts of Kenya in the late

1960s (UN 1971). These are well over twice and in many cases three times the rates of growth recorded in rural areas, although 70 per cent of the total population of the developing areas still live in the latter.

In the towns the cost of building sufficient numbers of dwellings with adequate water supplies and sanitation to keep pace with the population growth is such that up to 7 per cent of a developing country's gross national product may be needed to maintain existing standards in its urbanising areas (UN 1971). There is evidence that such money is not being made available and that as a result urban conditions and health standards are deteriorating. The problem of overcrowded housing is of particular importance in this sphere, with densities of three or more to a room being common.

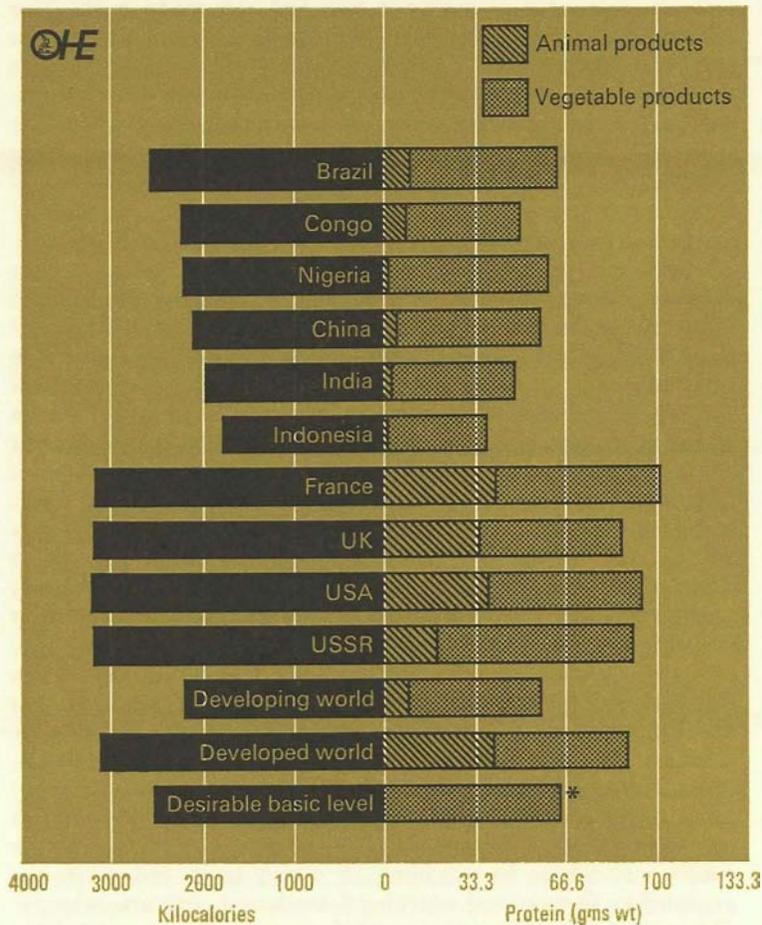
Intimately connected with the development of the towns and cities has been the growth of inter- and intranational travel which has helped carry some diseases. For example, the current cholera pandemic which began in 1961 in Indonesia was spread largely by travellers.

#### **Water supplies and sanitation**

Over a third of the developing countries covered by the United Nations world economic survey in the late 1960s reported that more than 40 per cent of their urban houses lacked piped water, although the WHO have recently claimed that by 1970 70 per cent of urban dwellers had some access to piped water supplies. It was estimated at that time that only 20 per cent of the rural population of South America enjoyed such a water supply. In many parts of Africa and Asia this figure was considerably lower. The UN development targets for 1980 are that all urban populations and 25 per cent of the rural ones should have potable water available. This, the WHO estimate, would involve an investment of £5,400 million. As has already been stated, the availability of clean water is a major variable in environmental standards affecting health. To purify and pipe water is an expensive and in many cases formidable engineering process. What is more, when an adequate supply is made available consumption rises steeply. Areas supplied by rural aqueducts use a rough average of 100-120 litres of water per capita per day, about 50 per cent more than people use in households supplied by wells (Mendia 1968).

The present water shortage in the developing countries could be alleviated to some extent by a change in the habits of many communities regarding sewage disposal in order to prevent the contamination of existing water supplies. This need not involve excessively high expenditure. For example, in Japan during the

Figure 6 Food consumption (late 1960s). Selected countries and areas



\*1 Animal proteins are not needed provided that the diet makes a balanced use of those from vegetable sources.

2 Figure estimate allows for some imbalances of distribution. 50 grammes a day is probably adequate for each individual. The usual basis for calculating protein requirements is one gramme for every kilogram of body weight, although it is suggested that the body can adapt its requirements to as little as a half gramme per kilo. Growing children and expectant mothers need more. An alternative method for calculation is based on the estimate that an adult needs about 11 per cent of his calorific expenditure to stem from protein breakdown, whereas children and pregnant women need 14 per cent from such sources.

early 1960s only 13 per cent of households were reported to possess flushing lavatories but nevertheless most sewage was disposed of quite satisfactorily via sanitation pits and absorptive wells. This remains the common method of sewage disposal and yet rates in Japan for diseases spread through faecal contamination are far lower than in the developing world. If rural populations are encouraged in the use of hygienic methods of sewage disposal a major source of infection could be reduced without undue cost, even allowing for basic environmental differences between Japan and developing areas.

### Nutrition

Approximate world food consumption levels are shown in Figure 6. It has been estimated (UN 1971) that about 25 per cent of the population of the Western Hemisphere, 80 per cent of that of Africa and over 90 per cent of that of Asia live in countries where the total amount of food available is such that the average number of calories and weight of protein available to each individual is below their estimated requirements. By contrast 80 per cent of Europeans receive an average of 10 per cent over the required protein levels and 90 per cent of the developed world's people receive at least 40 per cent of their protein from animal products as opposed to 3 per cent of the people in the developing countries; 75 per cent of the population of the latter areas received less than 20 per cent of their protein in first class form.<sup>1</sup>

Recent research has emphasised the importance of protein deficiency as a cause of ill-health, although it is often associated with undernourishment (i.e. insufficient calories). In 1967 a USA government survey reported that an estimated 60 per cent of the underdeveloped countries' people were malnourished (i.e. seriously lacked some essential nutrients) whilst 20 per cent suffered from undernourishment. Protein-calorie deficiency diseases include conditions such as kwashiorkor, in which frank oedema is the outstanding feature, and nutritional marasmus, extreme wasting. The occurrence of serious cases of protein-calorie malnutrition varies between 1 per cent and 10 per cent of the total population in developing regions, with 10-20 per cent case fatality. More moderate forms have been shown to occur in about one third of the population (WHO survey 1968-69).<sup>2</sup> Protein deficiency is of particu-

1 Vegetable sources do not necessarily contain all the amino acids needed to a healthy diet, although it is quite possible for a planned mixed diet of vegetables to be perfectly adequate.

