HEALTH

Sector Policy Paper

Sector Policy Paper•Politique sectorielle•Documento de política sectorial

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HEALTH
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INTRODUCTION

This is the first study published by the World Bank that is specifically addressed to health issues. Direct lending for health projects has not been part of the Bank's activities,[1] although its operations have influenced health conditions and some projects have included health services. Earlier papers have examined the Bank's policies in fields that significantly influence health conditions, such as water supply and sewerage, population planning and the environment. This paper now attempts a more comprehensive review of the policy relating to health. For this purpose, it:

- assesses the health situation in developing countries;
- examines the impact of poverty on ill-health, and of ill-health on economic development;
- analyzes the trends in health policy in member countries and offers suggestions for reform; and
- outlines the policy the Bank has decided to follow.

Health conditions in developing countries have improved considerably in recent decades. In general, the improvement has been associated with economic progress. But international differences in health levels remain substantial; within nations, differences in the health of the rich and the poor are no less wide. The evidence suggests, furthermore, that health conditions among poverty groups in different countries are basically similar, as the poor suffer from a core of fecally-related and air-borne diseases. Malnutrition increases the susceptibility to many of these diseases, and compounds their severity.

In developed countries, economic progress has reduced the threats to health by ensuring safe water supplies, sanitary waste disposal, adequate housing and improved nutrition. These improvements are essential for controlling disease; and until they are made, narrowly defined health care services will be largely ineffective. Even under very favorable circumstances, personal health care can do little to diminish the incidence of disease, although it can reduce its harmful effects. To improve the health of the poor in the developing countries, it is essential to devise programs which will improve sanitation and water supplies, housing, personal health practices and nutrition, and promote family planning and simple preventive health measures.

Improvements in health usually reduce mortality and tend, therefore, to accelerate population growth. In the longer term, once people perceive a reduction in infant and child mortality, they may want

[1] *All references to the World Bank in this paper are to be deemed to refer also to the International Development Association, unless the context requires otherwise. The fiscal year (FY) of the two institutions runs from July 1 to June 30.*

smaller families; but the interval between health improvements and this perception may be considerable. If the improvements are not accompanied by other measures to promote socioeconomic progress, faster population growth may offset the stimulus to economic development that better health could bring through reduced absenteeism, increased labor productivity and better exploitation of natural resources. The long-term effect of modernization and socioeconomic progress has historically been a fall in both mortality and fertility. Health programs, therefore, should not be isolated efforts, but should form part of a broad program for socioeconomic improvement designed to reduce mortality and fertility.

In many developing countries, health policies are inefficient and inequitable. Too large a proportion of public expenditures on health are allocated to impressive, but expensive, modern hospital facilities and sophisticated medical manpower. The allocations have resulted in a bias toward inpatient, curative care—a practice which barely touches health problems in areas beset with serious environmental hazards to health. Furthermore, the resources are typically concentrated on the needs of urban areas. Rural people are neglected; thus, only a small proportion of the total population is granted effective access to modern health care.

To increase the effectiveness of health resources and to ensure more equitable access to care, governments need to curtail their expenditures on hospitals and highly trained personnel, and devote more resources to the staffing of low-level health services in areas with few facilities, or none at all. The services would focus primarily on improving environmental and public health, personal health practices and nutrition. Further savings might be made by analyzing the cost-effectiveness of health care activities, and by better administration and more rational pricing policies.

Reforms in the service offered to the poorer people should concentrate on improving health at the community level. The objectives should include changes in living habits and attitudes, as well as household and community activities to improve water supply and sanitation. While the demand for curative care would not be denied, a more economical balance would be struck between measures to treat disease and measures to control its incidence.

The World Bank has initiated project lending in a number of areas that directly affect health. The number of health-related projects supported by the Bank has increased from four in fiscal 1969 to 22 in fiscal 1973. In the latter year, the total of such loans and credits was $500 million. Of this amount, $366 million was for water supply and sewerage, and $22 million was for population projects. The health components

of education, rural development, irrigation and drainage, and sites and services projects totaled about $19 million.

The Bank has decided that, in the coming years, it will continue to strengthen its awareness of the health consequences of the projects it supports, and of opportunities for improving health that are available under present patterns of lending. In other words, while the health benefits of projects are expected to increase, the patterns of lending will remain basically unchanged.

Although this implies that the Bank will be less deeply involved in health than if it had decided to lend for basic health services, the scope and potential of the policy is not to be underestimated. It means that the Bank plans to:

- minimize any adverse side effects on health resulting from its lending operations in other sectors (such as projects for irrigation, drainage, land settlement, etc.);
- make a number of key interventions necessary for improving the health of low-income groups (for example, projects involving water supply, sewerage, nutrition, family planning, sites and services for low-cost housing, and training of health personnel);
- conduct field experiments to test selected elements of a reformed health-promotion system within rural development, population, and sites and services projects.

Chapter 1: HEALTH CONDITIONS IN DEVELOPING COUNTRIES

Health conditions in developing countries have improved considerably in recent decades. Generally, the improvements have accompanied socioeconomic progress. There is a marked association between the level of per capita income in a developing country and its health status. Superimposed on very substantial intercountry differences in health are equally notable variations within countries between rural and urban areas and between the poor, the middle-income and the affluent groups. Health conditions of the poor everywhere are basically similar. Their core disease pattern consists of the fecally-related and air-borne diseases and malnutrition. Socioeconomic development can reduce these hazards through improved nutrition and better health habits. In addition, sanitary water supply and waste disposal diminish the fecally-related diseases, and better housing and reduced crowding reduce the air-borne diseases. Sanitation has also contributed to reductions in another group of diseases—the vector-borne diseases—by destroying breeding and feeding areas for insects and small animals.

General Measures of Health

Life expectancy at birth and at selected ages is the most reliable measure of health status available. Although this measure does not take nonfatal diseases into account, it is closely correlated with many forms of morbidity and debility, and therefore provides an index to the range and intensity of health problems. For the developing countries as a group, life expectancy at birth is estimated to be about 49 years, compared with slightly over 70 years for the economically advanced countries (see Table 1). For the African continent, the estimate is 43.3

Table 1

Life Expectancy at Birth in Some Major Areas of the World

(In years)

	1935-39	1950-55	1955-60	1960-65	1965-70
Developing regions	32.0	41.7	44.4	47.0	49.0
South Asia	30.0	40.6	43.4	46.1	48.8
East Asia	30.0	44.8	47.1	49.6	52.2
Africa	30.0	36.4	38.6	40.9	43.3
Latin America	40.0	52.3	55.3	57.9	60.2
Developed regions	56.0	64.6	67.8	69.2	70.4

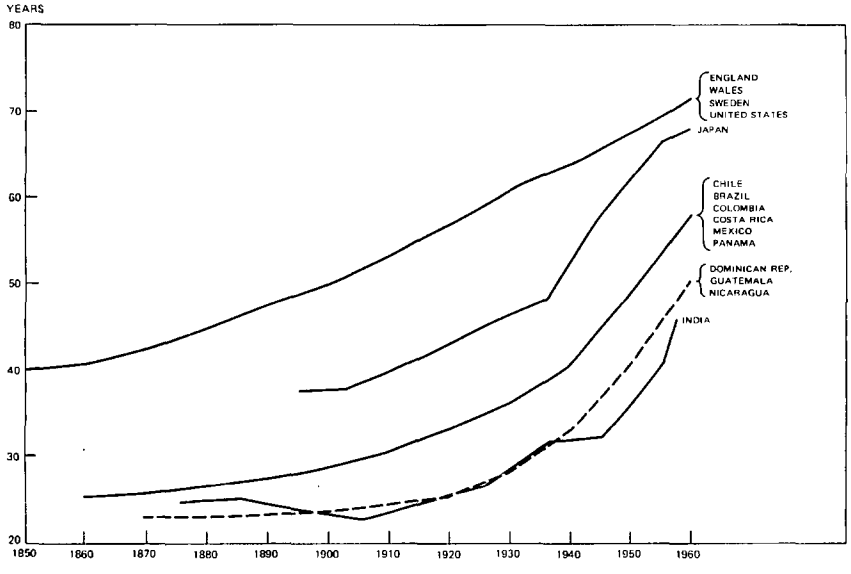
Source: World Bank. *Population Policies and Economic Development*, Statistical Annex Table 2. Baltimore and London: The Johns Hopkins University Press, 1974.

years for the period 1965-70. Since these values are averages, they do not indicate the health status of the poorest citizens of the developing countries.

The average life expectancy at birth for the developing world increased from 32 years before World War II to 49 years by the end of the 1960s. Starting from a very low level, the improvement in life expectancy was larger in both absolute and relative terms than in developed countries. The rate of improvement has declined, however—from 2.7 years in the periods 1950-55 and 1955-60, to 2.6 years in 1960-65 and to only 2.0 years in 1965-70. Further evidence on trends in life expectancy is presented in the Figure.

Life expectancy at various ages yields broader insights into health status than life expectancy at birth alone. Table 2 presents data for selected countries which show that, in countries with low life expectancy at birth, surviving the first year of life greatly increases the expected life span. In Cameroon, for example, life expectancy at birth is only 34 years, but those who survive to one year of age may expect to live 40 more years. This phenomenon results from the extraordinary risks of death encountered during the first year of life. Countries

Trends in Life Expectancy in Selected Countries



Source: Arriaga, E. and Davis, K. "The Pattern of Mortality Change in Latin America." *Demography* 6(3):223-242, 1969 (August 6) (Tables A-3 and A-4).

Table 2

Life Expectancy in Selected Countries for Males at Specified Ages

(In years of life remaining)

Country	Age					
	0	1	5	10	15	20
Cameroon	34	40	42	41	38	35
Central African Republic	33	40	41	38	n.a.	31
Chad	29	34	34	31	n.a.	31
Colombia	44	50	52	48	44	40
Egypt	52	56	61	57	52	48
Gabon	25	34	38	36	n.a.	29
Guinea	26	33	35	32	n.a.	29
India	42	48	49	45	41	37
Japan	68	69	66	60	56	51
Mexico	58	62	60	56	52	47
Nigeria	37	45	49	47	43	39
Sweden	72	72	68	63	58	54
China, Republic of (Taiwan)	66	67	64	59	54	49
United States	67	68	65	59	54	50

Source: United Nations. ***Demographic Yearbook, 1968,*** Table 21; and ***Demographic Yearbook, 1970,*** Table 20. New York: United Nations, 1969 and 1971, respectively.

with high life expectancies, however, have low rates of infant mortality; hence survival in the first years of life up to the age of five does not add significantly to the total expected life span.

Differences between and within Countries

A striking association exists between measures of per capita income and health status. Annex 2 shows the relationship between per capita income and life expectancy, infant mortality and the crude death rate, respectively. African countries, which have the lowest per capita incomes in the world, report the lowest levels of health, while the Latin American countries, which are among the wealthiest of the developing nations, report a health status approaching that of the developed world.[1]

Substantial intercountry differences in health are accompanied by equally notable variations within countries. These differences are pronounced between urban and rural areas in developing countries. The crude death rate for 1960 in the rural areas of the developing world was estimated by the United Nations as 21.7 per 1,000, compared with 15.4 for urban areas.[2] Data on infant mortality are especially pertinent as

[1] *The correlation coefficient for per capita GNP and life expectancy is 0.580 for the countries reported in Annex 20. If the United States is excluded from the analysis, the coefficient becomes 0.726.*

[2] *United Nations.* Demographic Trends in the World and Its Major Regions, 1950-1970, *Table 12. New York: United Nations, 1973.*

they refer to the population most vulnerable to health hazards. Absolute levels of infant mortality are probably grossly underreported in developing countries; the degree of underreporting is probably much greater for rural than for urban areas. Nonetheless, mortality rates, as reported, are much higher in the rural areas. These differentials are a consequence of the marked contrast in socioeconomic conditions between rural and urban areas. Such rural-urban differentials tend to disappear in advanced European countries, where living standards are much less disparate than in the developing countries.

Interestingly, the contrast between rural and urban health status in today's developing countries is opposite to that which prevailed historically in the advanced nations when they were becoming industrialized. In 1841, overall life expectancy for males in England and Wales was about 40 years, but in London it was only 35 years and in the industrial cities of Liverpool and Manchester, it was only 25 and 24 years, respectively.[3] Compared with rural people, the health status of urban dwellers in the now developing countries is better; this is because they enjoy higher incomes, better sanitation and water supply, higher school enrollment ratios, and superior environmental and personal health services.

The Disease Pattern

A comprehensive assessment of the health situation requires knowledge not only of death rates and life expectancy rates for all age groups, but also of the distribution, by cause, of mortality and morbidity. This study focuses on infectious and parasitic diseases—which are communicable—plus malnutrition as the core health problems of developing countries.[4]

Reliable information on patterns of disease is extremely difficult to compare on a countrywide basis for most nations.[5] Nevertheless, it is possible to convey a general idea of the difference in disease patterns on the basis of models developed by the United Nations (see Table 3). These models simulate the pattern of disease under specific assumptions regarding population characteristics, environmental conditions and socioeconomic circumstances. One model represents a population characteristic of a developing country: life expectancy at birth of

[3] *United Nations, Department of Economic and Social Affairs.* The Determinants and Consequences of Population Trends, *Vol. I, p. 133. New York: United Nations, 1973.*

[4] *The degenerative diseases—diabetes, hypertension, cardiovascular disease and malignancies—and accidents are excluded. It is believed that these problems are of lower priority because they make up a relatively minor part of the health burden of developing countries.*

[5] *Many problems arise in analyzing such data: underreporting is more common for some diseases than for others; multiple-causation leads to misreporting; and many deaths are registered without identification of causes (in Thailand, for example, such deaths account for 59% of the total reported, and in Iraq the proportion is 44%).*

Table 3

Percentage Distribution of Deaths by Cause in Selected Model Populations

	Model developing country	Model developed country
All causes	100.0	100.0
Infectious, parasitic and respiratory diseases	43.7	10.8
Cancer	3.7	15.2
Diseases of the circulatory system	14.8	32.2
Traumatic injury	3.5	6.8
All other causes	34.3	35.0

Source: Adapted from *Population Bulletin of the United Nations,* No. 6, pp. 111-112, particularly Table V.33. See also pages 106-110 for a description of methods used in constructing these and other models. New York: United Nations, 1963.

40 years and a young age structure. The second model represents a developed country: an older age structure and a life expectancy at birth of 70 years. These statistics broadly indicate the different disease patterns of developed and developing countries.

The most widespread diseases in developing countries are probably those transmitted by human feces. The most common are the intestinal parasitic and infectious diarrheal diseases, but also included are poliomyelitis, typhoid and cholera. The spread of these diseases is easy in areas without community water supply systems. The category "bacillary dysentery and amoebiasis, enteritis, and other diarrheal diseases" was the leading identified cause of death in Paraguay (1971), Guatemala (1970) and El Salvador (1971). In Pakistan (1972), the category "all forms of dysentery" was the most frequently notified communicable disease.[6] In a case study in Punjab, India, a death rate of 3,446 per 100,000 infants from acute diarrheal diseases was reported.[7] In the Arab Republic of Egypt, Iran and Venezuela, the monthly incidence of diarrhea among children of preschool age has been estimated to be between 40% and 50%.[8]

Intestinal parasitic diseases are frequently chronic and debilitating rather than causes of acute illness or death. Their incidence in the developing world is often high. A World Bank case study of the labor force engaged in civil construction at three sites in West Java, Indonesia, found 85% infected with hookworm.[9]

[6] *World Health Organization.* The Fifth Report on the World Health Situation, 1969-1972—Part II, Review by County and Territory. *Geneva: WHO, 1974.*

[7] *Scrimshaw, N. S., Taylor, C. E., and Gordon, J. E.* Interactions of Nutrition and Infection. *WHO Monograph Series No. 57, p. 240. Geneva: WHO, 1968.*

[8] *Van Zijl, W. J. "Studies on Diarrheal Diseases in Seven Countries."* Bulletin of the World Health Organization *35:249-261, 1966.*

[9] *Basta, S. S., and Churchill, A.* Iron Deficiency Anemia and the Productivity of Adult Males in Indonesia. *World Bank Staff Working Paper No. 175, p. 1. Washington: World Bank, April 1974.*

Possibly one of every four persons in the world is infected by round worms.[10] Case studies in Sri Lanka, Bangladesh and Venezuela found an average whipworm infection rate in preschool children of between 50% and 70% for both round worm and whipworm; at the age of six the infection rates for helminths were 95%, 97% and 93%, respectively, in Sri Lanka, Bangladesh and Venezuela.[11]

The second major disease group consists of the air-borne diseases. The group includes tuberculosis, pneumonia, diphtheria, bronchitis, whooping cough, meningitis, influenza, measles, smallpox and chickenpox. These diseases are spread by breathing the air-borne, respiratory secretions of infected persons. According to government statistics, they accounted for 24% of reported deaths in Bolivia in 1971, 29% in Guatemala in 1970, and 19% in Chile in 1972.