2 Clinical judgements alone have been shown to underestimate the prevalence of malnutrition by about 30 per cent (Shakir et al 1972). Anthropometric measurements are more reliable tests.

lar importance in its effect on children because it not only weakens them, so increasing their vulnerability to infections, but may also retard their physical and mental development.<sup>1</sup>

In malnourished populations living in poor environments malnutrition and infection should not be considered separately in relation to the patterns of prevalent ill health. They act synergistically in reducing the body's defences against the occurrence and effects of illnesses. All infections tend to cause an amount of increased nitrogen loss, mainly in the form of urea, and for persons receiving inadequate protein this can be extremely serious.

World food production is potentially, at least, increasing as fast as the population and the development of bio-engineering and new techniques of protein extraction from various sources, for example leaves, hold out considerable hope for further productivity increases. But even the 'green revolution' itself may have brought with it attendant social problems. It has been suggested that the often uneven distribution of its economic benefits has sometimes served to widen the gap between those rich enough to capitalize on the new varieties, which need well-irrigated land, and those too poor, thus increasing social discontent, aggravating landlord-tenant relationships and reducing agricultural employment (UNICEF 1972).

The major food problem of today is fundamentally that of distribution, both of food itself and of knowledge regarding nutrition. In the developing areas both problems relate to cultural traditions and values. For example, many of those involved in the administration of food distribution at various levels appear to be too unconcerned with the urgency of the problem, although this question also relates directly to the political environment in which administrators work.

Customs such as the denial of milk to pregnant women and the favouring of male adults at the expense of other members of the family, especially children, cause nutritional imbalances within certain communities. So too does reliance on certain staple foods when these are inadequate. For example, the Baganda of Southern Uganda feed their children mainly on steamed plantain which is very low in protein content. Protein-calorie malnutrition amongst their children is high. Yet because of its central role in the cultural traditions of the Baganda they resist its replacement with a more suitable base for their diet.

The diffusion of simple knowledge regarding dietary needs and food production could and is improving the health of many people. For example, the encouragement of the production and consump-

1 One aspect of malnutrition that has been recently noted is that where the food available is of low grade the sheer volume to be digested may damage those who consume it, even though the content may be adequate for their needs.

tion of certain vegetables, such as soya beans, in some areas could greatly increase protein availability. Game species such as the antelope are so well adapted to the rangelands of Africa where about forty-five million pastoralists live that a good case can be made for their replacing cattle as the major source of meat. However, one stumbling block to this end is the cultural attachment of the population to cattle (Kyle 1972).

Poor nutrition and insanitary living conditions tend in themselves to be merely reflections of the overall poverty of the developing world but much could be done to improve environmental conditions without great capital outlay. Simple education in these fields is just as vital an element as any other in improving the general standards of health and it is the relative importance of factors such as this as opposed to the significance of medical care itself which this paper will go on to discuss.

## Communicable diseases

Over 40 per cent<sup>1</sup> of all deaths in the developing countries occur amongst children under five years old from a combination of malnutrition, parasitic infection, diarrhoeal disease (resulting in dehydration) and other supervening infections such as pneumonia (ITDG 1971). UNICEF believes this figure to be as high as 80 per cent in some areas. The WHO diarrhoeal diseases advisory team found that in many regions only 20 per cent of children were free from helminth (worm) infections. The very young in the developing world carry such a heavy burden of infection that most experience only a few days free from illness during the course of each year and those who survive to maturity are often retarded in physical and/or mental growth. While the risk of infection and reinfection is continuously present the control of such patterns of disease in developing areas via personal medical care alone is both unsatisfactory and economically impossible. In any case, a proportion of the bacterial pathogens involved in diarrhoeal disease in developing countries are now resistant to the drugs economically affordable in such areas (WHO 1971).

Many diseases today confined mainly to tropical and sub-tropical developing countries were once widespread in the temperate, now industrialised regions. Europe has known malaria as far north as England and as the predominant disease in parts of Italy, Greece and Yugoslavia. Hookworm, perhaps the most important form

<sup>1</sup> UK equivalent figure 3 per cent.

of intestinal parasitism, plagued the constructors of the San Gothard Tunnel. And leprosy has been prevalent in Scandinavia and Iceland. The first stages of the eradication of these diseases in the developed world began decades before Pasteur demonstrated the bacterial nature of certain diseases and about three-quarters of a century before Ehrlich laid the foundations of chemotherapy. They began with gradual changes in human behaviour and thus environmental conditions which led to the increased interruption of infection transmission and paved the way for their eventual disappearance.

The role of curative medicine in improving the health of a population in the conditions of the developing countries today is always going to be secondary to that of environmental improvement and education for behavioural change designed to break the cycles of disease transmission. This section, therefore, looks at some aspects of the 'dynamic process involving the ecology of the infectious agent and the environment' as a preliminary to the discussion of more specific questions regarding medical resource allocation. Such an approach to the understanding of the occurrence of disease is not original. Hippocrates in the 4th Century BC wrote that 'To investigate medicine properly one must take account of the seasons, the wind, water, orientation of the city, topography and the customs and occupations of the people under observation'.

Communicable diseases are of two basic types, those in which transmission is direct between persons and those in which a necessary stage of the life cycle of the infecting organism takes place outside the human host in a disease vector such as an insect in the case of plague or yellow fever or a snail in the case of bilharzia. Table 2 shows the prevalence and means of transmission of the most important communicable diseases. Direct infections are passed on through either the respiratory tract, as in cerebo-spinal meningitis, the surface of the body, as in leprosy,<sup>1</sup> or through faeces and hence via flies or contaminated food or water. The diseases transmitted in this latter manner play a very important part in the pattern of disease so frequently found in the children of the developing countries. They include the intestinal helminths, the dysenteries, enteric diseases and cholera. Control of the infectious diseases can be achieved in three main ways:

- 1 Through changes in the macro-environment, e.g. purified water supplies, elimination of vector habitats.
- 2 Through changes in the micro-environment, e.g. changes in domestic sanitary behaviour.
- 3 By increasing the population's immunity to diseases by vaccination.