Table 4 presents an analysis of a recent study of various areas in Latin America where (excluding Jamaica) fecally-related diseases, air-borne diseases and malnutrition were the primary cause of death in over 70% of cases (excluding deaths from congenital anomalies and perinatal causes) among those below the age of five. The fecally-related diseases alone were responsible for over half of all deaths among children under five years of age in Chaco Resistencia, Bolivia; Ribeirao Preto Franca, Brazil; and San Salvador.

These three major disease groups account for the majority of deaths among the poorest people in developing countries, and particularly among children below the age of five. Other debilitating and fatal diseases are limited to particular geographical areas or particular ways of life. The water-borne diseases are the most significant of this group. However, direct contact with the exudate from infections is also an important transmission process for such diseases as syphilis, gonorrhea and leprosy. The contact diseases are generally of relatively minor significance except in limited areas. They are controlled largely by improved hygiene and changes in social habits.

Vector-borne diseases are less widespread and figure less prominently in mortality and morbidity statistics, but are nonetheless significant in the developing world. The most widespread of these diseases are malaria, trypanosomiasis (sleeping sickness), Chagas' disease, schistosomiasis (bilharzia), and onchocerciasis (river blindness). In sub-Saharan Africa alone, about 270 million people remain exposed to malarial infection without any organized protection. In some areas, the malarial infection rate is 90% to 95%. Cases reported per 100,000

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[10] *Wilcocks, Charles, and Manson-Bahr, P. E. C.* Manson's Tropical Diseases, *Seventeenth Edition, p. 247. Baltimore: Williams and Wilkins, 1972.*

[11] *Van Zijl, W. J. "Studies on Diarrheal Diseases in Seven Countries,"* op. cit., *Table 12.*

Table 4

Percentage of Deaths under the Age of Five (Not Due to Congenital Anomalies or Perinatal Causes), for which Fecally-related Diseases, Air-borne Diseases or Malnutrition Were the Primary Cause of Death

Areas	Deaths caused by			
	Fecally-related diseases	Air-borne diseases	Nutritional deficiency	Total
Chaco, Argentina, rural	40	36	2	79
San Juan, Argentina, central urban	38	32	3	72
San Juan, Argentina, suburban	34	38	8	80
San Juan, Argentina, rural	35	42	8	84
Chaco Resistencia, Bolivia, rural	52	27	6	84
La Paz, Bolivia, urban	29	55	3	87
Viacha, Bolivia, rural	25	65	0	91
Recife, Brazil, urban	42	41	5	88
Ribeirao Preto, Brazil, urban	49	36	2	87
Ribeirao Preto, Brazil, rural	50	29	3	81
Ribeirao, Preto Franca, Brazil, rural	55	20	7	82
Sao Paulo, Brazil, urban	40	33	5	78
Santiago, Chile, central urban	31	37	6	73
Santiago, Chile, suburban	33	38	3	74
Cali, Colombia, urban	44	25	15	84
Cartagena, Colombia, urban	38	23	17	78
Medellin, Colombia, urban	49	22	11	82
San Salvador, El Salvador, urban	52	28	6	86
San Salvador, El Salvador, rural	51	22	13	86
Kingston, Jamaica, urban	37	21	5	63
St. Andrew, Jamaica, rural	23	23	23	69
Monterrey, Mexico, urban	43	35	4	83

Source: Puffer, Ruth R., and Serrano, Carlos V. *Inter-American Investigation of Mortality in Childhood, Provisional Report,* Appendix Table I, pp. 133-154. Washington: Pan American Health Organization, September 1971.

were 15,247 in the Central African Republic (1972), 11,433 in Senegal (1972), and 10,439 in Upper Volta (1971). In Uganda in 1971, there were 1.6 million registered cases in a population of about 10 million.[12] The disease is endemic, and adults have acquired a higher degree of natural immunity through the process of adaptation. However, in the Indian subcontinent, epidemics break out periodically because adults have not achieved this level of adaptation. Malaria eradication campaigns launched in the 1950s and backed by international agencies were largely successful in 37 countries.[13] However, there is evidence of recent setbacks in Indonesia, Sri Lanka and the Indian subcontinent.

[12]*Weller, T. H. "World Health in a Changing World."* Journal of Tropical Medicine and Hygiene *77(4) Supplement: 54, 1974 (April).*

[13]*Weller, T. H. "World Health in a Changing World."* Ibid., *p. 54.*

The number of persons living in areas where the eradication program is in the "consolidation phase" declined from 335 million in 1966 to 299 million in 1971.

Trypanosomiasis[14] occurs in a very wide band across the middle of Africa. It is generally fatal if not treated in its earliest stages. In the early twentieth century, as the movement of people was stimulated by colonization, the disease spread disastrously on the continent. In Uganda and the Congo, the population was estimated to have been cut in half. Between the World Wars, mobile health teams and enforced mass testing and treatment of populations substantially reduced the prevalence of trypanosomiasis; and, by the 1950s, it was under control in most areas. However, in some areas, control services were later dislocated, and in others, community-level support for control measures dwindled. The disease has started again to become more serious since the mid-1960s.[15]

The American form of trypanosomiasis, Chagas' disease, is concentrated in the rural areas. It is endemic in most countries of South America, and in much of Central America. The disease is typically chronic and can continue for years. Many cases show no symptoms, but heart troubles are a common sequel, and no satisfactory treatment exists.

Schistosomiasis is a debilitating disease of varying severity transmitted by snails. In arid regions, the disease is not a major problem since enough surface water is rarely available for large snail colonies. Large areas of slow-moving water and water vegetation provide an ideal habitat for the snails, and the most severe instances of the disease are found in East Asia. There are now perhaps 200 million clinical cases of schistosomiasis in the world, and its impact is growing.

Onchocerciasis, although less common in the world as a whole, is hyperendemic to Western Africa and parts of Central America. It is a debilitating, helminthic disease. Heavy infections of long duration produce clinical results which, even apart from blindness, can be very severe. In some areas, the disease has led to the depopulation of fertile river valleys. The vector, the simulium fly, prefers swift running water as its habitat. Although man-made lakes above dams tend to flood simulium breeding grounds, the turbulent water near the sluice gates can create ideal breeding conditions below the dam. Thus, the development of water resources may help spread the prevalence of the simulium fly and the incidence of the disease.

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[14]*Cattle are highly vulnerable to some forms of the trypanosome which are harmless to man. For a long time, much of sub-Saharan Africa did not have draught animals because of animal trypanosomiasis, and this was probably a major reason for slow technological development in the area.*

[15]*Burke, J., "Historique de la Lutte contre la Maladie du Sommeil au Congo."* Colloque International sur la Lutte contre les Grandes Endémies, 1970, *pp. 93-110 Antwerp: Prince Leopold Institute of Tropical Medicine, 1970.*

In addition to these vector-borne diseases, tetanus is of real concern in many areas. Its prevalence is related both to specific occupations and practices. The disease is caused by anaerobic bacteria that live in dung or earth. In many areas of the developing world, tetanus in newborn children is a major danger, often because dung is used to stem the bleeding of the umbilical cord. Agricultural workers who wound themselves while working are also susceptible to tetanus. The use of animal manure as fertilizer may worsen the problem.[16] Induced abortion in unsanitary surroundings is a common cause of tetanus infection. Without sophisticated medical care for the disease, the fatality rate approaches 100%.

Chapter 2: CAUSES OF POOR HEALTH

Even though life expectancy is increasing and the incidence of specific diseases, such as malaria, has been reduced through eradication programs, poor health persists as a major problem in many developing countries. The conditions responsible for this situation need to be better understood if effective policies are to be formulated. Climate, cultural practices and life styles undoubtedly have an impact on health. However, the socioeconomic characteristics of a population have an even more pervasive influence.

Secular increases in health standards in Western Europe and North America were brought about much more by rising living standards and improving socioeconomic conditions than by medical care *per se*. For example, the incidence of cholera and typhoid fell in Britain and the United States long before effective methods of treatment were available; to this day, developed countries do not practice generalized immunization. In Sweden, death rates have been falling steadily since about 1800.[1] In the United States, tuberculosis deaths went down from 200 per 100,000 population in 1900, to 3 per 100,000 in 1967. Yet sanitoria and collapse therapy for treatment of tuberculosis were not widely available until the 1930s—when the death rate was already down to about 70. Chemotherapy became available only in the 1950s

[16] *In Kenya, the incidence of tetanus increased rapidly and was highest in areas where agricultural activity was greatest. See Fendall, N. R. E., "Agronomy and Health."* Lancet: *648, 1965 (October 2).*

[1] *Scrimshaw, N.S. "Myths and Realities in International Health Planning."* American Journal of Public Health *64(8):792-798, 1974. Scrimshaw argues that better nutrition has been the main factor in mortality declines in both developed and developing countries.*

when the rate was below 30.[2] It is the poverty of developing countries, with its accompaniments of rapidly expanding populations, inadequate nutrition, and crowded and unsanitary living conditions that is at the root of the health problems described in Chapter 1. The ways in which these elements of a low level of socioeconomic development interact and foster disease are explored in this Chapter.

Demographic Factors

A number of health risks derive from high fertility rates in developing countries. When large numbers of people live in poor households located in crowded, unsanitary surroundings, communicable diseases spread easily, and high mortality and morbidity rates result, particularly in the case of children. High mortality rates, in turn, induce families to have many children so they can assure themselves of surviving progeny. This circular pattern of high fertility rates and high mortality rates is difficult to break because lower mortality rates are followed slowly, and then only partially, by lower birth rates (see Table 5). In countries with high birth rates, children compose a relatively high proportion of the population. Children under five years of age make up 15% to 20% of the total population of developing countries, compared with about 8% in developed countries. Because children have less immunity to disease than adults, children's diseases predominate in developing countries, where half of all deaths are accounted for by children under five years of age.

High fertility rates imply high parity, and high parity directly affects maternal mortality—a sharp and steady increase in risk of death occurring after the third birth. Although the differentials are most marked where obstetric care is minimal, higher maternal morbidity due to toxemia, placental disorders, malpresentations and hemorrhage continues to occur in women of high parity after improved obstetrical care has reduced mortality.[3]

At a family level, population pressure increases the resort to abortion, a practice which can carry major health risks. Data on induced abortion are very difficult to obtain because the practice is illegal in most developing countries. Nevertheless, it is known that between 1958–60 in Chile, abortions accounted for 8% of all admissions to National Service Hospitals and 27% of blood transfusions; they were

[2] *For a review of these issues, see Winkelstein, Jr., Warren. "Epidemiological Considerations Underlying the Allocation of Health and Disease Care Resources."* International Journal of Epidemiology *1(1):69–74, 1972.*

[3] *World Health Organization, for the United Nations Economic and Social Council.* Working Paper No. 8 for the World Population Conference, 1974: Health Aspects of Population Trends and Prospects, *p. 17. New York: United Nations, 1973. This is an extremely useful paper on the interrelation of health and population*

Table 5

Mean Rates of Decline in Infant Mortality Rate (IMR) and Crude Birth Rate (CBR) in Developing Countries Since 1945–49 by Interval Between Decline in Infant Mortality and Onset of Decline in Crude Birth Rate

Interval between decline in IMR and CBR	Number of countries	Rates of change since 1945-49 in: Infant mortality rate	Crude birth rate
0 years	1[1]	−.0361	−.0178.
5 years	6	−.0196	−.0219
6-9 years	16	−.0373	−.0165
10-14 years	14	−.0353	−.0238
15-19 years	13	−.0327	−.0146
20 years	3	−.0288	−.0000
Total	53	−.0367	−.0178

[1]The Dominican Republic experienced a temporary rise in infant mortality after 1950-54, which has since reversed; the crude birth rate has been declining since 1950-54, so that the fall in birth rate appeared to precede the fall in death rate even though in 1950-54 the crude birth rate was 44.0 and the infant mortality rate was 79.7.

Source: World Health Organization, for the United Nations Economic and Social Council. ***Health Aspects of Population Trends and Prospects,*** E/CONF.60/BP/7, Table 1. Mimeo. New York: United Nations, 1973 (June 28).

responsible for over $1 million in hospital care expenditures in 1960. Studies in Turkey in the early 1960s estimated that, in a population of less than 30 million, 500,000 abortions were performed every year, and resulted in 10,000 deaths. One study in Turkey found 6.7 maternal deaths from abortion per 100 live births. The overall abortion rate in three metropolitan areas of Turkey recently was 56 abortions per 100 live births. For women over 30 years of age there were 1.1 to 1.5 abortions per live birth.[4] Studies of several areas have found the rate of abortion to be much higher among women who have already had several children.[5] Thus abortion can be interpreted principally as a response to untenable population pressure, at the family level.

Demographic factors may influence health at the community level as well as at the family level.[6] Population pressure on the land may lead to overcropping, soil degradation, and poor nutrition for an entire community. It may force people to migrate, with the resulting emotional and physical health problems of social disorganization. Population growth makes it more difficult to provide safe or sufficient water

[4]*Helpern, Milton,* et al. *"Abortion and Public Health."* Abortion in a Changing World, Vol. 2, *Robert E. Hall (ed.), pp. 47-48. New York and London: Columbia University Press, 1970. The figures should be regarded as approximate.*

[5]*Chow, L. P. "Abortion in Taiwan."* Ibid., *Vol. 1, pp 253-254 Requena, Mariano. "Abortion in Latin America."* Ibid., *Vol. 1, pp. 341, 345-346*

[6]*World Bank.* Population Policies and Economic Development, *pp. 68-72. Baltimore and London. The Johns Hopkins University Press, 1974.*

supply, garbage disposal and sanitation for the community. It increases the cost of providing adequately trained health manpower and medical facilities. When population pressure exists in a community, housing is likely to become congested; while high population density in a favorable social environment may not create major health problems, in an environment of poverty the probability that the infection will spread is very high.[7]

Malnutrition

Widespread malnutrition is a characteristic of poor nations which contributes to the incidence and severity of health problems. It poses a major threat to children and, in extreme cases, threatens their lives. Data presented earlier (in Table 4) underlined the role of malnutrition as a *primary* cause of death of children under five years of age in selected locations in Latin America.

In addition to being a primary cause of death among children in the developing world, malnutrition creates serious health problems by contributing to premature births and to abnormally low weight at birth. A major study of child mortality in Latin America—a comparatively well-fed part of the developing world—found that nutritional deficiency and immaturity (i.e., premature and/or underweight babies) were the direct cause of 6% of the deaths occurring before the age of five, with one or the other factor an associated cause in 57% of all deaths.[8]

Malnutrition is also a major contributing factor in infectious disease. Malnutrition impairs normal body responses to disease, thereby reducing acquired immunity. The importance of malnutrition as a contributing cause of illness and death has been widely documented. For example, it has been observed that, except where populations are malnourished or otherwise uncommonly susceptible to disease, the incidence of tuberculosis is significantly lower than would be expected by the widespread presence of the tubercle baccillus.[9] Diarrheal diseases have resulted in large numbers of deaths among undernourished children in Guatemala.