1 An example of a disease whose transmission is interrupted by even the most elementary hygienic precautions.

**Table 2** *Major communicable diseases in the developing world***Malaria**

About 500 million people at risk of contracting malaria outside China. Insect vector. See text.

**Schistosomiasis**

180 million affected. Responsible, like other parasitic infections, for protein loss. Often associated with hypoproteinaemia. Snail vector, water-related. See text.

**Filariasis**

250 million affected. About 30 per cent suffer from elephantiasis. Some evidence of spread from urban to rural areas. Insect vector.

**Onchocerciasis**

20 million affected. Mainly in the African savannah. Vision impaired in 30 per cent of cases. 4-10 per cent blinded. Insect vector.

**Trichuriasis**

350 million affected. Helminth. Spread by faecal contamination directly or via water and food.

**Ancylostomiasis**

450 million affected. Helminth. Spread by faecal contamination directly or via water and food.

**Ascariasis**

650 million affected. Helminth. Spread by faecal contamination directly or via water and food.

**Amoebiasis**

10 per cent of the world's population affected. Spread by faecal contamination as above.

**Chagas' disease**

7 million affected. S. American Trypanosomiasis. No cure. 10 per cent fatality rate in children. Insect vector.

**Trypanosomiasis**

Limited by attacks on the vector *Glossina*. Occurs in tropical Africa, especially in S. Sudan.

**Smallpox**

52,000 cases reported in 1971, the total occurring estimated by the WHO to be 150,000, a reduction of nearly 2,000 per cent since 1967. See text.

**Polio**

Increasing frequency in developing countries, associated with a fall infant mortality rates below 75/1000. Oral vaccines available. See text.

**Infectious Hepatitis**

Difficult to control. Some hope of vaccine development. Spread by faecal contamination.

**Respiratory Virus Infection**

Leading cause of morbidity in all regions. Synergistic action with other diseases results in considerable mortality.

**Yellow Fever**

Difficult to estimate real number of cases. 15,000 affected in Ethiopian outbreak in 1962-3. Constant danger from jungle foci of the infection, which may lead to an urban outbreak.

**Trachoma**

About 600 million people affected. World's major cause of blindness. Evidence to suggest better environmental hygiene alleviates effects.

**Influenza**

Epidemics cyclic. Pandemics represent the greatest infectious disease hazard to the populations of developed countries.

**Measles**

High case fatality in developing countries. Vaccine available but too expensive except in developed countries. See text.

**Leprosy**

11 million+ affected. Long duration. About one third disabled. Associated with lack of water and consequent lack of washing, spread by contact. On-going research into immunology and prophylaxis.

**TB**

Probably over 20 million active cases, three quarters in the developing world. Droplet infection. Chemotherapy and BCG vaccine available.

**Cholera**

171,000+ cases reported in 1971. See text.

**Diarrhoeal Diseases**

Includes dysenteries and enteric infections, typhoid etc. Spread by faecal contamination. See text.

**Plague**

Still frequent, especially pneumonic plague. Half all cases reported in Vietnam, presumably because of USA medical presence. Insect vector.

**VD**

Increasing numbers of cases throughout the world. For example, about 1 per cent of the USA's population is expected to contract gonorrhoea in 1972. Showing increasing resistance to treatment.

**Yaws**

Widespread successful eradication. Over 30 million cases cured with penicillin in the early 60s. Spread by body contact.

**Cerebro-Spinal Meningitis**

At least 30,000 reported cases in 1970. Showing increasing resistance to sulfonamides. Droplet infection. See text.

Of the indirectly transmitted diseases malaria is probably still the most important. The success of eradication campaigns aimed at the destruction of the mosquito vectors either directly by the large scale use of DDT or by destroying their habitats, for example by draining swamps, illustrate how these diseases may be controlled by measures aimed at changing ecological balances. The extent of control gained over malaria is shown in that by 1970 three-quarters of the population living in originally malarious areas inhabited land which was either malaria free or in the process of being made so, more than half of them living in areas where the eradication campaigns had reached the final maintenance stage. Even so, about 400 million people are still liable to contract the disease.<sup>1</sup> The recurrence in 1968 of malaria in Ceylon after it had been virtually eradicated by 1963 shows the importance of maintaining vigilant observation of the external sources of a disease even after it has apparently disappeared in the human population. Expenditure in

<sup>1</sup> These figures do not cover the quarter of the world's population living on mainland China.

Ceylon in 1969 on malarial eradication and the treatment of sufferers was twenty times as great (£1 million) as the estimated £50,000 it would have cost to maintain the surveillance abandoned in 1963, which would have probably prevented the return of the disease.

The control of some other indirectly transmitted diseases has proved more difficult. The malaria carrying mosquitoes may be quite effectively destroyed by the large scale use of insecticides. Other disease vectors have proved more difficult to eliminate and in such cases a different approach is needed, which may be exemplified by the measures taken against bilharzia (schistosomiasis).

Bilharzia weakens more than 180 million people throughout the world. In areas such as Egypt, where new dams have resulted in an increase of the types of habitat suitable for the black snail vectors, the numbers infected are increasing and now the majority of the agricultural labour force of that country is infected. Although specific drug therapies have been developed these are expensive, not very efficient and have sufficiently unpleasant side effects to require medical supervision of their administration. By themselves they are useless if the patient is going to be immediately re-infected after treatment.<sup>1</sup> Molluscicides may be used to destroy the snails which inhabit the edges of lakes and rivers but total and maintained eradication would be extremely difficult. The only solution appears to lie in widespread public education regarding the causes of infection coupled with extended medical and environmental improvement such as water purification wherever possible. The illustration on the inside covers of this booklet is from a public health education campaign about schistosomiasis conducted in Brazil with the help of the international pharmaceutical industry and is a good example of the sort of educational approach needed as a base for such campaigns in the developing countries. It is noticeable that it is aimed mainly at children who, being probably both more literate and more flexible than the adults, are seen as the gateway to communication with the mass of the population. They are also, of course, one of the groups at the greatest risk of infection.

Similar approaches aimed at the improvement of domestic sanitation and standards of house and child care are needed to reduce the incidence of the directly transmitted diseases, as experiences during the recent cholera pandemic have shown.<sup>2</sup> In 1961 the

1 Immunisation against Bilharzia is a distant possibility.

2 The El Tor biotype causes clinically less severe cholera than does the 'classical' cholera vibrio, case fatality averaging 1 per cent to 3 per cent when treatment is received, although this figure may rise to between 5 per cent and 8 per cent for children. Treatment consists mainly on maintaining body fluids. The case mortality rates reported to the WHO were generally between 20 per cent and 30 per cent indicating that in most of the areas affected by cholera adequate treatment was not available to the bulk of the population.

El Tor biotype of the causative agent spread from its endemic focus in Indonesia up through the Chinese mainland and then westward through India to eastern Europe and then to parts of North and West Africa in 1970. In countries such as Japan and the USSR cholera was quickly controlled, largely due to good sanitation and, especially in the USSR, the advantages of the central direction of the health services. In the developing countries where progress in sanitation has often lagged behind other forms of development and where rapid urbanisation and unplanned irrational use of water and land resources has frequently lowered sanitary conditions in recent years the disease was far more difficult to control.

To the extent that the patterns of disease found in the developing countries are global, world wide surveillance is needed and eradication programmes should be planned with their international significance in mind. A notable example of success on such a scale is the WHO anti-smallpox campaign, despite the recent outbreak in the exceptional circumstances in Bangla-Desh. In 1971 over half the 52,000 reported cases occurred in Ethiopia which only began its eradication campaign in January of that year.

In that vaccination can provide long-term protection against virus diseases it is one form of personal medical care which is feasible on a large scale in developing countries. Even so, there are considerable problems regarding the cost of such programmes. For example, measles is a major killer in the developing countries but although an effective vaccine has been produced its cost limits its use to only the industrialised nations. In the case of poliomyelitis – a disease which increases in prevalence in a population as natural immunity is lost due to a rise in living standards,<sup>1</sup> – vaccination again has a very important role to play. The prices of vaccines could be much reduced from their present levels if they were bought in bulk by a central purchasing body and then resold to individual developing countries. It is hoped that the WHO will shortly take up such a role, by buying with hard international currencies and selling for developing countries' own money.

What emerges from even a brief survey of health in the developing countries is an underlining of the importance of communicable diseases in these areas and a reinforcement of the view that measures aimed at changing the conditions and ways in which people live are of key significance in altering the incidence of infections in particular communities.

Education regarding hygiene and the causes of ill-health designed to promote behavioural and consequently environmental change backed, where financially possible, by engineering projects such as

<sup>1</sup> In seven countries out of nine whose reported infant mortality has fallen below 75 per 1,000 since 1955 there has been a reported increase in polio (WHO 1971).

the provision of piped water and by vaccination campaigns, have at present a greater role to play in changing the mortality and morbidity patterns of the developing countries than has the introduction of sophisticated curative medical techniques. This has been realised by many people for a considerable time. The failure of those working in the health services to implement this understanding has been due in part to sheer shortage of physical means and in part to aspects of social dynamics discussed in the following sections of this review.

## Medical resources and manpower

The distribution of medical resources is often expressed in terms of doctors, nurses or hospital beds per head of the population. Table 3 gives such figures for 1967 for some world regions.

These figures give a general picture in that they indicate that resources are considerably more restricted in the developing world than in the developed. But in many ways overall figures such as 'population per doctor' or 'hospital beds per 1,000 population' are wholly inappropriate in describing the situation regarding medical manpower and resources in the developing world. They do not take into account the great variation in the distribution of facilities between the towns and rural areas, where the majority of the population live. They give no indication of the relative availability of services such as hospital treatment to the various sections of the population. And they provide no guide to the appropriateness of the services provided to the health needs of the community they should serve. Ignoring the variations in definition of a 'hospital bed' figures such as hospital beds per capita only have any significance at all in the context of the health services of the developed world, and even here their relevance is doubtful. As with so many aspects of medical services in the developing world such figures have been used because they are used in the developed countries, without any regard for the basic differences in the situations in the various areas.

In the absence of reliable comprehensive statistics relevant to the medical care needs of the developing countries it is often necessary to use selected examples to illustrate important points.

It has been estimated that in the late 1960s between 45 per cent and 55 per cent of total government health expenditure in the

**Table 3** *Number of doctors, dentists, nurses and hospital beds by selected WHO areas 1967*

	No. 1967	% increase 1960/67	Pop. per unit 1967	Pop. per unit '67 Pop. per unit '60
<b>Doctors</b>				
Europe	1,141,000	27	640	0.85
Africa	23,000	44	9,700	0.82
S.E. Asia	118,000	25.5	5,960	0.94
E. Med.	58,000	53	4,730	0.78
<b>Nurses</b>				
Europe	1,824,000	34	400	0.81
Africa	86,000	41	2,600	0.84
S.E. Asia	87,000	28	8,084	0.93
E. Med.	32,000	31	8,573	0.81
<b>Dentists</b>				
Europe	201,000	28	3,633	0.85
Africa	2,100	10.5	106,000	1.06
S.E. Asia	6,900	15	102,000	1.03
E. Med.	6,300	40	43,450	0.85
<b>Hospital beds</b>				
Europe	6,376,000	20.6	110	0.85
Africa	410,000	14.2	540	1.02
S.E. Asia	464,000	23	1,520	0.97
E. Med.	244,000	25.7	1,120	0.94

Europe includes USSR and Turkey.

Source: WHO 4th Report on the World Health Situation

developing countries was spent on hospital services. Thirty-five per cent to 45 per cent was spent on personal health services and the remainder was divided between non-personal public health services and teaching (Abel-Smith 1967). There is much evidence that this expenditure would have been better directed towards more public health services designed to prevent rather than to cure diseases. Regarding the provision of personal services it seems certain that these would be more efficiently provided by more diffuse community services than by hospitals.

For example, the capital costs of a single teaching hospital in Africa may exceed the entire annual recurrent health budget of the country in which it is situated. In principle such hospitals should function not only as a teaching base but as the peak of a medical care referral system. They do not do so in many parts of Africa. For example, in the early 1960s over four fifths of all admissions to the New Mulago Hospital in Kampala, Uganda, came from the immediate locality of the hospital (ITDG 1971). There is evidence indicating an inverse relationship between the distance individuals live from health centres and hospitals and the use they made of them.

significant over only two or three miles (Bryant 1969). Thus, in Ghana, government health expenditure is amongst the highest in Africa at over £1 per head yet it is estimated that two thirds of the population are not effectively covered by the medical services, which are primarily hospital based and to which patients have to travel (Gish 1971).