Similarly, it has been observed that mortality due to measles was 274 times as high in Ecuador as in the United States in 1960-61—before the

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[7]*Cassel, John. "Health Consequences of Population Density and Crowding." National Academy of Sciences,* Rapid Population Growth: Consequences and Implications, *pp. 462-478. Baltimore and London: The Johns Hopkins University Press, 1971.*

[8]*Calculated from data in Puffer, Ruth R., Serrano, C. V., and Dillon, Ann.* The Inter-American Investigation of Mortality in Childhood, *pp. 2-6. Washington: Pan American Health Organization/WHO, 1971.*

[9]*Scrimshaw, N. S., Taylor, C. E., and Gordon, J. E.* Interactions of Nutrition and Infection, *pp. 60-142. Geneva: World Health Organization, 1968.*

development of measles immunization. At the time of the study, the incidence of the disease in the two countries was probably not significantly different. A more recent study of Recife, Brazil, identified nutritional deficiencies in 74% of measles deaths.[10]

Just as malnutrition can increase susceptibility to disease, so also can disease contribute to malnutrition. Epidemics of diarrheal diseases are often followed after a few weeks by outbreaks of nutritional diseases. This has been a well-documented and frequent occurrence in many countries, including Mexico, India, New Guinea and Brazil, etc.[11] Enteric infections inhibit the absorption of nutrients in the intestinal tract, thereby increasing the intake required to maintain nutritional status. Furthermore, fevers associated with infections increase the role of metabolism and thereby boost nutritional requirements.

The problem of inadequate nutrition is compounded by rapid population growth. Large family size and close spacing of births frequently preclude sufficient food and care for children.[12] Evidence of the correlation between malnutrition and large family size comes from Nigeria,[13] Thailand[14] and India.[15] Large family size and closely spaced births combine to make malnutrition a major cause of death among children under five years of age.

Unsanitary Conditions and Housing

The fecally-related or fecally-transmitted diseases found throughout the developing world share a common origin: the contamination of food, water or soil with human waste. If water is not safe for drinking, or is insufficient for personal hygiene and sewage disposal, diarrheal disease will spread more easily. Typhoid, dysentery and cholera are spread in this way, as are other intestinal infections which not only cause much illness among adults, but are also often fatal to infants or undernourished young children. Another disease related to poor sanitary conditions is trachoma. Although the exact transmission cycle is

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[10]*Puffer, Ruth R., and Serrano, Carlos V.* Patterns of Mortality in Childhood. *Scientific Publication No. 262, Table 99. Washington: PAHO/WHO, 1973*

[11]*Scrimshaw, Taylor, and Gordon,* op. cit., *pp. 216-221.*

[12]*Aguirre, A., and Wray, J. "Estudios Epidemiologicos sobre Desnutricion en Candelaria" (unpublished paper, 1965), cited in Bryant, John,* Health and the Developing World, *p. 103. Ithaca: Cornell University Press, 1969.*

[13]*Morley, D. C., Bicknell, Joan, and Woodland, Margaret. "Factors Influencing the Growth and Nutritional Status of Infants and Young Children in a Nigerian Village."* Transactions of the Royal Society of Tropical Medicine and Hygiene *62(2):164-195, 1968.*

[14]*Wray, J. D. "Population Pressure on Families: Family Size and Child Spacing "* National Academy of Sciences, Rapid Population Growth, op. cit., *Vol. 2, p. 408.*

[15]*Gopalan, C., and Rao, K. Visweswara. "Nutrition and Family Size."* Journal of Nutrition and Diet *6(3):258-266, 1969.*

still in dispute, trachoma is known to be closely related to poor hygienic conditions, particularly a lack of water for washing. Dusty conditions exacerbate the disease.

Surveys of water supply and sanitation facilities in the developing world have recently been conducted by the World Bank and the World Health Organization.[16,17] Data on the proportion of populations served by community water supply and sewage disposal facilities are presented in Table 6. These data are only approximate because of

Table 6

Estimates of Access to Water Supply and Sewerage[1]

	Per capita income in 1970 (US$)			
	Less than $100	$101 to $150	$151 to $450	Greater than $450
Number of countries	15	17	34	12
Percentage of population with access to water supply				
Rural, with reasonable access	13	8[2]	28	32
Urban, with public standpost	24	31	21	17
Urban, with pipe to house	21	36	58	63
Percentage of population with access to sewage disposal				
Rural, adequate	7	12	26	n/a
Urban, other disposal methods[3]	54	67	40	n/a
Urban, sewage system	6	14	24	n/a

[1]These estimates were obtained by calculating the population-weighted average of reported coverage within the group of countries. The definitions of coverage and of urban and rural are those developed by the individual countries and hence are not comparable. Furthermore, no attempt has been made to evaluate the quality of these statistics at the country level. The values reported in this table should therefore be interpreted only as crude "order of magnitude" indicators.

[2]This value is dominated by India and Pakistan which report 6% and 3% coverage, respectively.

[3]Buckets, pit privies and septic tanks not connected to public sewer system.

Sources: Pan American Health Organization. ***1972 Annual Report of the Director, Pan American Sanitary Bureau, Regional Office of the World Health Organization.*** Official Document No. 124, Table 32. Washington: PAHO, 1973.

World Health Organization. ***World Health Statistics Report,*** 26(11), Tables 3 and 5. Geneva: WHO, 1973.

inconsistencies in the definition of "reasonable access" to water supply and "adequate disposal" of excreta. Nevertheless, even from these approximate data, it is evident that rural populations in the poorer developing countries have access to almost no sewage disposal facilities. In urban areas, there is considerable reliance on buckets, pit privies and septic tanks which are not connected to a public sewer system. Facilities connected with the city sewer systems are not widespread, except in the higher-income developing countries.

[16]*See World Bank. "Water Supply and Sewerage."* World Bank Operations Sectoral Programs and Policies, *pp. 239-254. Washington: World Bank, 1972.*

[17]*World Health Organization.* World Health Statistics Report *26(11):720-783, 1973.*

In most countries, only a small proportion of the rural population has access to modern water systems. In the urban areas of countries with per capita incomes below $150, roughly a third of the population depends on public standposts, and only the middle- and higher-income groups use more sophisticated facilities. A substantial part of the population—rural and urban—relies on polluted river water, or similar sources.

For both water supply and sanitation facilities, the proportion of the population which is well-served rises with the level of socioeconomic development. Rural and shanty-town populations, however, still have access to no, or only the most rudimentary, facilities.

The link between sanitary conditions and health is illustrated by studies that report on health improvement resulting from better water supply and sewage facilities. Studies in several developing countries document a reduction in diarrheal diseases brought about by better water supply and sanitation facilities.[18] Privy construction in Costa Rica helped halve the death rate from diarrhea and enteritis between 1942 and 1954.[19] In a Philippines case study, improved water supply and toilet facilities cut cholera incidence by about 70%.[20] In nineteenth-century Britain, cholera was brought under effective control several decades before the causative agent, *cholera vibrio,* was discovered. Studies in California and Kentucky indicate that the incidence of dysentery in children varies dramatically, depending on the water and sewerage standards of dwellings.[21] The incidence among children living in dwellings with inside water supply, but outside privies, was twice as great as for children in dwellings with inside water and flush toilets. The rates of incidence doubled again for children in dwellings using both outside water supplies and outside privies.

Not all studies, however, show that better water supply systems and sanitation facilities result in improvements in health. Several studies have concluded that the source of water supply for a family matters less than might be expected; "the bacteriological purity of water as

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[18] *Van Zijl, W. J. "Studies on Diarrheal Disease in Seven Countries."* Bulletin of the World Health Organization *35:249-261, 1966.*

[19] *Schliessman, D. J. "Diarrheal Disease and the Environment."* Bulletin of the World Health Organization *21(3):381-386, 1959.*

[20] *Philippines Cholera Committee. "Field Evaluation of Environmental Sanitation Measures against Cholera." World Health Organization,* Strategy of Cholera Control, *BD/CHOLERA/71.5:31, Table 5. Geneva: WHO, 1971.*

[21] *For a review, see Schliessman, D.J. "Diarrheal Disease and the Environment."* Op. cit., *pp. 381-386. Many studies of the impact of environmental factors on health have failed to control for the effects of correlated variables—most notably, the level of socioeconomic development and of nutrition. Thus, they overestimate the importance of environmental measures. Several studies have sought to resolve this problem; e.g., Hollister, Arthur C., Beck, M. Dorothy, Gittelsohn, Alan, and Hemphill, Emmarie C. "Influence of Water Availability on* Shigella *Prevalence in Children of Farm Labor Families."* American Journal of Public Health *45(3).354-362, 1955.*

measured by type, city or well, did not influence infection rates."[22] The answer to this paradox may possibly be found in the cultural practices of the populations studied. For example, drinking water is often stored in cooling jars, which are nearly always contaminated. Or families may continue to drink well or river water because of greater convenience, better taste, social patterns or its supposed special qualities.

Cases can also be found where privies had little effect on the prevalence of disease,[23] or even had a negative effect.[24] Here, too, cultural habits may offer an explanation. A poorly maintained privy may be worse than none at all. Alternatively, even where public acceptance of privy campaigns in areas of Latin America has been good, the privies have frequently been used as chicken coops or grain silos.[25] Obviously, the health benefits will be limited in such cases. The ambiguous findings do not cast doubt on the link between sanitary conditions and disease. Rather, they point to the difficulties encountered in trying to change traditional patterns of behavior.

Relatively simple techniques of waste and water treatment are available which, if applied, would greatly diminish the risks of catching fecally-transmitted disease. Sanitary storage of human excreta accomplishes a great deal; within two weeks, many of the harmful bacteria die because they cannot survive for long outside the human host. Viruses are also delicate organisms and can be expected to die quickly. Helminths can remain a hazard for a longer period of time, particularly in the form of resistant cysts; eventually the cysts also die. Another technique of waste disposal is sedimentation or filtration. In both cases, the solid particles to which bacteria cling are separated out and retained till harmless. In addition, two decomposition processes, which occur naturally, render sewage harmless: oxidation (using oxygen from air or water) and anaerobic fermentation. Which of the two processes occurs depends upon the availability of oxygen for oxidation. Many "modern" processes, such as trickling filters and aeration, are simply intended to speed the natural process. Most decomposition processes rely on successive biological cycles which involve different algae. During the course of these cycles, organisms that are harmful to man are destroyed. Even helminths may be killed by the heat generated by a composting system of anaerobic fermentation. If at all pos-

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[22]*Stewart, William H., McCabe, Jr., Leland J., Hemphill, Emmarie C., and DeCapito, Thelma. "The Relationship of Certain Environmental Factors to the Prevalence of* Shigella *Infection."* American Journal of Tropical Medicine and Hygiene *4:718-724, 1955 (July).*

[23]*Scrimshaw, N. S., Taylor, C. E., and Gordon, J. E.* Interactions of Nutrition and Infection. Op. cit., *pp. 248-249.*

[24]*Van Zijl, W. J. "Studies on Diarrheal Disease in Seven Countries"* Op. cit., *p. 252.*

[25]*Wagner, E. G., and Lanoix, J. N.* Excreta Disposal for Rural Areas and Small Communities. *World Health Organization Monograph Series No. 39, p. 22. Geneva: WHO, 1958.*

sible, a biologically pure source of water should be chosen. If not, processes such as storage and sedimentation-filtration should be employed. Chemical treatment by chlorination of water is also highly effective in destroying a wide variety of disease agents.

In addition to poor sanitation and water supplies, very sizable proportions of the total population of cities in developing countries live in substandard dwellings lacking in space, ventilation and sunlight. Such conditions tend to increase the incidence of air-borne diseases. It is probable that overcrowding is the main reason why children in low-income countries contract air-borne diseases at an earlier age than in developed countries. In addition, the extended family system brings the child into regular contact with many other children at a very early age, thus increasing his exposure to disease. Among children whose immune response is not yet fully developed, the risk of serious multiple infections is very high. In developed countries, the risk does not arise until the child enters school.

Causes of Improved Health

To recapitulate, the *core health problems* throughout the developing world, except among middle- and upper-income urban groups, are fecally-transmitted diseases, air-borne diseases and malnutrition. These three elements interact cumulatively and synergistically. This is particularly true of those below the age of five, but also applies to the older age groups. Improved water supply and sanitation check the fecally-related disease cycles. More spacious, well-ventilated living conditions cut down the transmission of air-borne and fecally-transmitted diseases. Better nutrition reduces susceptibility to infection, and greatly diminishes the severity as well as the duration of illness; it is of special importance for infants and young children.

Few worthwhile studies have been conducted concerning the effects of health services on health status, and those that exist are difficult to evaluate. In some cases, concurrent improvements in water supply, sanitation or housing have not always been fully taken into account, or nutrition may have improved, but its effect has not been identified.

Sophisticated health approaches are inappropriate unless backed up by outreach and preventive services. Modern drugs, in some instances, bring immediate relief, or even eventual cure, but may have no lasting effect on the health of a person who must return to a disease-ridden environment. Treatment for parasitic infection may mitigate the clinical symptoms, but is not likely to keep a person from becoming reinfected. A medical school program for hospital care of

premature infants in Colombia achieved survival rates comparable to those in North America, but 70% of the infants discharged from the premature nursery were dead within three months.[26]

Three research projects—in Guatemala, Nigeria and the United States—have demonstrated that primary health care and increased nutrition could have a substantial impact on mortality among both infants and children in the one-to-four age group (see Table 7). The studies also show that such health care could be effective even if delivered by auxiliaries, with only limited referrals to physicians[27] or hospitals.[28] However, the relative importance of nutrition *vis-à-vis* primary health care is very difficult to determine. In addition, infant mortality in an environment of poverty is likely to remain greatly in excess of that in a developed country. Child morbidity is likely to remain at a high level too.

In general, better water supply, sanitation and housing alter the *incidence* of disease, and in this way affect morbidity and mortality. Nutrition alters both the *incidence* and the effects of clinical disease. Even under very favorable circumstances, curative health care can do little to alter the incidence of disease,[29] although it can reduce its harmful effects. Curative health care systems will, therefore, benefit the population principally by lessened *effects* rather than lessened *incidence* of disease, unless there is a strong emphasis on preventive health in the services offered.[30]

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[26] *J. D. Wray, personal communication, cited in Bryant, John.* Health and the Developing World, *p. 240. Ithaca: Cornell University Press, 1969.*

[27] *In the cases covered by the Guatemalan study, 99% of all visits were handled by primary care personnel and only 1% were referred to a physician. Even if no such referral had been possible, and all those referred would otherwise have died, the fall in mortality would have been considerable due to care by auxiliaries. See Habicht, Jean-Pierre. "Delivery of Primary Care by Medical Auxiliaries: Techniques of Use and Analysis of Benefits Achieved in Some Rural Villages in Guatemala." Pan American Health Organization,* Medical Auxiliaries. *Scientific Publication No. 278, pp. 24-37. Washington: PAHO, 1973.*

[28] *During a year, according to the study at Imesi, Nigeria, roughly 30 children per 1,000 were referred to a hospital. Even if no such referral possibility had existed and all these children had died, the fall in child mortality would have been impressive due to care by auxiliaries. See Morley, David.* Paediatric Priorities in the Developing World, *pp. 146 and 318. London: Butterworths, 1973.*

[29] *In the United States study, the Navajo Many Farms scheme, very intensive and expensive curative health care, with considerable efforts at preventive health, achieved significant reduction in the incidence of tuberculosis and ear infection; this might well have been more difficult to achieve in a less scattered community. Incidence of active trachoma, and of the pneumonia-diarrhea disease complex, was not affected. Presumably in both cases the reservoir of infection and ease of transmission remained too great. See McDermott, Walsh, Deuschle, Kurt W., and Barnett, Clifford R. "Health Care Experiment at Many Farms."* Science *175: 4-5, 1972 (January 7).*

[30] *It is likely that health care in the areas covered by the Nigerian study was so effective because of the strong emphasis on preventive health services, including family planning. The desired family size was down sharply compared to a control village, although still very large (see Morley, David,* Paediatric Priorities in the Developing World, op. cit., *Table 50), and children attended clinics an average of 20 times per year in the one-to-four age group (Morley,* ibid., *Table 20). In this context of overall concern for community health, it was possible to achieve a cut in the malaria parasite rate (Morley,* ibid., *pp. 124-147). How much was due to curative health care is unclear. Certainly, health care that is so intensive is rarely available in developing or developed countries.*

Table 7

Experimental Impact of Health and Nutrition Improvements on Mortality[1]

Project Area	Infant mortality rate per 1,000 live births		Mortality rate per 1,000 children among children one to four years old	
	Before	After	Before	After
Navajo Many Farms study	150	70	N.A.	88
Nigerian study	295	72[2]	69	28[3]
Guatemalan study	139[4]	55	28	6
United Kingdom (1966)	19		0.8	

Notes:

[1]All these programs involved costs such that they would be difficult to replicate on a national scale in a developing country. For instance, health care costs were about $5 to $8 per year per child in the Nigerian and Guatemalan projects, although this figure may exclude some overhead costs. Indirect health care costs, such as nutrition, were not specified.