A new hospital is being completed at Tamale in Northern Ghana at an estimated cost of £2.4 million for 300 beds (£8,000 each). The expected recurrent annual cost of this hospital is £600,000, double the operating budget of the northern region for all medical care at the time of building. £2.4 million would be sufficient to build 80 rural health centres to the relatively high Ghanaian standards or 120 at an average East African figure of £20,000. As another example the capital involved in the construction of the new hospital in Lusaka, Zambia (£5 million), would have been enough to finance the construction of 250 of the latter type of health centres which, if each served 20,000 people, could cover the entire population. Estimating recurrent costs of the centres at £10,000 per annum or 50p per head (ITDG 1971) this strongly suggests that more benefits are likely to accrue to the nation from expenditure on health centres rather than from investment in hospitals.

An extreme example of imbalance in the health resource allocations of a developing country is shown by Ayub Khan's recent administration in Pakistan.<sup>1</sup> The projected cost for a new hospital

**Table 4** *Population per physician, selected countries. (Late 1960s)*

Country	Urban	Rural
Ethiopia	3,000	200,000
India	500	40,000
Indonesia	2,800	6 million
Iran	850*	20,000
	3,700**	
Kenya	1,000*	45,000
	2,000**	
Nigeria	2,050	59,000
Senegal	3,050	46,000
Sierra Leone	3,250	39,000
Syrian Arab Republic	1,900	6,350
Thailand	850*	120,000
	3,600**	
Togo	2,050	70,000

\* Population per doctor in capital.

\*\* Population per doctor in other urban areas.

Source Gish 1971, WHO 1972

1 The new Pakistani government has recently revised its health expenditure allocations.

to be built at Islamabad was £3.26 million. In the same year the total expenditure of the rural health centre programme was £1.24 million (Gish 1971). Yet 80 per cent of the population is rural. Given that teaching hospitals in such areas do not act as the end points of a nationwide referral system this illustrates the extent to which a premature move towards medical specialisation in a developing country effectively channels the majority of medical resources of the country into the service of a privileged minority of the people.

The tendency of medical personnel to cluster in the urban areas is shown in Table 4. This in itself would not be disturbing if many of these doctors travelled outside the town to work in the rural areas. But this is not so. The explanations for the tendency are reasonably clear. Firstly, living standards are far higher in the cities and the opportunities for private practice are confined to them. Secondly, the opportunities to practise the sophisticated methods in which doctors are trained are available only in the cities which act as foci for the medical communities. Even when doctors are working in countries where they are born, they are likely to be of urban middle class origin and find the rural areas in many ways a foreign world.

For doctors trained in Western medical practises, particularly when they have experience of working in Western countries, a preference for working in cities seems inevitable. It has been estimated, for example, that between 15 and 20 per cent of all Indian doctors have been influenced by direct experience in developed countries (Gish 1971). It seems improbable that methods of tying doctors to working in rural areas for certain periods after training, such as in the Phillipines or Iran, will be particularly effective or even that large economic incentives would really promote the formation of efficient rural health services whilst the training of those expected to provide such services is clearly geared to needs of a completely different social, economic and physical environment. There is no doubt that developing countries need a nucleus of people who possess a sophisticated and extensive knowledge of modern medical methods. But it is unreasonable to suppose that these individuals should be expected, or expect themselves, to administer directly the health care services of the populations of the rural areas of the developing world where the need for simple education in general hygiene, family planning, child care, nutritional habits and simple medical treatment is far greater than the need for complex and expensive treatment practised at the frontiers of Western medical technology.

### **The role of the medical auxiliary**

Against this background the arguments advanced by Gish, King and others for the large-scale training and deployment of medical

assistants or auxiliaries appear very persuasive. Suitably trained, such workers could treat most common conditions such as diarrhoeal diseases and infected wounds whilst carrying out vaccination campaigns and diffusing elementary knowledge regarding health and birth control throughout the community. The role of a medical auxiliary in a developing country may well differ considerably from that of assistants currently being employed in some of the developed nations. For example, the feldshers of the Soviet Union have rather more medical training than is necessary in less developed areas and they frequently work in closer contact with doctors than would be possible in a developing country.

The 'barefoot doctors' of the People's Republic of China may serve as a model for the sort of medical auxiliaries needed in much of the developing world. There, selected members of every community are trained by working with mobile health teams over a period of about three years during the four to five slack months which lie between the agricultural seasons of each year. They remain in their own communities whilst gaining knowledge about simple medical treatment and the general social and hygienic practices which are known to be prerequisites to the eradication of the most essential causes of ill-health. A fundamental requirement of such training is the presentation of knowledge in terms of direct practical examples. Such training may equip individuals with sufficient information to provide care within their communities without promoting their need or ability for intra or international mobility. However, whether such a model is workable in cultures which do not accept the ethos of social discipline current in China is questionable. Opportunities for personal advancement will tend to draw individuals away from their rural communities as soon as they gain a degree of education.

Medical auxiliaries are already practising in many areas of Africa. In Ethiopia there are over 200. The Sudan has over 750 auxiliaries, Uganda 400, Tanzania 200 and Kenya and Malawi about 600. In the latter country there are about eighty doctors and the administration of medical services depends very greatly on the auxiliaries (ITDG 1971). Indeed if medical auxiliaries are to play their full role they must be prepared to operate quite independently of doctors in the more isolated parts of developing countries rather than acting as merely assistants to doctors.

A point of major significance is the cost of training an auxiliary as opposed to that of a doctor. It has been estimated that the average cost of training a physician in the UK is £15,000 and in the USA £22,000. Estimates from schools in the developing world vary considerably, ranging from £10,000 to Bryant's estimate that in some cases costs are up to 65 per cent greater than the current USA

figure (ITDG 1971). On average costs appear to be comparable with those of the UK and USA. On the other hand the costs for training auxiliaries in Africa at present range from about £500 in Uganda through to about £1,000 in countries such as Kenya and Malawi for courses which last about three years. In the new university at Yaounde, Cameroon, it is hoped to train medical personnel rather more economically. Auxiliaries are expected to cost about £220 each to train as opposed to £7,000 for a doctor and £1,500 for a nurse.