[2]After an additional year, the infant mortality rate was 48.

[3]After an additional year, the child mortality rate was 19.

[4]This figure is based on recall by mothers and can be compared with the national official statistic at that time of 89.

Sources: Navajo Many Farms study: McDermott, Walsh, Deuschle, Kurt W., and Barnett, Clifford R. "Health Care Experiment at Many Farms." *Science* 175:23-31, 1972 (January 7) (especially Table 2). Experiment provided nutrition; university-supported, physician-staffed primary care; and excellent hospital referral. Staff included two field physicians, two nurses, one Navajo teacher and four Navajo auxiliary health workers for each 1,000 population. Consultants were often available onsite from the parent university. Facilities included several automobiles with two-way radio-telephones for visits to the homes, and in daylight with favorable weather, the availability of a light airplane to remove critically injured persons.

Nigerian study: Morley, David. *Paediatric Priorities in the Developing World,* pp. 316-340, especially Table 52. London: Butterworths, 1973. Experiment provided some nutrition, physician-staffed primary care, and some hospital referral.

Guatemalan study: Habicht, Jean-Pierre. "Delivery of Primary Care by Medical Auxiliaries: Techniques of Use and Analysis of Benefits Achieved in Some Rural Villages in Guatemala." *Medical Auxiliaries.* Scientific Publication No. 278, pp. 24-37, especially Table 10. Washington PAHO, 1973. Experiment provided nutrition, auxiliary staffed primary care, and some referral to physicians and hospitals.

Chapter 3: APPROACHES TO HEALTH POLICY

Programs to improve health can be viewed both as "consumption," which is the final aim of economic development, and as productive investment. A systematic description of both aspects is necessary in considering present and future policy in this field. In principle, the benefits and costs of health schemes should be assessed to determine the order of priorities; in practice, the calculations often turn out to be far too difficult and unreliable. Where benefit-cost analysis is not feasible, cost-effectiveness analyses may provide information which is useful in improving resource allocation within the sector.

A Social Goal

It is obvious that health contributes directly to human well-being and may, in fact, be regarded as one measure of welfare. Good health permits participation in personal, family, social and political activities.

Health care has an important human support function in comforting the afflicted and counseling the anxious. Whether or not illness can be cured or even mitigated, health care satisfies a felt human need—one to which people have been prepared to devote substantial manpower and financial resources in nearly all societies at all times.

A Productive Investment

The impact of health on the productive capacity of society is somewhat easier to measure than its direct consumption value. Ill health is thought to impose economic costs by: (1) reducing the availability of labor; (2) impairing the productivity of employed workers and capital goods; (3) wasting current resources, particularly nutrients; and (4) impeding the development of natural resources, animal wealth and tourism potential. Each of these costs is elaborated in the following discussion.

Reducing Availability of Labor

Both premature death and absenteeism due to illness reduce the availability of labor. However, the sizable unemployment and underemployment in developing countries implies that premature mortality may not impose an economic cost in itself. If ill health results in replacement at no cost, of deceased workers by the able-bodied unemployed, there may be no reduction in output.

Morbidity in the labor force leading to absenteeism may have a greater economic impact. Absenteeism usually disrupts the production process; even under conditions of high unemployment, the temporary replacement of absent workers is likely to result in loss of output. Only a few surveys provide data on the effects of diseases on absenteeism and, therefore, on output. A careful study of tuberculosis control in the Republic of Korea concluded that an optimal disease program resulting in increased work life and decreased absenteeism would yield a return of $150 for each dollar spent.[1] Additional examples of disease control programs that have substantially reduced absenteeism include antimalaria programs in the Philippines and southern Africa, and yaws control programs in Haiti.[2] Various efforts have been made to estimate the cost of absenteeism due to disease, by valuing days lost at current wages. The resulting estimates are often very large, although they are misleading under conditions of high unemployment.

[1] *Feldstein, Martin A., Piot, M. A., and Sunderesan, T. K.* Resource Allocation Model for Public Health Planning: A Case Study of Tuberculosis Control. *Supplement to Volume 48 of the* Bulletin of the World Health Organization, *p. 95. Geneva WHO, 1973.*

[2] *Winslow, C. E. A.* The Cost of Sickness and the Price of Health. *WHO Monograph Series No. 7, pp. 22, 25, and 30. Geneva: WHO, 1973.*

Impairing Productivity of Labor

Ill health affects the productivity of workers since their strength, stamina and ability to concentrate suffer. The statistical evidence on this is limited. A recent Bank study of construction and rubber plantation workers in Indonesia showed that the effects can be very important. The prevalence of hookworm infestation was 85%, and 45% of the victims suffered from a resulting iron deficiency anemia. Treatment of the anemic workers with elemental iron for 60 days, at a total cost of 13 U.S. cents per laborer, resulted in an increase in productivity of approximately 19%.[3] This implies a benefit-cost ratio of 280 to 1. However, one of the most careful studies undertaken on the effects of disease on labor productivity in a developing country found the effects of schistosomiasis and certain other diseases in St. Lucia to be slight.[4] These findings are qualified by the fact that the economic effects of many helminthic infections, including schistosomiasis, depend upon the intensity of infection, and the St. Lucia form of schistosomiasis is not very severe.

A conceptually distinct effect of ill health on productivity derives from its impact on education and training. Ability to learn is impaired by sickness and malnutrition.[5] Absences from school because of disease may reduce cognitive achievements. Early mortality and disability will reduce the period of time over which the pay-off from an investment in human capital can be expected, and thus diminish the productivity of training.

Wasting Current Resources

Many helminthic diseases waste resources because nutrients are consumed by the helminths themselves. A waste of calories occurs in the case of fevers, because of the extra metabolic demands made on the body. In enteric diseases, intestinal absorption of nutrients is impaired. One study in Panama reports, for example, that the value of excess food consumed in cases of enteric infections amounted to about $10 per person per year.[6]

Disease also leads to expenditures on treatment. Coverage by modern health services is limited in many developing countries, but often

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[3] *Basta, S. S., and Churchill, A. "Iron Deficiency Anemia and the Productivity of Adult Males in Indonesia." World Bank Staff Working Paper No 175, pp. 6-8. Washington: World Bank, April 1974.*

[4] *Weisbrod, Burton A., Andreano, Ralph L., Baldwin, Robert E., Epstein, Erwin H., Kelley, Allen C., and Helminiak, Thomas W.* Disease and Economic Development, *pp 72-80. Madison: University of Wisconsin Press, 1973.*

[5] *Selowsky, Marcelo, and Taylor, Lance. "The Economics of Malnourished Children: An Example of Disinvestment in Human Capital."* Economic Development and Cultural Change *2(1):18-19, 1973.*

[6] *United States Office of International Health, Department of Health, Education and Welfare.* Syncrisis: The Dynamics of Health, Vol. I: Panama, *p. 44. Washington: Government Printing Office, 1972.*

money is spent in other ways on treating diseases: self-medication with local or modern drugs, or payments to injection men, traditional healers or spirit doctors. Whether or not modern or traditional medicine is effective, the costs of treating illness are a burden on the community.

Impeding Development of Resources

An enormous waste of resource occurs when poor health conditions restrict settlement in areas with fertile land or other natural resources. The presence of onchocerciasis has restricted access to land and resources in Western Africa. Studies of Nepal, Sri Lanka and parts of Mexico show instances where malaria eradication has induced a movement of labor and capital into resource-rich districts from less well-endowed areas, with a net increase in the total output.[7] A similarly successful settlement scheme was carried out in the Anchau Corridor in Nigeria after the control of sleeping sickness.[8]

Some human diseases also infect animals in certain areas,[9] and programs can improve human and animal health simultaneously, thereby facilitating exploitation of animals as food or as draught animals. The possibilities of fostering livestock development while benefiting human health are not limited to disease-control programs only. For example, providing water in arid areas not only permits the development of livestock and crops, but can also help improve the health of human beings. It may cut time spent in carrying water back and forth, which can be a considerable saving.[10]

The tourism potential of a country can be undermined if the likelihood of contracting serious diseases is unusually high. One example is sleeping sickness in game parks. Sudden epidemics of disease can have a particularly dramatic effect on tourism; they may even affect commodity exports because of controls imposed by importing countries.

Better Health for Socioeconomic Development

Health is at the heart of a complex set of interrelationships. As shown in previous chapters, the entire disease pattern in a particular area is intimately related to levels of fertility, standards of living and cultural habits. Poverty, ill health, high fertility, high mortality, fatalism

[7] *Taylor, Carl E., and Hall, Marie-Françoise. "Health, Population and Economic Development." Science 157:651-654, 1967 (August 11).*

[8] *McKelvey, Jr., John J.* Man Against Tsetse, *pp. 156-173. Ithaca: Cornell University Press, 1973.*

[9] *The pork and beef tapeworm, trypanosomiasis, brucellosis, anthrax, hydatid disease, and sometimes schistosomiasis in the* S. Japonicum *form.*

[10] *Wagner, E. G., and Lanoix, J. N.* Water Supply for Rural Areas and Small Communities. *WHO Monograph Series No. 42, p. 19. Geneva: WHO, 1957.*

and short time horizons constitute a possible low-level social equilibrium. In practice, this equilibrium has already been disturbed in most developing countries by a fall in the death rate, and in some countries by the start of a fall in birth rates. Better health is one way human beings achieve more positive control of their environment, and that, in turn, increases their desire and ability to plan their future. Within this framework are many linkages. Economic and educational development may encourage family planning[11]; family planning improves nutrition; nutrition improves health; health can improve attitudes to family planning, reduce absenteeism, increase labor availability and productivity, and facilitate exploitation of natural resources. The net impact of these factors on economic development, however, is ambiguous, and will depend critically on the time lags involved and the magnitude of each response.

Paradoxically, health improvements may pose a threat to well-being if the net effect is to increase the rate of population growth significantly. Changes in health status affect population growth in a number of ways. Firstly, any generalized improvement in health in a developing country will lower mortality among the very young; this, by itself, will tend to increase population growth. Secondly, by reducing the many diseases that interfere with completion of pregnancy, better health and nutrition tend to increase fecundity. Thirdly, lower maternal mortality will also increase the number of surviving women who can bear children. For example, venereal diseases reduce fecundity; infectious hepatitis, tuberculosis and malaria interfere with completion of pregnancy; malnutrition contributes to maternal mortality, fetal loss, shorter fertile time-spans and absence of menstrual periods. Thus, better health and nutrition may well increase the *ability* to produce healthy babies and their chance of survival. The effects of better health on the will to reproduce, however, is less clear.

If parents aim for a target number of surviving children, a decline in mortality among young children could lead to a reduction in fertility. There is some evidence that parents respond to a child's death by a desire to replace it, suggesting that a fall in child mortality would tend to be partly compensated by a fall in fertility.[12] Some empirical evidence on the relationship between a fall in infant mortality and a fall in fertility is shown above in Table 5.

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[11] *Especially education for women. See U.N. Secretariat. "Women's Rights and Fertility."* U.N. World Population Conference, Bucharest, Romania, August 1974, Conference Background Paper, *E/CONF. 60/CBP/5, pp. 3-9. New York: United Nations, 1974. Many of the factors affecting fertility have been discussed in World Bank,* Population Policies and Economic Development, *Appendices A and B, pp. 141-163. Baltimore and London: The Johns Hopkins University Press, 1974.*

[12] *World Bank.* Population Policies and Economic Development, *pp. 52-53*

The data suggest that a decline in the birth rate is related to a fall in the infant mortality rate, but that the birth rate is less than perfectly responsive. Studies of sharp changes in mortality, such as those conducted in Sri Lanka and Mauritius, suggest that the birth rate falls less sharply than the death rate.[13] There are also cases, such as Jamaica, where death rates fell steadily but birth rates did not decline significantly for a long time. While death rates and birth rates have tended to move together, it is impossible to determine which is the causative factor; it does seem, however, that a fall in mortality is frequently accompanied by a less pronounced fall in fertility. The speed and the extent of the response may perhaps be increased by the delivery of effective family planning services.[14]

When satisfactorily integrated with other socioeconomic advances, health improvements are a vital part of the development process. But if promoted in isolation, improved health could have unbalancing effects, because the adverse effects of more rapid population growth may undermine health gains. A constructive health policy will aim at maintaining the delicate balance between better health and overall economic development.

Role of Government

The private market cannot be expected to allocate to health either the amount or the composition of resources that is best from a social perspective. The most critical failure of the market derives from the inability of consumers of health services to choose rationally. This inability is in part a consequence of the extraordinary complexity of medical problems and the consumer's lack of experience as a patient. Market failure also results from the presence of externalities. For example, procedures which halt the spread of communicable disease yield benefits to entire communities and, therefore, cannot be chosen properly by individuals acting in their own interest. The health care system possesses many of the characteristics of public utilities. Often the unit producing services (health station, clinic or hospital) must be large relative to the local service area so that effective competition is not possible. For these and other reasons, governments have found it necessary to intervene in the health sector.

The role of governments in the health sector can be illustrated by reference to three distinct situations. The first relates to health for a special group of workers or in a small zone of critical economic importance. Often the private market mechanism will direct resources to

[13] *Frederiksen, Harald. "Feedbacks in Economic and Demographic Transition."* Science *166(3907): 837-847, 1967 (November 14).*

[14] *World Bank.* Population Policies and Economic Development, *pp. 133-140.*

those health expenditures which have an attractive financial payoff. Private corporations frequently undertake disease control before opening up new land for commercial plantation or mineral exploitation. Private industry provides nutritional supplements or subsidized dispensary facilities for workers if this causes profits to rise as a result of reduced absenteeism and increased labor productivity. Financially rewarding opportunities for health investment do exist, but the market mechanism breaks down all too frequently due to ignorance, the riskiness of health technology, and the presence of indivisibilities, and of external economies and diseconomies.

In principle, public investment need not be circumscribed by imperfections of cost-price signals and many outlays on health can be justified if planners are sensitive to the health dimension of production or infrastructure projects. Lack of such sensitivity in the past has caused considerable damage to the health status of populations residing in the areas in which government projects are located. The neglect of the health aspect has been most unfortunate in projects connected with the use of water: hydroelectric dams, irrigation and drainage schemes. They may have contributed to the spread of water-related diseases, such as malaria, onchocerciasis and schistosomiasis. These adverse consequences can be mitigated by giving explicit attention to the health aspect at the project design stage and by introducing health components, if necessary. Wherever the extra cost of the health component is more than offset by additional benefits, the overall economic return on the investment will rise. Economic benefits of health outlays can usually be identified, but there will be many instances in which they defy precise measurement. Accordingly, it is easier to specify the critical minimum size of the health component that should be introduced in a project than to determine its optimum level.

Secondly, it is necessary to consider programs to control specific diseases on a nationwide basis. In this case, indivisibilities and external economies are such that the market mechanism is most unlikely to function. The application of cost-benefit analysis may, however, help to identify a sizable volume of government expenditure on health which can be justified as "investment." Alternatively, cost-effectiveness analysis may provide suggestive evidence. However, even at this level, the possible importance of demographic effects may make a standard economic approach to project analysis hazardous.

Thirdly, there are programs to improve the general health of the bulk of the population. In this case, the private market mechanism undeniably operates but the distortions are very serious. Maldistribution of incomes in countries where average incomes are also very low means that the health needs of the poor are not translated into effective

demand. While the distortion caused by income inequality applies to all sectors, the consequences for health are particularly tragic. Because of the emotional appeal of health issues, it may be politically attractive to redistribute welfare through government provision of health care.

Affluent groups in developing countries have the economic capacity to pay at market prices for most of the health services they require. Public subsidy to them is difficult to justify by any standard. However, it would appear appropriate for governments to encourage the development of insurance schemes and prepayment mechanisms for the relatively affluent. While such a program might be expected to enroll only a small part of the population, it would nonetheless foster the private alternative in health care and relieve the public sector health budget. It is important that any private scheme be devised in such a way that it does not claim a disproportionate share of health resources or encourage their misallocation.

To achieve the best results from available resources, government health programs should be designed on the basis of cost-effectiveness studies. This is a subject which has not been explored adequately, so there are many unanswered questions. It is possible, however, to illustrate the technique by comparing the cost-effectiveness of immunization and sanitation measures in the case of cholera. Vaccination gives only about 50% protection from cholera for four to six months. The per capita cost of such immunization is 15 cents. Under admittedly favorable conditions in the Philippines, rudimentary privies were built at a cost of under $1 per privy, excluding self-help labor. This is equivalent to a per capita cost of about 15 cents. Such privies, if properly maintained, cut cholera rates by about 60%. Even after allowing for maintenance and replacement costs, privy construction is clearly more cost-effective than immunization. Even when the costs of privies is three times that of immunization, the privy program will be cheaper after the sixth year.[15]

In comparing privy construction with merely treating those who fall ill, the rate of incidence of fecally-related diseases is an important factor to be taken into account. Viewed as a way to cut down on the incidence of cholera alone, privy construction would tend to be slightly the more expensive alternative—even in a cholera endemic area—because clinical cholera occurs in only a small proportion of those infected and, in any case, is a relatively rare disease even in endemic areas. However, privy construction can also reduce the incidence of a whole range of other killing or disabling diseases. Epidemiological

[15]*Cvjetanovic, B. "Sanitation versus Vaccination in Cholera Control: Cost-Effect and Cost-Benefit Aspects." World Health Organization,* Strategy of Cholera Control, *BD/CHOLERA/71.5, p. 36. Geneva: WHO, 1971.*

models which represent biomedical realities adequately are extremely difficult to construct, so that rigorous cost-effectiveness analysis is difficult to conduct.[16] Nevertheless, the diseases whose incidence can be reduced through improved water supply or improved sanitation are many, and account for a very large part of the total disease pattern. The fact implies that privy facilities which are properly used and maintained would be far more economical than personal curative care.

Chapter 4: PRESENT POLICIES OF DEVELOPING COUNTRIES

Few governments in developing countries have tried to select health policies after rational consideration of the questions discussed in the previous chapter. The objectives of health expenditures in terms of consumption and investment have rarely been articulated. The administrative framework for making decisions is usually fragmented, the data base is deficient, and specific measures are seldom evaluated for cost-effectiveness.

Expenditures on Health

Government expenditures on health in low-income countries seldom exceed 2% of GNP. The small sum spent per capita is one reason for the narrow coverage provided by public health services. Annex 3 presents data on government health expenditures per capita and as a percentage of the national budget. Of the 65 developing countries for which data are available, in 17 countries governments make health outlays that are less than $1 per capita, and the average outlay for the very poor countries with a per capita income of under $100 is only 87 cents. The average rises to $1.42 for countries with per capita incomes between $101 and $200, and to $2.85 for countries with per capita incomes between $201 and $300. The pattern of government health outlays per capita is summarized in Table 8.

Public health services cover only a small proportion of the population in developing countries because heavy emphasis is placed on high-cost, individual, curative medicine, as opposed to environmental

[16] *A very sophisticated attempt is made by Cvjetanovic, B., Grab, B., and Uemura K., in "Epidemiological Model of Typhoid Fever and Its Use in the Planning and Evaluation of Antityphoid Immunization and Sanitation Programmes."* Bulletin of the World Health Organization *45:53-75, 1971.*

Table 8

Per Capita Government Health Expenditures in Developing Countries

(Figures are for recent years)

Per capita GNP	Total number of countries	Government health expenditures per capita					
		Less than $1.00	$1.01 to $2.00	$2.01 to $3.00	$3.01 to $5.00	$5.01 to $10.00	Above $10.01
		(Number of countries)					
Less than $100	12	9	2	0	1	0	0
$101-200	15	7	3	4	1	0	0
$201-300	16	0	4	5	5	1	1
$301-600	14	1	1	3	4	4	1
$601-1000	8	0	0	2	1	0	5
Totals	65	17	10	14	12	5	7

Source: Based on Annex 3.

and preventive measures. The bulk of the limited government outlays for health go toward maintaining expensive, well-equipped hospitals manned by highly trained medical personnel. For various reasons discussed later in this chapter, large numbers of people living in the countryside or city slums are allowed to remain beyond the reach of the modern medical sector. Thus, present health policies are not only inefficient but also inequitable in most developing countries. The limited data available on private expenditures for health suggest that private health spending is often considerably larger than government spending, and the ratio between the two types of expenditures varies widely.

Most private and public expenditures on health services in both poor and rich countries are devoted to episodic curative care. Individuals have a tendency to neglect preventive measures and early diagnosis, choosing instead to call on professional care only during health crises. Governments have ratified the practice by supporting the construction and staffing of curative care facilities. Quantitative evidence on the extent of the bias is not available, in part because a standard of cost-effective preventive health care has not been established. The fragmentary data that are available on the extent to which people rely on curative care in developing countries are shown in Annex 4.

Resources for Medical Care

A large part of government funds are spent on hospitals, particularly on inpatient services manned by highly and expensively trained doctors and nurses. These modern medical facilities are concentrated in

urban centers. In Ghana, for example, 62% of physicians in 1969 were in urban areas, where 15% of the total population lived.[1] Similarly, the Greater Accra Metropolitan Area in the same period had 23% of the nation's hospital beds, but only 9% of the total population. Figures for physician availability reinforce the impression that the geographical distribution of their services is very uneven in developing countries (see Annexes 8 and 9).

Physicians usually settle in urban centers rather than respond to the critical needs of rural areas. In addition, many physicians from developing countries migrate to the developed world for specialty training not available at home. As a result, some developed countries have large, circulating pools of physicians from developing countries: the United States has about 12,000; the United Kingdom, 5,000; and Canada, 1,300. Most of these physicians return home after about three years. However, about 1,500 physicians a year from developing countries establish permanent residence in the United States; several hundred per year do so in the United Kingdom.[2] There are similar flows to other developed countries. Annex 13 provides additional data on the emigration of physicians from developing countries. The countries of emigration are India, Pakistan, Philippines, Thailand, the Republic of Korea, Argentina and Colombia. While the highest rate of migration shown, 67%, is for Thailand, only an estimated 4% of Thai emigrant physicians practice abroad permanently. On the other hand, 17% of the 22% of Turkish physicians who emigrate do not return to their native land.

The education of physicians is extremely expensive—often costing more than $25,000 per physician at 1974 prices, but occasionally exceeding $80,000. These estimates are for recurrent costs alone and exclude the capital costs of medical schools. They also do not include the exceptional costs of providing the elaborate teaching hospitals that are often attached to medical schools.

A considerable proportion of international assistance has been given to developing countries for the training of medical personnel. Often the emphasis has been on sophisticated clinical treatment of acute illness in individuals rather than on improving the health level of a whole community on a continuing basis. The training abroad of clinical specialists has often served to increase the status of sophisticated hospital services, and has almost certainly helped to divert both funds

[1] *Sharpston, M. J. "Uneven Geographical Distribution of Medical Care: A Ghanaian Case Study."* Journal of Development Studies *8(2):210, 1972 (January).*

[2] *The Committee on the International Migration of Talent.* International Migration of High-Level Manpower, *pp. 695-696. New York: Praeger Publishers, Inc., 1970.*

and manpower from an extension of the coverage provided by health services.[3]

Coverage of Official Health Services

Although the evidence is fragmentary, it appears that public health services cover only a small part of the population in many developing countries. In some cases, the proportion covered is so small that the influence of the services on the nation's health can at best be negligible.

Most patients visiting health facilities come from the immediate vicinity. In Kenya, 40% of the outpatients attending a health center lived within five miles; 30% lived five to ten miles away; and only 30% lived more than 10 miles away.[4] An Indian study showed that the proportion of a community attending a dispensary decreased by 50% for every additional half-mile between the community and the facility.[5] In another Indian study, over 60% of the patients came from within one mile of the primary health center.[6] To a large extent, the area of influence of an outpatient health facility is limited by the distance patients are prepared to walk.[7]

The decline in inpatient use of health facilities is somewhat less rapid, but still rather dramatic. In Uganda, the use of inpatient facilities halved for every three miles; outpatient attendances halved every two miles. In Ghana, 80% of the inpatients at the five major hospitals came from the urban district in which the hospital was located.[8] From these facts (often known as the patient care "gradient") it is possible to calculate the proportion of a country's population without access to government health coverage, although the calculation may err on the op-

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[3] *Equipment may even be bought specifically to satisfy the "need" of a physician who has received specialized overseas training, without reference to the priority health requirements of the relevant population: see Sharpston, M. J. "Uneven Geographical Distribution of Medical Care: A Ghanaian Case Study,"* op. cit., *p. 215. On the general issue, see Weller, Thomas H. "Tropical Medicine: Obligations and Responsibilities." Presidential Address,* American Journal of Tropical Medicine and Hygiene *14(2): 184-185, 1965 (March).*

[4] *Fendall, N. R. E. "Medical Planning and the Training of Personnel in Kenya."* Journal of Tropical Medicine and Hygiene *68:12, 1965.*

[5] *Frederiksen, H.* Maintenance of Malaria Eradication. *Duplicated Report WHO/Mal/429, p. 2 and p. 6, Table 1. Geneva: WHO, February 1964.*

[6] *India, Rural Health Training Centre, Najafgarh.* The Services from a Primary Centre *(1964). Cited in Roemer, Milton I.* Evaluation of Community Health Centres, *p. 25. Geneva: WHO, 1972.*

[7] *For a review of this subject, see Jolly, Richard, and King, Maurice. "The Organization of Health Services."* Medical Care in Developing Countries, *Maurice King, (ed.), pp. 2.6-2.7. Nairobi: Oxford University Press, 1966. For additional supporting evidence for Tanzania, see Gish, Oscar. "Resource Allocation, Equality of Access and Health."* World Development *1(12):38-39, 1973 (December).*

[8] *Study by Saakwa-Mante, cited in Sharpston, M. J. "Uneven Geographic Distribution of Medical Care: A Ghanaian Case Study."* Op. cit., *pp. 211-212.*

timistic side because it assumes that coverage within a stated geographical radius of a health facility is adequate.[9] In Ghana, only about half of the population was covered on this basis. In Thailand only 32% of the total districts have physicians who have authority to diagnose disease and treat patients.[10]

Given the poor transport typical of rural areas in the developing world, distance is a serious impediment to obtaining health care. Dirt roads often become impassable in the rainy season and, in any case, travel on foot or by draught animal may be the only form of transport available to the inhabitant of a rural area, particularly in an emergency. Yet speed can be essential to effective treatment.

For infants with acute diarrheal disease, timely oral rehydration by a medical auxiliary close by is likely to be more effective than belated but sophisticated parenteral rehydration at a distant hospital. To some extent, the same applies for adult patients. It is estimated that cholera patients who arrive at a hospital within three hours of the onset of symptoms run no risk of death; that those who arrive after three to six hours have a 10% fatality rate; and that after six hours, the fatality rate is 30%.[11] There is a similar need for speed in the case of some deliveries.[12] For chronic conditions, a long trek to a distant health facility may not seem worthwhile until a long period of increasing debility has been suffered. By then, however, irreversible damage may have occurred. Perhaps more importantly, distance is an overwhelming obstacle to use of the health care system when no crisis exists, and prevention is thus neglected.

It has become declared policy in most developing countries to provide a "pyramid of health care"—starting with health centers or health posts, through district hospitals, up to a national referral-teaching hospital. Yet in all but the most advanced and geographically small developing countries that have exceptional transport and communications facilities, the problems of long-distance use of health facilities seem almost insurmountable. In Ghana, the Central Hospital absorbed 149 of the 298 physicians available to the official health services, yet only about 1% of the patients in this hospital had been officially referred by

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[9]*Sharpston, M. J.* Op. cit., *pp.211-213. It was assumed that health care within the urban district (or similar size area) containing a health facility was "adequate."*

[10]*Muangman, Debhanon. "Rural Health Care in Thailand." Paper presented at Quaker International Seminar, Philippines-Indonesia, July-August 1973 (unpublished), p. 5.*

[11]*Mathen, K. K., Barua, D., Cvjetanovic, B., and Uemura, K. "Costs of Treatment and Prevention and Economic Losses due to Cholera." World Health Organization,* Strategy of Cholera Control, *BD/CHOLERA/71.5, p. 14. Geneva: WHO, 1971.*

[12]*In theory, it would be both possible and desirable to screen high-risk pregnancies in advance, so that the need for possible special treatment was already organized as the woman went into labor. In fact, however, few such systems actually exist.*

medical personnel outside the hospital. Another 7% had referred themselves, coming into the Accra region from outside for treatment.[13]

A wide cultural gap may exist between the personnel at a modern health facility and the tradition-bound people it is designed to serve. Even a relatively unsophisticated facility can encounter resistance. In Ghana, health posts were equipped with maternity beds, although rural Ghanaian women apparently preferred delivery at home. As a result, the maternity facilities were underutilized.[14] A study of rural Thailand found the health service underutilized because people apparently preferred such alternatives as herbalists, priests, spirit doctors, pharmacists, "quack" doctors or injectionists, traditional midwives, and friends and relatives.[15] A survey in a peri-urban area of Cali, Colombia, found that 40% of the population used a well-staffed health center, 28% knew of its existence but did not use it, and 32% did not know about the center at all.[16] Even in a developed country, hospitals are frightening places to many people, only to be visited in times of extreme need. A villager is even more likely to react with anxiety to the sophisticated clinical facilities of an urban hospital. In addition, the cultural gap between physician and patient, even if the physician is a fellow-national, may be so great that discussion of symptoms can be very difficult.

The combined impact of geographical, administrative and cultural factors seriously limits effective health coverage in many developing countries. In 1970, a countrywide health survey undertaken in Thailand[17] found that, on the average, sickness occurred twice per year per person[18] but that only 17% of the surveyed population utilized public health facilities during a year. Even in the metropolitan area of Bangkok, 45% of the people treated themselves with the aid of a pharmacy; in the rural areas this figure rose to 61%. Private clinics were important sources of health care in Bangkok, serving 31% of the people, and traditional doctors or priests were quite important in the rural areas of Thai-

[13]*Study by Saakwa-Mante, cited in Sharpston, M. J. "Uneven Geographical Distribution of Medical Care: A Ghanaian Case Study."* Op. cit., *pp. 209-211.*

[14]*Sharpston, M. J. "Health and Development."* Journal of Development Studies *9(3):455-456, 1973 (April).*

[15]*Cunningham, Clark E. "Some Social Aspects of Rural Medicine in North-Central Thailand: A Preliminary Data Paper." Cited in Bryant, John.* Health and the Developing World. *Ithaca: Cornell University Press, 1969.*

[16]*Llanos, Guillermo, personal communication (1967), cited in Bryant, John.* Health and the Developing World, *p. 88.*

[17]*Ministry of Public Health and the Faculty of Public Health, Mahidol University, Bangkok, Thailand (1970), cited in Muangman, Debhanom. "Rural Health Care in Thailand."* Op. cit., *p. 5.*

[18]*This low figure implies a severe interpretation of "sickness." In the United States or the United Kingdom, in an average month, one person in four consults a doctor, and disease incidence is certainly far lower. See White, K. L., Williams, T. F., and Greenberg, B. G. "The Ecology of Medical Care."* New England Journal of Medicine *265:885-892, 1961. Cited in Fendall, N. R. E. "Primary Medical Care in Developing Countries."* International Journal of Health Services *2(1):301, 1972.*

land, serving 12% of the people.[19] In Cali, Colombia, where the physician-population ratio is 1:910, 17% of the children who die are not seen by a physician, and another 19% have no medical attention during the 48 hours preceding death.[20] A study in rural Punjab, India, found that for every 100 of the population, there were 89 yearly contacts with health personnel in the public sector, against 221 with registered indigenous medicine practitioners.[21] A recent study in a village close to New Delhi showed that only 7% of illness came to the attention of the medical services.[22] In another study of Punjab, 8,000 episodes of illness were reviewed: 36%, or 3,000, did not require health services. Of the remaining 5,000, 10% were dealt with by the public sector, 29% by private practitioners (mostly indigenous), and 61% received no care at all. "In Egypt, which has a more widely distributed health service than India, one study showed that only 20-25% of families made use of National Child Health Centers and up to 80% of mothers were dependent on traditional midwives for delivery."[23]