### Opposition to 'auxiliaries'

There is little doubt that many people realise the significance of medical auxiliaries and that they will continue to increase in numbers throughout the world. For example, in Zaria, Northern Nigeria, it is hoped that the training of medical auxiliaries will soon be commenced. At present the doctor/population ratio in this region is 1 per 150,000 and it is estimated that about an extra 3,000 doctors would be needed to fulfil the WHO recommendation of a ratio of 1 per 10,000. In 1973 the first cohort of thirty doctors will graduate from the Ahmadu Bello medical school in Zaria, but it must be expected that many of these will leave the region. Against the background of these facts it should be remembered that by the year 2000 the population of Northern Nigeria will probably have doubled, a point which underlines the hopelessness of attempting to man health services in such areas with staffing ratios comparable to those in the developed countries.

Perhaps the major medical manpower problem of the world today is how to introduce the medical auxiliary in areas where he is needed, but does not exist, against the widespread opposition of the medical profession (King 1970). Medical auxiliaries should be regarded not as substitutes for doctors in developing regions but as fulfilling a unique and essential role in a health care structure in which the medical practitioner is seen as occupying a place one stage higher up the referral system. On many cases they will be the only contact patients have with medical services but even so this will be far more desirable than the present state in many rural areas where there is no care whatsoever.

Pressures from sources mainly within the medical profession for the maintenance of medical standards based on developed countries' priorities, regardless of the health needs of the people, are still strong. For example in Pakistan the licentiate, a medical worker with a shorter period of training, had been taking up many posts in the government rural services which were and are severely understaffed. However, the British General Medical Council did not consider these physicians suitably qualified for practice in the UK

and consequently the occupational group was abolished due to pressure from the Pakistani medical profession, despite the useful work being done by licentiates. The Pakistani doctors were motivated to an extent by the prospect of being ranked as equals with the licentiates and hence losing their rights to practice in Britain.

In Ethiopia the rural doctor/population ratio is about 1 per 200,000 and most of the medical care in these regions is administered by auxiliaries, over 200 of whom had been trained at the Gondar College. In 1962 the control of the college was taken over by the Haile Selassie I University and consequent modifications to the curriculum have greatly reduced the relevance of the training to the auxiliary's future community role, increased its academic content and have led many of the students to become medical students subsequent to their training. The entire programme at Gondar is now of greatly reduced value (Gish 1971). In conjunction with the development of the University medical school a hospital is being built in Addis Ababa, where 2.5 per cent of the population live, at an estimated cost of £3.25 million. The total government expenditure on health services in Ethiopia is about 20p per head and it is estimated that 75 per cent of the population have virtually no contact with health services. The recurring annual costs of the new hospital are estimated at 25 per cent of the country's total annual health expenditure.

### The medical 'brain-drain'

An important factor relevant to these considerations is the international demand for medical personnel, especially doctors, which at present acts as a considerable drain on the resources of the developing countries. There are probably 50,000 or more doctors from these nations currently practising in the developed world, 10,000 of them, mainly from the Indian sub-continent, in the UK (Gish 1971).<sup>1</sup> They are often nominally classified as receiving advanced training but in reality they gain only experience of Western medical practice, usually in a hospital environment. There are also many nurses of similar origin in the UK although most of them received their professional training in this country whilst most of the doctors qualified in their own. At UK training costs the doctors working here represent about £150 million of investment in higher educa-

<sup>1</sup> In 1967 direct financial aid from the British government for medical services in the developing world was about £6 million, plus the fact that nearly 2,000 British doctors were serving abroad and nearly 1,000 health workers of all types from developing countries were training in Britain. It seems probable that in fact we received medical aid from the developing countries, rather than vice-versa. Of course these doctors are paid by the British taxpayer whilst employed in this country, although much of such payments will stay in our economy. Foreign doctors constitute 60 per cent of all NHS junior hospital doctors (Gish 1971).

tion made by some of the poorest countries in the world and being used to the benefit of one of the richest.

In the light of this it does appear to be an anachronism for the British General Medical Council to maintain the principle of reciprocity for doctors qualifying in Commonwealth, or ex-Commonwealth, countries. Doctors from all other nations must take a qualifying examination before practising in this country. When the social needs of the Commonwealth countries are considered it is surprising that their doctors are allowed such easy international mobility. However, even when qualifying examinations are imposed, such as those set by the American Educational Council for Foreign Medical Graduates, very substantial numbers of students from the developing countries are passed because they are trained in techniques relevant to the needs of the developed countries. Indeed the medical schools in countries such as the Phillipines have become geared to this end. Effective controls on medical emigration will ultimately have to come from those countries which are losing their doctors.

### Summary

The conclusion regarding resource allocation in the developing world's health services is that the costs of hospital building and maintenance are out of all proportion to the total amount of money available for health services in developing countries. Moreover, large hospitals with facilities for sophisticated treatment are wholly inappropriate to the health needs of the mass of the developing countries' population. They encourage medical specialisation of a sort which leads to the isolation of the medical fraternity from practise or interest in rural areas where a vast reservoir of ill-health could be alleviated by the application of relatively easily acquired technologies and expertise. If it is accepted that it is desirable to improve the health levels of the mass of the population within the present economic resources then doctors must be trained to be educators as well as healers and they must be prepared for medical auxiliaries to provide the first stages of medical care, in many cases acting totally independently of supervision. Medical standards are hardly likely to be threatened. In rural clinics in developing countries today a visiting doctor may see up to fifty patients an hour. Painstaking diagnosis is improbable. Despite measures such as the mobile health corps in Iran, adequate medical coverage of the rural population of the developing world is only likely to be achieved by the widespread introduction of medical auxiliaries.

Improvements in the health services of the developing world will only be achieved if planning is based firmly on the objective investigation of the experience and needs of the population and the

economic realities of their situation. Such an analysis can only be made in relation to the social priorities for development which governments decide. In the next section the role of health care as a priority in socio-economic development will be discussed, together with a look at the influence of the presently developed countries with the developing.

## Discussion

With the exception of the People's Republic of China the balance of medical resource allocation in the developing countries is weighted very heavily towards the sort of hospital-based curative medicine now practised in the developed world. As Table 5 indicates private sector expenditure on health frequently accounts for between one half and three quarters of total health expenditure in a developing country, nearly all of which buys personal curative services which benefit only a tiny, rich minority of the population. Of government expenditure at least one half goes on hospital services and only about a twentieth on public health schemes.

Such measures are unlikely to cut into the vicious circle of events which underlies the health problems of the developing countries today which, if it is to be broken, requires far more concentration on preventive medicine backed up by programmes aimed at restricting the population's fertility.