Effectiveness of Official Health Services

Despite their obvious limitations, official health services have achieved some measure of success. A striking example is the use of residual insecticides for malaria eradication, where very significant results were obtained with large-scale international assistance. Other diseases have also been controlled by environmental measures. Trypanosomiasis has been controlled in much of Africa by cutting down undergrowth which forms a suitable habitat for the tsetse fly. Smallpox has been successfully controlled by immunization throughout much of the developing world. If sufficient coverage can be achieved,

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[19] *A Colombian study showed that only 23% of those who fell sick sought medical advice; of those, 28% consulted pharmacists, nurses, traditional healers and others (rather than a physician). However, nearly 40% became sick in a two-week period, which suggests that mild ailments were included, for which self-treatment would be normal even in a developed country. See Ministry of Public Health, Colombia, and Colombian Association of Medical Schools.* Health Manpower and Medical Education in Colombia—*Vol. II:* Preliminary Findings, *pp. 25-30. Washington: Pan American Health Organization, 1967.*

[20] *Personal communication from Guillermos Llanos, cited in Bryant, John.* Health and the Developing World, *pp. 52-53.*

[21] *Kakar, D. N., Srinivas Murthy, S. K., and Parker, R. L. "People's Perception of Illness and their Use of Medical Care Services in Punjab." Paper presented at Seminar on Behavioral Research in Health and Medical Care sponsored by the Indian Council of Medical Research, New Delhi, March 1972 (unpublished mimeo), cited by Morley, David.* Paediatric Priorities in the Developing World, *p. 57. London: Butterworths. 1973*

[22] *Personal communication from Ghai, O. P. (1971), cited in Morley, David.* Paediatric Priorities in the Developing World, *p. 57.*

[23] *Hamman, M., Allah, A. F. A., Hammouda, A. M., and Shaurawz, A. E. A. "Field Training in Family Health Care for Medical Students in Assuit University." Paper presented at the Conference on the Teaching and Practice of Family Health, Benghazi, 1973, cited in Morley, David.* Op. cit., *p. 59.*

measles may soon be similarly contained by immunization.[24] Yaws has also been contained throughout much of the world, an achievement possible only since the discovery of penicillin. Cholera control has reduced deaths in India from 800,000 per year during the epidemics at the turn of the century, to the current rate of 3,000 a year.[25]

The extent to which personal health services have helped reduce the effects of disease probably varies widely according to the level of official health coverage. For example, in Sri Lanka and Cuba, the impact has probably been considerable, because of the excellent coverage and availability of doctors, even in the rural areas. In Sri Lanka, the provision of cheap or free rice has probably improved general nutrition and, therefore, health levels as well.

Recently several countries have initiated health service programs that rely on very low levels of technology, and focus broadly on community activities rather than exclusively on personal services. These programs have recruited indigenous service providers, systematically building on public trust and social discipline to implement impressive programs of vector control, sanitation, health education and public health. The most notable of the programs has been developed in the People's Republic of China. Although the information available is limited, it is useful to summarize what is known about this program.

In the 1950s, the People's Republic of China placed considerable emphasis on providing new urban hospital beds.[26] Probably in response to Russian influence, "middle medical schools" were set up where students, who had reached the intermediate level in secondary school, attended a three-year course to become "assistant doctors." At the time of the "great leap forward" in 1958, an increased effort was made to provide health care to rural areas, and to promote cooperation between practitoners of traditional and Western medicine. Interest in rural health services may have diminished somewhat in the period that followed. However, the "cultural revolution" brought major changes. "In medical and health work, put the stress on the rural areas," stated a directive of June 26, 1965. Commune members with only primary education were selected to receive three months of training, periodically augmented by refresher courses, thus becoming "barefoot doctors." They were trained to give first aid, supervise immunizations, oversee refuse and excreta disposal, and promote public health campaigns. Some divided their time between agricultural and health work, according to the commune's decision. By now,

[24] *A very efficient vaccine now exists. See, for example, Morley, David.* Op. cit., *pp. 226-230.*

[25] *Mathen, K. K., Barua, D., Cvjetanovic, B., and Uemura, K. "Costs of Treatment and Prevention and Economic Losses due to Cholera."* Op. cit., *pp. 20-21.*

[26] *Horn, Joshua S.* Away with All Pests, *p. 60 New York and London: Monthly Review Press, 1969*

about one million "barefoot doctors" have been trained, or roughly one per 800 people.

The high level of participation in the socioeconomic development of the People's Republic of China greatly facilitated the implementation of public health measures. Because of widespread environmental and preventive measures, health problems have greatly diminished, despite the fact that water and sanitation facilities are much poorer than in developed countries. Typhoid still exists and the pneumonia-diarrhea complex of early childhood is still a major problem. Syphilis may well have been brought under control. Schistosomiasis continues, although control efforts probably have greatly improved the situation. In southern China, malaria has been brought under reasonable control by the use of DDT. Hookworm still exists, but its serious clinical effects are not in evidence. Tuberculosis has been greatly diminished, although it is still found on a larger scale than is typical in a developed country.[27] The same is true of trachoma.[28] "Barefoot doctors" have probably performed a useful first aid function, not least in terms of providing human support. They may have done little to supervise intensive nursing of sick infants, but by use of modern drugs, including those normally prescribed only by a physician in the West, have had some impact on disease and suffering in older age-groups. Although no national data are available, informed observers believe that health levels are remarkably high, considering the stage of development reached by the People's Republic of China.

Chapter 5: A HEALTH POLICY FOR THE FUTURE

Per capita health budgets and the availability of trained manpower vary greatly among developing countries. The potential for extending the coverage of official health services, therefore, is very different at different levels of development, as are the health reforms that might be implemented. It may be feasible for some countries to think in terms of developing a network of health services staffed mainly by well-trained paramedicals who refer complex cases to physicians and district hospitals, but at the moment such a possibility seems remote for the poorest countries. However, even very poor countries can extend some sort of health services on a nationwide basis. How rapidly

[27] *Sidel, Victor W., and Sidel, Ruth "The Delivery of Medical Care in China."* Scientific American *230 (4):21, 23 and 26, 1974 (April)*

[28] *McDermott, W., and Stead, Jr., Eugene A.* Pattern of Disease *(unpublished paper, 1974), pp. 58-64*

the target can be reached and what standard of service can be provided will vary from country to country. In the final analysis, the allocation of public funds for this purpose remains a matter of value judgment and political feasibility. As argued earlier, public health expenditures to improve the quality of life of the poor can be justified on moral and economic grounds, although the complex and dynamic interaction of demographic, social and cultural forces affected by health makes it difficult to say, on economic grounds, how large such expenditures should be.

Substantial savings can be secured by nationalizing existing hospitals, curtailing hospital construction, and overhauling policies on the pricing of health services. Reforms of the health system for expanding coverage of village communities and the urban poor should emphasize environmental and preventive measures aimed at controlling the incidence of disease, combined with the use of standard drugs and simple procedures for treating illness. Implementation of such a scheme would require a new approach to training health personnel and organizing delivery systems. Essentially, the aim would be to promote health from *within* the community on a continuing basis, rather than from without on an episodic, crisis basis.

Financing Extended Coverage

Restricting the use of government funds for construction of new urban hospitals or expansion of existing ones is the easiest method of freeing resources for expansion of coverage. Furthermore, if hospital services in developing countries were subjected to a thorough cost-effectiveness analysis, substantial savings could be secured. This is because, firstly, too much is spent on inpatient services compared with outpatient services. The former are extremely expensive. In Kenya, in the mid-1960s, an average inpatient stay cost about $12 at a district hospital, $24 at a regional hospital and $52 at a national hospital.[1] These estimates exclude sizable capital costs. A large part of recurring inpatient costs are essentially "hotel" costs—laundry, catering, heating, airconditioning—which have a remote relation to treatment or cure. There is reason to believe that the bulk of serious illness typical of developing countries—diarrheal diseases, malnutrition conditions, leprosy, tuberculosis—can be treated effectively on an outpatient basis.

Secondly, the stay of an inpatient can be shortened in various ways. For example, the duration of a cholera patient's stay in a hos-

[1] *Jolly, Richard, and King, Maurice. "The Organization of Health Services."* Medical Care in Developing Countries, *Maurice King (ed.), Chapter 2. Nairobi: Oxford University Press, 1966.*

pital can be reduced dramatically by the use of antibiotics.[2] Thirdly, many savings can be realized through administrative and cost-control measures that include avoiding wastage through time-expiration of drugs, pilferage and bad maintenance of buildings and equipment.

The system of pricing government health services is critically important, not only for mobilizing funds but also for resource allocation in the health sector. It is important to devise methods for discouraging malingerers and those inclined to use sophisticated medical facilities irrespective of need. A policy of full-cost pricing of health services would create substantial financial incentives for people to avoid hospitals (particularly inpatient services), and to rely instead on less expensive visits to outpatient facilities and local health posts. Such a scheme would also mobilize some funds for the government to finance activities for which it cannot charge users. It is tempting to introduce different charges for the rich and the poor, if at all administratively feasible, but care should be taken that this does not encourage the expansion of higher revenue-earning services for the rich rather than services for the poor.

The Reformed Health Service

The main conclusion of the last chapter was that the official system of health care at present is top-heavy; too much is being spent on doctors and hospitals in urban areas, while coverage in the countryside is extremely limited. Future policy should correct this bias by (1) extending the coverage of the primary health care system; (2) increasing the responsiveness of existing health posts and district hospitals to the needs of the primary health worker; and (3) planning the extension of primary care with the aim of supplementing the role played by traditional healers in village society.[3]

To be effective, the health care system must be very close—both geographically and culturally—to the community it serves, and it must enjoy the full confidence of the community. By identifying health problems close to their onset, and by motivating, supervising and educating individuals and families to avoid infection and to seek appropriate treatment, the local primary health worker would be in a better position to exploit the potential of environmental health measures and modern medical science than his counterpart in the conventional official systems of health care. Generally, the latter

[2] *Mathen, K. K., Barua, D., Cvjetanovic, B., and Uemura, K. "Costs of Treatment and Prevention and Economic Losses due to Cholera." World Health Organization,* Strategy of Cholera Control, *BD/CHOLERA/71.5, p. 13. Geneva: WHO, 1971.*

[3] *Mahler, H., Director-General of the World Health Organization. "Address to the World Health Assembly," 27th World Health Assembly. Geneva: World Health Organization, May 1974.*

lacks the capacity to penetrate the community, is not familiar with local life styles, and tends to emphasize curative medicine.

The community health worker, under the reformed system, should reside in the community he serves and should command the respect of the community. He should be integrated into the local society so that he can identify disease without patient-initiated contacts at the health post. Routine periodic house visits may sometimes be required to make such assessments; in other instances, local political, social or religious institutions may offer opportunities for ongoing surveillance of community health conditions.

The health worker can be male or female, an old traditional healer or birth attendant, or a young primary school graduate. The choice should reflect cultural attitudes, and literacy would not be an essential qualification. There would be community involvement in selecting the worker who, in many cases, would also hold other employment. He would receive brief training in treating some of the most common diseases. Training in clinical skills would be very limited; complicated cases would have to be referred to health centers, district hospitals or possibly traditional healers. The limitation on the curative skills of the health worker would be desirable to ensure adequate time for environmental and preventive work. The worker would be taught the fundamentals of maternal and child care, of delivery, and of monitoring the growth of young children, particularly for nutritional problems. The worker would organize mothercraft sessions for feeding malnourished children and the nutrition education of mothers, provide immunizations, and be responsible for encouraging family planning.

The worker would also be responsible for organizing community efforts in environmental health, water supply and sanitation. A large range of simple technologies is available for excreta disposal, and pit latrines can be easily constructed with local labor and materials and only a minimum of technical assistance.[4] Provision of water at low cost with only limited outside technical assistance is often much more difficult. It is not always feasible to provide bacteriologically safe water at a price which can be afforded, and with equipment which can be maintained. Planning for maximum water quality standards may, in effect, condemn much of the population to completely unimproved water supplies for an indefinite period. In such cases, there might be a trade-off between water quality and quantity, especially since for health purposes simple dilution of the disease agent is very important.

[4] *For a review of this subject, see Wagner, E. G., and Lanoix, J. N.* Excreta Disposal for Rural Areas and Small Communities, *pp. 17-24 and 159-164. Geneva: WHO, 1958.*

Community-based health workers would probably best receive their training in stages: perhaps one day every two weeks for six months if travel distances are short; or a continuous training period of two weeks, followed by an interval of several months, and then possible further training. The curriculum should be carefully designed so that it is easy to understand and is of practical use in terms of the exact disease and cultural patterns of the local population. Although continuous refresher training with the same material would always be required, the teaching of progressively more advanced curative skills should be related to successful performance of community workers in the basic fields of preventive and environmental health. Indicators of success could be such measures as contraception acceptors, immunizations performed, latrines built, and the state of the village water supply. The traditional health care system will probably continue to be important for a long while.

Such health workers would be much better suited, technologically and socially, to cope with the disease pattern of poor communities than the clinical physician. The health worker's great virtue would be his socioeconomic and cultural origin—the same as that of the people he is servicing—and thus his capacity to interact with them in a style and idiom they understand. However, it should be recognized that his socioeconomic origin is also the source of his weakness; he can easily be exploited by dominant groups in the village, and his relatively brief training can be swamped by a lifetime of tradition or custom. To be effective, the health worker must be monitored, supervised and supported by other ranks in the hierarchy of the health delivery system.

The immediate supervision of these community health workers would be provided by auxiliaries. Such auxiliaries would be full-time community health promotion workers, with perhaps 18 months to two years of health training in addition to primary or, if possible, middle school education. A substantial part of their training would be spent on water supply and sanitation technology, elementary medical sociology and traditional medicine. Some clinical skills would also be taught, but it would be important to ensure that adequate emphasis is given to promotion of community health rather than to care of disease on an individual basis.

Two alternatives exist for higher management of this service. Under one system, the supervisory auxiliary would, in turn, report to a "primary-care managerial physician." Compared with a typical clinical doctor, such a physician would have training that is less clinical and has a different emphasis: much less attention would be given to the degenerative diseases and more to the treatment of infectious

diseases common in developing countries. A primary-care managerial physician would be trained to perform emergency surgery with limited equipment. He would be better trained than the typical clinical doctor in epidemiology—the science of the causes of diseases in their social setting. More generally, he would receive education in community health promotion on a continuing basis rather than in episodic curative health care provided on an individual basis. All this would involve a study of local customs and an acquaintance with methods of traditional healers. He would need to have an elementary familiarity with agronomy, the nutritional value of crops and the place of livestock in rural life. He should be able to participate in general efforts at rural development and to discuss health-related improvements with community leaders.

The great majority of medical schools in the developing world are not capable of producing primary-care managerial physicians. However, efforts to reorient training and education programs are now being made in Mexico, Colombia, Israel and Cameroon. Experiments are under way in Mexico to move medical teaching away from lavishly equipped special hospitals to provincial hospitals and health centers under conditions which approximate normal situations in the field. In Israel, attempts are being made to associate training with community health by giving medical schools some responsibility for providing health services in a district.

An alternative approach to managing the supervisory auxiliaries is to entrust the management of the reformed health service to people who have a broad background in rural development, community work and administration, but who are not physicians. In this case, the managers would obtain technical support in medical care and public health from others, although it would also be necessary for these managers to receive some public health training.

The curriculum proposed for the primary-care managerial physician is exacting. Once in the field, such persons might feel—with some reason—that their advanced medical training is somewhat wasted. In addition, the natural human urge to do clinical work, and to save lives which perhaps only the physician can save, could tend to distract the managerial physician from his assigned tasks of community health promotion, supervision and, particularly, administration. The second alternative of putting individuals who are not physicians in charge of such programs would free managers from these pressures. If they are familiar with community work, they would have an attitude appropriate to community health promotion.

The reformed health service proposed here would be expected to provide greater access to health care, greater penetration into the

community and lower unit costs. To operate economically, the system needs procedures and drugs that are as simple and inexpensive as possible. The sophisticated diagnostic work-ups of advanced Western medicine would not be possible. The basis for choice of procedures or drugs would be that, even if administered casually, they would generally improve the health of the community. If community support is to be preserved, it is also important to guard against excessive risk of what the community views as untoward side effects. Failure to observe these principles would probably undermine the effectiveness of the health care system.

The economies obtainable under the reformed system will be offset to some extent by salaries for a much larger number of primary health workers. Not to pay attractive salaries to all personnel would be a false economy and would injure the entire package. On balance, however, the reformed system is likely to be less expensive to operate per capita than the existing traditional system.

Increasing Effectiveness of Official Health Services

Financing extended coverage through measures that improve the cost-effectiveness of hospitals has already been considered in this chapter. The underlying premise of the reformed health service is the need to change the emphasis from expensive treatment of illness in individuals on an intermittent curative basis only, to the promotion of health on a *continuous* basis at the *community* level. This requires a change in the ecological and cultural situation in which disease thrives. It will not be easy to achieve for it requires a systematic and sustained approach aimed at changing living habits and attitudes, as well as household and community action to improve water supply and sanitation practices. The aim is not to ignore the demand for curative care but to bring about a balance between measures that treat disease and measures that control its incidence. Attempts to provide health education or environmental health will encounter resistance if they are divorced from curative care. The problem is to make certain that curative care does not preempt all other approaches.

The proposed mix of training and activity for community health workers, auxiliaries and managers is designed to address this problem. The reformed health service will provide limited curative care based on standard drugs and simple procedures which can be administered in the field by workers who have had brief training. These activities will be combined with a strong emphasis on measures to improve nutrition, water supply, sanitation and health education. To maintain this balance over time will require repeated reinforcement through

monitoring and evaluation procedures aimed at preventing the dislocation of preventive and environmental measures in favor of curative services, for which there is a ready demand. In turn, the monitoring and evaluation should be linked directly to criteria for giving salary increases and promotions to community workers within the health service.

The case studies which have already been cited, and the experiences of the People's Republic of China, Tanzania and several Latin American countries, indicate that community-based health promotion services can be highly effective. However, in practice, various factors may combine to lower the effectiveness of such services in improving the health of the general population. At a technical level, insufficient emphasis on preventive and environmental health supervision, and health and nutrition education, may greatly diminish the impact on morbidity and mortality. At a sociopolitical level, inegalitarian distribution of power within a community may limit access by some of the population to such services, and confer excessive benefits on certain groups. Furthermore, the degree of effectiveness of community-based health promotion services, will inevitably depend upon the degree of social cohesion and sense of social responsibility of a community. Nevertheless—and provided there is adequate commitment on the part of the government—such services offer perhaps the best hope of achieving a major improvement in the health levels of the larger part of the population of developing countries.

Chapter 6: WORLD BANK LENDING FOR HEALTH-RELATED PROJECTS

The health sector in developing countries has not been the object of the World Bank's lending activities, but the Bank has financed a wide range of activities that influence health conditions. The proportion of Bank-supported projects containing health components has been growing; the growth reflects the attempt over the last five years to broaden the Bank's lending in ways which directly attack problems of poverty. Since 1970, lending activities have also reflected the Bank's concern with environmental issues. Though the figures are not all-inclusive, Tables 9 and 10 identify a number of health-related projects receiving Bank assistance. These grew from five projects in fiscal 1969 to 20 in fiscal 1973. Excluding the grant for the onchocerciasis program

Table 9

World Bank/IDA Lending for Health-related Projects: Population, Nutrition and Water Supply and Sewerage, FY1962-78

	FY 1962-68	FY 1969	FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976[1]	FY 1977[1]	FY 1978[1]
Population											
Number of projects	–	–	1	2	2	2	2	3	3	5	6
Amount of loans and credits	–	–	2.0	7.8	34.4	21.5	17	43	54	69	89
Nutrition											
Number of projects	–	–	–	–	–	–	–	0	1	1	1
Amount of loans and credits	–	–	–	–	–	–	–	0	20	25	20
Water supply and sewerage											
Number of projects	14	5	3	9	4	11	8	14	13	15	17
Number of projects with sewerage component[2]	(3)	(1)	(2)	(4)	(2)	(5)	(3)	(7)	(5)	(7)	(8)
Amount of loans and credits	138.1	34.6	32.5	224.7	78.7	299.0	173.7	305.0	320.0	357.0	423.0

[1]Proposed lending.
[2]Figures for FY1976 are based on an average of 40-45% per year.

in Western Africa, the total for such loans and credits in 1973 was $487 million; of this amount, $299 million was for water supply and sewerage. The total of loans and credits for population projects was $22 million. Loans and credits for the health components of projects in the fields of education, rural development, irrigation and drainage, and sites and services for low-income housing totaled about $19 million.

Only in the population and education projects, however, is there evidence that health considerations have had any significant effect on the basic design of projects. In the case of water supply and sewerage, little systematic analysis of health benefits has been made, although it is assumed that these projects generated such benefits. A health component has been attached to some of the irrigation, drainage, land settlement and rural development projects, but aspects other than health have rarely, if ever, been modified significantly by health considerations. In general, health components have been a small proportion of total project costs. Population projects differ somewhat; their health components have typically been very large.

The Bank's activities in the field of population have led it into a

Table 10

World Bank/IDA Lending for Health and Projects with Health Components: Education, Rural Development, Irrigation and Drainage, and Sites and Services, 1970-73[1]

(US $ millions)

	1970	1971	1972	1973
Education				
Number of projects with health components	1[a]	1[b]	–	2[c]
Amount of loans and credits	13.8	7.3	–	43.3
Health component of projects	n.a.	0.3[2]	–	7.75
Health component as percentage of total project costs	n.a.	5.6%[2]	–	19.5%
Rural development				
Number of projects with health components	1[d]	2[e]	2[f]	3[g]
Amount of loans and credits	21.5	14.7	8.9	32.8
Health component of projects	n.a.	0.4	0.8	3.3
Health component as percentage of total project costs	n.a.	1.4%	6.4%	6.2%
Irrigation and drainage				
Number of projects with health components	–	–	–	1[h]
Amount of loans and credits	–	–	–	36.0
Health component of projects	–	–	–	8.1
Health component as percentage of total project costs	–	–	–	6.5%
Sites and services				
Number of projects with health components	–	–	1[i]	–
Amount of loans and credits	–	–	8.0	–
Health component of projects	–	–	0.4	–
Health component as percentage of total project costs	–	–	3.8%	–
Health				
Number of projects with health components	–	–	–	1[j]
Amount of loans and credits	–	–	–	n.a.[3]
Total cost of projects	–	–	–	54.0

[1] By calendar year of appraisal report.

[2] Capital cost only.

[3] 0.75 as first grant.

[a] Greece
[b] Uganda II
[c] Tanzania IV, Zambia III
[d] Jengka II (Malaysia)
[e] Karonga (Malawi), Caqueta (Colombia)
[f] Upper Volta, Alto Turi (Brazil)
[g] Jengka III (Malaysia), Rwanda, Mauritius
[h] Upper Egypt Drainage
[i] Senegal
[j] Western Africa: Control of River Blindness

much more direct concern with health than has been the case in other fields. Financing health facilities used for the delivery of family planning services (health centers, maternity hospitals, vehicles and training institutions) have taken up the bulk of the loans and credits. The total cost of the nine population projects for which Bank/IDA assistance of approximately $81 million was approved through fiscal 1974 is about $154 million. Of this amount, $94 million, or 62%, has gone to health facilities; another $59 million, or 38%, consists of funding health manpower training costs and operating costs.

The Bank has been active in population projects only since 1970. The first four years of operations have seen the initial approach to providing family planning services evolve from the concept of a service-delivery system somewhat independent of general health considerations, toward a much closer integration with general health-delivery systems. The early projects show a relatively heavy emphasis on the construction of urban maternity hospitals and on postpartum programs as major channels of acceptor recruitment. Recent projects in Indonesia, India, Malaysia, Iran and Egypt reflect increasing emphasis on rural health delivery systems, on the training of nursing and lower-level health auxiliaries, and on the integration of family planning and general health services—particularly maternal and child health services.

In most cases, identification of population projects to be supported by the Bank has been preceded by sector surveys which have increasingly included fairly extensive reviews of the potential borrowers' health delivery systems. These reviews are not designed to cover the entire health sector and they generally omit a number of important aspects. The Bank's work has brought it into increasingly close relations with WHO and, to a lesser extent, with the United Nations Children's Fund (UNICEF). A Memorandum of Understanding was signed by WHO and the Bank in November 1973, outlining the interests of each institution in population questions.

The Bank's activities in the water supply and sewerage sector started in 1961. Because of the state of operations in many countries, considerable emphasis was initially put upon administrative competence and financial viability. From the start, cross-subsidization has been accepted, and this is now being actively encouraged. Since the establishment of the Bank-WHO Cooperative Program in 1970, extensive sector surveys have been undertaken as a background to project identification.

Progress toward quantifying the impact on health of water supply and sewerage projects is illustrated by the Sao Paulo water supply and pollution control project (1971) and the Minas Gerais water supply

and sewerage project (1973) in Brazil, and by the Addis Ababa project (1972) in Ethiopia. In the appraisal of the Sao Paulo project, the health benefits were not quantified; they were explicitly stated in the report to justify expenditure on sewerage mains which, on other grounds, showed an economic return of only 5%. The Minas Gerais project followed from a Bank-WHO Cooperative Program Sector Survey which reviewed the Brazilian National Sanitation Plan and covered the entire state of Minas Gerais. It was innovative in several respects, including the lending technique, the extent of cross-subsidization and the degree of emphasis on rural areas. Health questions did influence the technical design of the project in some respects (for example, avoiding intermittent water supply), but not in others (for example, choosing between standpipe and water piped to houses). By seeking to reach lower-income groups, health benefits were expected to be increased. The appraisal of the Addis Ababa project attempted to measure the social cost of water-borne diseases, attributed to the project the potential elimination of these diseases among a small proportion of the population, and thus arrived at an estimate of the health benefits in quantitative terms.

The first Bank-supported project to finance sites and services for housing was in Dakar, Senegal, in 1972. It included construction and equipment of five health centers at a cost of about $400,000, or roughly 4% of total expenditure on the project. The number of health centers was derived from the concept that one per 100 hectares was needed, but no particular justification was given for this figure, and no estimate was made of the health impact of either the project or the priority of the health center component. Similar components are included in other sites and services projects now being prepared, and it is hoped that future housing projects will include a more sophisticated analysis of the health component.

Early Bank-assisted projects in education concentrated on "hardware"—mainly constructing and equipping school buildings. In the late 1960s, increasing emphasis was placed on both technical assistance and such software as curriculum reform and educational planning. At the same time, there was a move away from general secondary education to various kinds of teacher training and technical education. This has led to the training of health personnel in a few projects, all since 1970. No definite trends have emerged in the Bank's policy for health manpower training. The first project, in Greece (1970), financed health manpower training mainly for such hospital staff as administrators, laboratory technicians, physical therapists and X-ray technicians. In contrast, the second education project, in Uganda (1971), supported the training of paramedical personnel for rural pre-

ventive services. The fourth education project, in Tanzania (1973), provided for the training of doctors who will supervise the health care given by paramedical personnel in the rural areas. In addition to paramedical training, the third education project, in Zambia (1973), included a Health Services Training School at Ndola which will use a new 650-bed hospital to train hospital staff. Thus, although there is greater awareness today of the need to emphasize rural health needs and train paramedical staff, Bank-supported projects continue to put considerable emphasis on hospital manpower.

In all cases, health manpower training has been only one component of larger projects. In the Tanzania and Zambia projects, for example, this component accounted for about 20% of the total project cost, less contingencies. In assessing the need for health manpower, the tendency has been to rely largely on national statements of manpower requirements—for instance, in the project identification work done under the Bank's Cooperative Program with the United Nations Educational, Scientific and Cultural Organization (Unesco), and in the work done by Bank consultants. The requirements have typically been based upon norms derived from the WHO targets for the first U.N. Development Decade. But the target ratios of health manpower-to-population are merely arbitrary global goals, and do not recognize differences in disease patterns or resource availability in different countries. However, in a recent development, both the Tanzania and Zambia projects included some analysis of health sector priorities as they relate to local conditions.

Studies of health manpower training have been conducted as part of education sector surveys. The Bank, however, has not yet been actively involved in curriculum development for health manpower. There is some feeling in the Bank that traditional urban-based medical schools are undesirable, and that training in a rural setting is preferable.

The increasing tendency to include a health component in agricultural projects is clearly related to the Bank's growing social concerns. Virtually all Bank-assisted agricultural projects that have health components date from 1970. During this period, the emphasis in agricultural lending has shifted from building large-scale irrigation infrastructure to providing assistance to the small farmer. Some of the recent projects involve irrigation and drainage, but they are no longer single-sector projects; rather, they are multisectoral in that they combine a number of activities, including marketing, agricultural extension and community development.

In some land settlement schemes, health facilities have been provided as part of the "minimum package" necessary to make the settle-

ment viable. From the outset, in the Caqueta land colonization project in Colombia (1971), availability of health services was considered an important factor in influencing a settler's decision to settle permanently in a remote area with a history of high disease prevalence. In other settlement schemes—as in the Alto Turi land settlement project in Brazil (1972), or the Jengka triangle project in Malaysia (1970 and 1973)—health was conceived of as a social service to be provided at increasingly sophisticated levels as the settlement became established and financial resources permitted. In these cases, health facilities were considered important if settlers were to remain in the area.

A few rural development schemes have had health components, either to guard against the possibly harmful side effects of the project (for example, the use of schistosomiasis control measures against the effects of irrigation in the Karonga rural development project in Malawi) or as part of an attempt to integrate social and economic development (for example, the rural development project in Mauritius). Sometimes health components have been added after the first phase of a project (for example, in the Shire Valley and Lilongwe agricultural development projects in Malawi). Previous phases of the Malawi projects had not included a health component; the construction of health centers generated active self-help efforts among the rural people, who then helped build some health posts.

At least one rural development project—the rural development fund project in Upper Volta—also provided for a water supply facility, in the hope that this would benefit health. In some cases, human health has benefited incidentally from an agricultural project. For example, the successful eradication of the tsetse fly under the agricultural development project in Rwanda will benefit human as well as animal health, since the trypanosomiasis carried by the tsetse fly affects both human beings and cattle.

A typical health component of a land settlement or rural development project is the provision of health posts, clinics or centers—in theory at least for both curative and preventive health work. However, hospitals have also been included in two projects—(the Alto Turi land settlement project in Brazil, and the Caqueta land colonization project in Colombia). Environmental health measures against specific diseases have been a common element in many projects—for example, molluscicíding in Karonga for schistosomiasis, dispensing malaria prophylactics and helminthicides in the Caqueta project, and spraying houses for malaria in the Alto Turi project. A second phase of the Caqueta project may have nutrition and health education components. Already rural health promoters, selected from settlers' families and trained locally, provide first aid, vaccinations, and aid at childbirth;

dispense malaria and helminthiasis drugs; and distribute birth control materials. A typical health component entails only a very small addition to project costs—less than 1% in the Caqueta and Alto Turi projects, 4% in Kenya and 6.5% in Mauritius.

The health components that have been added to land settlement and rural development projects have not always been systematically designed. Once it has been decided to include a health component in a project, a consultant is hired to formulate the design of the component in the light of any existing health plan or development plan. Considerable enterprise has been shown in the ways in which health components have been added to agricultural projects, but no attempt has been made at a cost-effectiveness analysis of varying mixes of disease control measures—that is, vector control, water supply, and sanitation, vaccination, curative measures and health education. Nor has the technical design of nonhealth project components significantly reflected health considerations.

There are times when irrigation and drainage projects may adversely affect the health of the people unless precautions are taken. Early projects, including the Nile delta drainage project in Egypt, launched in 1969, contained no health component. In the next phase of Bank policy—illustrated by the Semry rice project in Cameroon launched in 1971—a public health consultant was employed to consider the health aspects after the basic project had been formulated. He concluded that the project would have both good and bad effects; it would reduce malaria by draining and leveling swamps, but would increase schistosomiasis in an area where the disease was already endemic. A number of control measures were considered, but were rejected on technical and financial grounds. A study of disease prevalence and of the snail population was initiated, which might lead eventually to selective molluscicide.