Although the provision of curative services in these areas may do much to alleviate individuals' suffering it can do little alone, given the resources available, to reduce the overall incidence of disease. Whilst there is a constant risk of infection and re-infection from a multiplicity of hazards costly individual treatments are of little long-term value. Indeed, if money which could be spent on improving sanitation, water supplies and nutritional standards is devoted instead to health services the long-term effect could very easily be detrimental to the physical well being of the population.

It is important to consider the factors which have led to the emergence of the situation in the developing countries where there is such a heavy skew in the distribution of services in favour of urban populations and towards expensive hospital facilities as opposed to less sophisticated yet more immediately relevant provisions for treatment.

Where, as for example in parts of Latin America, private social insurance schemes have been introduced to finance medical services, such services have naturally reflected the needs of those who make the major contributions to maintaining them, the urban wage

**Table 5** *Health expenditure 1967. Selected countries*

Country	Per capita expenditure	Private as % total	Infant mortality rates <sup>1</sup>
Sweden	£63.9	26	12.9
UK	£34.22	23	18.3
USA	£91.7	77	22.4
Greece	£10.5	44	34+
W. Malaysia	£ 3.8	50	45+
Ceylon	£ 2.2	51.6	50+
Ghana	£ 2.4	66	40 Urban
El Salvador	£ 4.5	70	170 Urban
			63+

<sup>1</sup> These rates are only rough guides, in that their estimation is difficult and they are crude rates covering considerable internal variations. E.g. in the UK there is over 34 per cent variation in the rates between social classes I and II and IV and V. Spicer & Lipworth 1966.

<sup>2</sup> The WHO basis for calculating these figures excludes some items more usually included under the heading of private health expenditure.

Source: WHO 4th Report on the World Health Situation

earners. The poor members of the rural communities are not so well cared for. Where such schemes have been introduced in developing countries, largely as a result of the political ideologies influential in certain areas, the result has been described (Abel-Smith 1972) as virtually 'a governmental denial of its responsibility to govern'.

Because the problems confronting the health services of the developing countries are so great and the costs and benefits involved so difficult to assess central government direction in health planning seems a precondition for an equitable distribution of benefits in the long term. Distribution by simple market mechanisms is not likely to safeguard the interests of the poor majority of the people. If nothing else, the mechanics of insurance schemes (whether state or privately run) which allow services to be generated in response to demand based on monetary contributions, will tend to direct resources away from them. Even if it were economically feasible to obviate distributional objections by crediting all persons with contributions, the sort of personal curative services that are generated by 'payment for item of service' which is associated with insurance-based schemes would be wholly inappropriate to the priorities of developing countries.

The nature of the health care systems in developing countries has of course been influenced by the historical base on which they were developed. For instance, those areas of the world which were once under British control were given a relatively sound basis for developing a service capable of reaching the majority of the popu-

lation. Today even a poor Commonwealth country like India spends as much per capita on public health as richer non-Commonwealth countries such as Thailand or the Phillipines.

The attitudes held by medical practitioners to their own social and professional roles<sup>1</sup> are another important influence on the health services. Medical training throughout the world is based on the knowledge and techniques gained in the now developed countries and many doctors in developing countries have had at some time in their careers direct experience of practice either in Western Europe, America or Russia. The applicability of many of the attitudes towards and methods of medical care evolved in the socio-economic conditions of the richest countries of the world to the problems facing medical practitioners in the poorest areas is very limited. In most cases their use leads to an undue emphasis on the importance of the academic qualifications of those allowed to practise, resulting in the setting of standards which are unsuitably rigorous and hinder the useful work which personnel such as medical auxiliaries could clearly do. The desire of doctors to practise the advanced techniques which represent to them the highest level of their professional skill explains to a considerable degree the apparent misallocation of medical resources in the developing world.

Gifts of sophisticated and prestigious yet unsuitable medical equipment by developed countries have also significantly influenced the patterns of medical resource distribution. Much foreign aid is of great value. The Christian churches provided each year some £300 million worth of services related to health care during the 1960s. The United States has spent about £26,000 million on aid since the Second World War (Myrdal 1972). In 1971 the developed countries spent between £80 and £90 million pounds on birth control programmes in the poorer countries. However, much of this aid has been wasted through the inadequate planning and supervision of its use and sometimes medical aid has been seen as a vehicle for politico-economic penetration and hence has not been designed to help the mass of the population but to impress powerful elite groups. For example, expensive equipment may be wasted because nobody knows how to work it or has use for it and vaccines may be wasted because of incorrect storage procedures. Also aid has often been aimed at introducing Western standards because the real nature of the developing world's problems were inadequately perceived.

<sup>1</sup> Native doctors have in many cases held dominant positions in the emergent class structures of previously colonial areas. In that medical practitioners have often had political power and influence, the attitudes of the medical profession have been particularly important.

In terms of the developing countries' own internal policies it can be argued that perhaps medical resources are more rationally allocated than appears at first sight. Given the economic weakness of such nations their governments have to attempt to calculate what forms of expenditure will give rise to the greatest overall benefit for the community. Thus they may believe that the existence of an educated middle class is so important to the future development of their countries that it is justifiable to devote a large proportion of the medical services available to the benefit of that class, a view which would to some extent justify the present allocation. Again, it could be argued that if urban areas are to serve as foci for development then concentration of all types of resources in them is desirable and it can be suggested that spin-offs in fields such as education from the provision of facilities such as hospitals are very great. However, the situation of the developing countries today is historically unique. Because the cities and middle classes played an important role in Western Europe during past centuries this does not mean to say that they have a similar role to play in today's developing nations. For example, the role of the emerging middle classes in breaking down the established power of the aristocracy in Europe through the introduction of new techniques of production has no clear parallel in present situations.

The current distribution of medical services in the developing world is in most cases the chaotic result of the working of diverse social forces and it seems most probable that it is largely detrimental to the physical wellbeing and future prospects of the populations of the areas concerned in that resources which could be productively employed are spent on services which are relatively ineffective. There are a number of arguments that suggest a more desirable allocation of medical services would take the form of a generally available but less sophisticated service based on medical auxiliaries with doctors serving at the apex of a system of referral and education.

The first is moral. Given the present distribution of morbidity and mortality experience in developing regions many ethical standpoints suggest the desirability of the alleviation of such suffering where physically possible. This requires efficient allocation of resources. The second is that medical services have an essential role to play in relation to the success of other social care programmes and they can only do this if they are more generally available throughout the community. A further factor relevant to the future of medical services in developing countries from a political view is that they may serve as social control mechanisms through which social discontent may be reduced and social integration increased.<sup>1</sup>

<sup>1</sup> Other sociological effects, such as changes in family structure, may also be expected. This might in turn lead to effects such as a reduction of the birth rate.

There do appear to be overwhelming justifications for the widespread introduction of medical auxiliaries as the primary stage of medical care in developing countries and for down grading the standing of hospital building and care from its present dominant position in the health resources allocation priorities of these areas. Doctors need to see their role as fundamentally advisory and educative rather than directly curative, recognising more explicitly that given the present socio-economic conditions improved sanitation, nutrition and education and decreased fertility have the most important roles to play in improving health standards. Such an increased emphasis on preventive medicine would, ideally, need to be backed by changes in the medical courses in developing countries' schools designed to make them more relevant to the prevailing social conditions there.

Perhaps the most potent argument for the provision of any kind of personal medical care in the developing countries is that such a service is, or at least should be, fundamentally educational. It may provide people with a greater knowledge of the working and needs of their bodies which can, in turn, act as a guide to expedient behaviour. The immediately tangible results of medical treatments may be used to indicate dramatically the rewards to be gained from such measures as the adoption of birth control techniques and may increase people's trust in the use of rational scientific thinking in general. The significance of personal medical care in such areas should be looked for in its synergistic interaction with other social care programmes rather than in its isolated importance.

Nevertheless, the value of personal medical services must not be overrated. The physical health of populations depends mainly on the environmental conditions in which they live and the improvement of the health of the people of the developing countries will largely depend on progress in this sphere. Many aspects of the necessary developments are dependent on the speed at which the underlying values and beliefs in these societies can adjust. In this context the example of China is encouraging. For example, attention has been recently drawn to the rapidity with which the 'barefoot doctors' have been able to introduce birth control techniques amongst the people there (IPPF 1972).

Yet any changes in the societies of the developing world can only be effective in genuinely increasing the sense of complete physical, mental and social wellbeing (the WHO definition of health) of the population if they are part of a social policy which is sensitive to the reality of human needs. Medical services can at best only free a population from some of the discomforts which act as barriers to the enjoyment of being. This experience depends far more on an individual's sense of the value and meaning of

existence, which rests on his or her orientation within a community, than it does on the standards of physical health associated with that community.

Where 'developments' are introduced without due regard for the structure of the society in which they take place they may result in much human suffering. Recent research has pointed to the painful conflicts frequently generated in the minds of the people of developing countries when they are faced with very rapid and incomprehensible social change (Lambo 1965, 1971). Planners in such areas must be aware of the real need for the maintenance of an equilibrium between factors such as the material and spiritual cultures of a society if their presumable long-term objective, that of making life as agreeable as possible for the population, is to be achieved.

## References

- Abel-Smith B (1967) An International Study of Health Expenditure. WHO.
- Abel-Smith B (1972) Medical care in Developing Countries (Lecture).
- Barnsley J H (1972) The Rich and the Poor. *Director* 3/1972, pp. 365-70.
- Barton W L (1970) Tropical Health. In *Human Ecology in the Tropics*. Ed. Garlick.
- Bauer P T (1972) Dissent on Development. Weidenfeld and Nicolson.
- Bryant J (1969) Health and the Developing World. Cornell University Press.
- Clifford-Gould C (Ed.) (1972) Health and Disease in Africa. University Press of Africa.
- Gish O (1971) Doctor Migration and World Health. G. Bell and Sons.
- Gordon-Smith C E Changing Patterns of Disease in the Tropics. *Brit Med Bulletin* 1972, 28, 1, pp. 3-9.
- Gundar-Frank A (1971) The Sociology of Development. Plato Press. IPPF Newsheets 1971, 1972.
- ITDG (1971) Health Manpower and the Medical Auxiliary.
- King M H (1966) Medical Care in Developing Countries. Oxford University Press.
- King M H (1970) The Auxiliary, His Role and Training. *J Trop Med Hyg* 12/1970.
- Kyle R (1972) *New Scientist*. 3/1972.

- Lambo T A (1965) in Wolstenholme G and O'Connor M (Eds) *Man and Africa*. Churchill.
- Lambo T A (1971) The Jacques Parisot Foundation Lecture.
- Logan R FL International Studies of Illness and Health Services. *Millbank Memorial Fund Quarterly*. 4/1968.
- Logan, W P D Mortality in England and Wales, 1848-1947. *Population Studies* 9/1950.
- Macdonald G (1963) The Development of Health Services in Tropical Countries. *Acta Tropica* Vol. 20 No. 3.
- Macdonald G (1964) Health Problems in Developing Africa. *Industry and Tropical Health* (v).
- McKeown T & Lowe C R (1966) An Introduction to Social Medicine. Blackwell.
- Mendia L (1968) in Prywes M and Davies A M (Eds) Health Problems in Developing States.
- Myrdal G (1972) Political Factors in Economic Assistance. *Scientific American*, 4/1972.
- Prywes M & Davies A M (Eds) (1968) Health Problems in Developing States. Grune and Stratton.
- Shakir *et al* (1972) *Lancet* VII, p. 143.
- Shaper A G, Kibukamusoke J W, Hutt M B R (Eds) 1972. Medicine in a Tropical Environment. *British Medical Journal*.
- Sharp I (1971) China's Medical Revolution. *Asian Journal of Medicine* 1/1971.
- Taueber I (1960) Japan's Demographic Transition Reconsidered. *Population Studies*, 7/1960.
- UN (1971) World Economic Survey, 1969-70.
- UNICEF News 3/1972.
- Victor Bostrom Fund (1971) Population and Planning in the People's Republic of China.
- WHO Chronicle 1970a Vol. 24 No. 10  
 1970b Vol. 24 No. 12  
 1971a Vol. 25 No. 4  
 1971b Vol. 25 No. 8  
 1971c Vol. 25 No. 9  
 1971d Vol. 25 No. 11  
 1972a Vol. 26 No. 4  
 1972b Vol. 26 No. 5  
 1972c Vol. 26 No. 6  
 1972d Vol. 26 No. 7
- WHO (1971) 4th Report on the World Health Situation 1965-68.
- WHO Press Releases 1971, 1972.
- WHO (1971) The Work of the WHO.
- Wrigley A (1969) Population and History. Weidenfeld and Nicolson.

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**Danger!  
Black snails**

VIU, DITO. UMA SO' PESSOA PODE TORNAR TÔDA A ÁGUA DE UM RIO CONTAMINADA!

**You see, Tommy, one person alone is enough to contaminate the whole river!**