In the latest phase of Bank policy, represented by the Upper Egypt drainage project launched in 1973, a consultant was employed to consider the health aspects of the project. As a result, a health component was included. The Bank is financing the foreign exchange costs of both preventive and curative measures for schistosomiasis control. One engineering design feature of the basic project—the use of closed rather than open field drains—may have been influenced by health considerations, but would probably have been chosen anyway because it saved land and required less maintenance. However, the specification of the schistosomiasis control area certainly did reflect technical vector control requirements; the control area was larger than the project area.

No attempt was made either in the Upper Egypt project, or else-

where, to quantify the economic benefits of disease control. Furthermore, there was no cost-effectiveness analysis of alternative measures of disease control. In addition, with the one possible exception of the Upper Egypt project, the basic engineering design of projects apparently has not been affected by health considerations; and although schistosomiasis control measures have been incorporated, measures to control other water-borne diseases—for example, malaria, which can also be affected by irrigation and drainage projects—have not yet been undertaken.

The onchocerciasis project in Western Africa is a new departure for the Bank. The purpose of the project is to control onchocerciasis in a wide belt of savannah. It is estimated that one million people in the region are at present affected by the disease; a large proportion suffers from varying degrees of blindness, and about 50,000 or more are totally blind. Effective drugs for mass chemotherapy to treat the disease have not yet been developed, though some funds have been allocated for research into possible methods of mass chemotherapy. The project is essentially based on vector control by aerial spraying. The cost of the first six-year phase of this 20-year program is estimated to be $54 million.

Small-scale onchocerciasis control projects in the region have been going on for some years, and various aid organizations have been involved, notably WHO, the U.S. Agency for International Development (USAID), the Fonds d'Aide et de Coopération, the European Development Fund, and the Organisation de Coordination et de Coopération pour la Lutte contre les Grandes Endémies. However, the Bank was a central force in organizing the new, large-scale operation. There is now a Steering Committee made up of the Bank, FAO, the United Nations Development Programme and WHO; WHO is the executing agency and the Bank is the financial coordinator. Several donors—including Canada, France, the United States, the Netherlands, the United Kingdom, the Bank, and the participating aid agencies—subscribed to the Onchocerciasis Fund Agreement in March 1974, and indicated their willingness to support the program on a continuing basis. Subsequently, the Federal Republic of Germany joined the donor group; and recently Iraq and Belgium have indicated their intention to participate. Additional countries may subscribe in the future. Prospects are good that more than three-quarters of the financing required for the first six-year phase can be obtained from these donors and the African Development Bank. The World Bank itself has made a total grant of $750,000.

The program is expected to reduce debility, and also the economic burden of blindness. However, it is envisaged that the principal eco-

nomic benefit will be that the program will help reclaim for human settlement the fertile river valleys that now lie deserted because of the disease. Resettlement will involve investment in infrastructure, and simultaneously provide opportunities to raise agricultural productivity.

Chapter 7: POLICY ALTERNATIVES FOR THE BANK

The Bank's earlier position, that it generally did not finance health activities, has in practice been substantially modified in recent years. There has thus already been an evolution in operational policy. Looking ahead, one policy option, which may be called Option One, is for the Bank to allow these trends to continue, to strengthen them and thereby to increase the effectiveness of its activities in the field of health. Under this option, health benefits from Bank-assisted projects would continue to increase, but the broad patterns of lending would remain basically unchanged. The health benefits would be viewed as important supplementary benefits of projects, rather than as constituting the main objective of lending.

A second policy option, Option Two, is for the Bank to add lending for basic health services to its current activities. This would increase the range of instruments it has for dealing with health problems.

The distinction between the two options is especially marked if seen in operational terms. Option Two may well seem to be the logical conclusion of the Bank's concern with all major aspects of socioeconomic development. The basic policy choice might be posed as to whether the present is the appropriate time for the Bank to move into the financing of basic health services. Both options imply increasing its expertise and experience in the health sector; the choice of Option One at this time does not preclude the adoption of Option Two later. The implications of each option are explained below.

Option One: Continue Progress in Increasing Health Benefits within Present Patterns of Lending.

The continuation of present trends in lending, within the existing lending patterns, would be likely to involve some increase in the amount of Bank lending for health-related activities. Whatever the size of the increase, the case is strong for the Bank's modifying its present approach to health questions. Until now, health factors have not always been fully considered in the basic design of a project. For

example, different cropping patterns in an agricultural development scheme may have different nutritional implications, and different agricultural technologies can involve very different health risks. Thus, one might avoid increasing the prevalence of a water-borne disease by relying on intermittent application of irrigation water, rather than ponding, in growing rice. Excavation in connection with construction projects might be undertaken in a way that avoids creation of mosquito-breeding ponds. At the engineering design stage of a hydroelectric, irrigation or drainage project, one might minimize the number of sites which can harbor snails (schistosomiasis vectors) or breed simulium flies (onchocerciasis vectors).

At present, "health components" are often added at a late stage of project preparation and do not receive the consideration necessary for exploiting available opportunities and achieving cost-effectiveness. The installation of health posts or health centers in projects for rural development, or sites and services, may not amount to much unless the basic approaches are examined thoroughly. The proper balance between environmental, preventive and curative aspects of health care, the orientation and training of health personnel and the relation of health workers to the community are fundamental issues. It may not be appropriate to raise questions of far-reaching importance for health policy when health is a rather small component of a project which does not have the improvement of health as its main objective. However, it may be possible in such cases to persuade some project authorities to conduct field experiments on a small scale, along the lines discussed above. Although it might not be possible to build a complete prototype of the reformed health service under the rubric of, say, a rural development project, it should be possible to introduce selected elements on a pilot basis and evaluate the results. Such experimentation would, of course, be much easier in countries where there is a congenial climate for health reform.

In the future, health considerations will become more important in selected projects. The proportion of project finance for health-related activities may become larger, though projects would still largely be justified in terms of objectives other than health improvements *per se*. For example, in a "water and health" project, the Bank would identify the most important local diseases whose prevalence could be reduced. It would investigate existing patterns of behavior related to water use, and modify the design of the project to ensure proper utilization. This information would also assist in designing a health education program for the community.

Another new step might be to support specific disease-control projects in areas where the diseases primarily affect the working-age

population, and also limit the use of fertile land. The Bank is already coordinating the financing of the onchocerciasis project in Western Africa, and will be providing a portion of the finance. It is playing a critical role in mobilizing other financial resources; similar opportunities may arise in the future. The Bank's participation does not necessarily have to be on a grant basis. Where investment in health would permit major new exploitation of natural resources, the normal lending criteria can be applied. In such cases, it would be logical to link disease-control operations closely to programs for land settlement and rural development.

Such projects could be accommodated readily within the present pattern of lending. At this point, the number of viable disease-control projects is unknown, but is not likely to be very large. Control of sleeping sickness in parts of Africa is an obvious possibility, particularly in view of the scope for agricultural settlement and livestock development. Joint work on this possibility is already being done by WHO and FAO.[1]

For onchocerciasis, there is at present no suitable drug for mass chemotherapy, so that the project in which the Bank is currently participating is based solely on vector control. Diseases requiring a mixture of environmental measures, individual treatment and community health promotion cannot be handled under Option One. The uncertainties involved in specific disease campaigns based on vector control are considerable. Estimates of costs can only be tentative, and unforeseen epidemiological factors may make control much more difficult. Pilot projects and careful research on the cost-effectiveness of alternative control measures may be essential preliminary steps. Research may also be necessary on the economic and demographic impact of the programs. It should be recognized that the time-lag between initiation of disease-control measures and successful land settlement will often reduce the rate of return from disease control—if viewed solely as an investment.[2]

Criteria would need to be formulated for appraising the nature and size of health components, and also for deciding the extent to which

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[1] *For an example of work already completed, see* Agency Terminal Report Kenya: Operational Research on Human and Animal Trypanosomiasis Eradication in Nyanza and Western Provinces, *PD/71.1, KEN 14/KENYA 2301-ex 0041, PD/71. Geneva: World Health Organization, July 1971.*

[2] *There are cases in which development of key pesticides, for example molluscicides, and drugs needed for control programs is inhibited by the fact that the market for them is very small. At present, such chemicals and drugs are available, if at all, only at very high cost. Thus a possible advantage of the Bank's involvement in major disease control programs is that its influence—direct or indirect—may promote research and development and a reduction in drug costs, thereby making control programs more attractive. It is not easy to estimate the general strength of this argument, but it apparently holds for both onchocerciasis and schistosomiasis, and on this basis alone, is not to be ignored.*

basic project design should be modified on health grounds. Where possible, an attempt should be made to calculate an economic rate of return for the health component or the rise in the cost of the basic project due to the design being altered for health reasons. The benefits would take the form of reduced costs of poor health conditions to the country. Often the imponderables would make it impossible to quantify project benefits within tolerable margins of error. Judgments would then need to be made, to the extent feasible, on the basis of cost-effectiveness. The Bank currently uses methods of evaluation other than the economic rate of return for its education and population projects.

Option One would require at least a brief analysis of the health sector as a whole, if projects are to be designed with consideration for health priorities. The depth of the sector analysis required would depend on the degree of experimentation envisaged and the extent of the Bank's involvement with health in each project. For example, take an education project with a component for training health manpower; it may need only a general guideline, supported by a review of the country's health sector to establish that there is a need for, say, rural auxiliaries or rural health workers, but not for clinical specialists. Far more complex are the population projects in which the Bank would significantly strengthen the network of primary health services. In these cases, a more thorough investigation of the whole health promotion system, at least below the regional hospital level, would be virtually indispensable. To assist in health sector analysis, it would be possible to make increasing use of WHO country health "profiles," as well as other sources such as the USAID "syncrisis" studies.

Option One mainly implies that it should be possible to make substantial improvements in health benefits from Bank-supported projects, without a major change in the pattern of lending.

Option Two: Bank Lending for Basic Health Services.

The Bank's population projects have large components for health facilities and for training health manpower; and they involve discussions with governments of cost-effectiveness in major parts of the health sector. However, these operations have relatively little impact on overall planning in the health sector. If the Bank were to begin financing projects that explicitly support basic health services, it would have a wider mandate to discuss general health issues with health ministries and would tend to have greater influence on health services, particularly if the Bank and WHO reinforce each other in their advisory roles.

If Option Two is chosen, the Bank would be committed to careful country-specific sector analysis, with the collaboration of WHO and other aid agencies operating in the health field. It is not likely that the Bank would want to support the existing health care systems in their present form in most developing countries. Despite declarations in planning documents, effective political commitment to health care for the bulk of the population poses considerable problems for many governments. Under such circumstances, the case is strong for not starting World Bank operations in a country where health priorities are inconsistent with equitable health programming approaches, and where the government is not willing to consider significant reforms. In such circumstances, and on such a fundamental social and political issue, it would appear likely that the Bank's influence, even in conjunction with WHO, would be limited.

Furthermore, some countries which now borrow for population projects may do so largely to finance health facilities. To avoid a possible shift of emphasis away from family planning, it would be important to ensure that all Bank-supported health operations keep population goals in mind.

Drawing up a lending program for basic health services would not be an easy task, even in countries that are judged to be eligible for Bank assistance because they accept the general idea of health reform and are willing to pursue family planning objectives alongside health programs. The Bank can rely on little experience with defining concrete goals for health promotion in developing countries; a great deal would have to be learned from experience. To train health personnel of the kind required for staffing a viable health care system, the Bank would have to stimulate the process of curriculum development. Current thinking on this topic is still very much at an experimental stage.

To exercise this Option Two, the Bank would have to take the following steps:

1. Substantially build up staff and consultants. The budgetary implications of Option Two would depend on the scale on which the Bank wishes to finance basic health services. However, even if the aim were to enter the field primarily to learn through experimental projects, it would be essential to create a critical mass of staff and other resources.

2. Establish a structural unit to identify, formulate, appraise and evaluate health projects. This unit would be responsible for implementing the Bank's lending program in the health area.

3. Undertake field research into the cost-effectiveness of different health promotion systems.

Conclusions

Before evaluating these two options, it is useful to recall the Bank's objectives and its limitations in view of certain characteristics of the health sector. The sector is one which has many characteristics similar to those of the education sector. Projects in both sectors generate benefits of "human value" as well as economic returns similar to those from infrastructure investment—for example, irrigation or roads. In the education sector, the Bank's policy has been to support projects which have a strong productive element. Without abandoning this orientation toward productive expenditures, the Bank's approach to education has been widening in recent years, and recognition has been given to the potential for welfare redistribution through education projects aimed specifically at lower-income groups. Similarly, in the area of nutrition, the Bank has emphasized activities which have both a redistributive impact, because they are directed toward the poor, and an investment orientation, since their economic returns, though difficult to measure, may well make the projects attractive on those grounds alone.

Whichever option is adopted, the approach in the health area should generally be similar to that in education; projects should be sought that combine promotion of economic development with redistribution of welfare.

The Bank makes three types of contributions to the development of its borrowers. Firstly, it transfers financial resources from richer countries to developing countries. Secondly, it encourages the more effective use of the borrower's own resources in the sector in which it is making a loan. Thirdly, it conveys the insights gained from experience in one developing country to other developing countries. The potential importance of these types of contributions differs in different sectors of lending.

The transfer of resources would not seem in itself an important reason for the Bank's involvement in the health field. This aspect is usually most significant to the recipient where projects require large-scale imports, and large and lumpy outlays. This is not likely to be the case in the health field, except in urban water supply where the Bank is already active, and in the construction of hospitals (which usually does not have high priority). To have health projects of the scale customary for Bank loans in small countries, the Bank would have to finance a very large share of the growth of total national government expenditure on health. There does not seem to be any special justification for this. At present, it is not possible to say what the appropriate national total for health expenditures should be. The Bank's

action in the health field cannot be justified on grounds that the sector as a whole receives too few resources, and that these resources ought to be supplemented by the Bank.

However, the evidence is ample that, in most developing countries where cost-effectiveness and equitable welfare distribution are regarded as important national goals, health expenditures are misallocated. The Bank might be able to achieve some limited beneficial effect by bringing to the attention of member governments the changes needed in current patterns of resource allocation for health. Of course, the larger the Bank's involvement in the health sector, the greater its possible influence. The amount of influence the Bank can exert over national policies also depends on the confidence that governments place in the Bank's expertise and, therefore, on its ability to carry out its third role—that of transferring relevant international experience. The general direction in which health policies should be changed is clear, but determining what will prove best for any individual country within this framework still requires careful study. Faced with similar uncertainties in other areas of human resource development, the Bank has chosen to encourage borrowers to carry out carefully monitored projects with experimental components. This has been the case with the population projects in India, and basic education projects in Western Africa.

A final general consideration concerns the role of the Bank in relation to other donors. Health programs have attracted financial and technical assistance from multilateral and bilateral sources (see Annex 1) although, in contrast to aid for family planning, the assistance has made up only a small part of national expenditures. Therefore, the need for the Bank to expand in the health field is not, *prima facie*, proven. However, two large donors in the health field have invited greater Bank involvement. One national agency has recently suggested joint operations with the Bank to finance low-cost health delivery services combined with family planning. The Director-General of WHO has proposed collaboration between his organization and the Bank, particularly in improving the allocation of national resources devoted to health. The types of assistance that WHO and the Bank provide and the services they have available are complementary. WHO does not finance large capital expenditures. It has much technical expertise, but limited strength in conducting economic analysis. The Bank's position is the reverse. Thus, substantial scope exists for collaboration with WHO and other agencies—as has already taken place with WHO in the Western Africa onchocerciasis project.

In the light of the Bank's objectives and limitations as outlined above, it is intended that Option One will be adopted as the Bank's

policy—namely, to continue progress in increasing health benefits within the present patterns of lending. Although this implies less Bank involvement with health than Option Two, the scope and potential of Option One should not be underestimated. A policy based on Option One would allow the Bank to:

1. Minimize the adverse side effects on health of its lending operations in other sectors (projects involving water use, land settlement, etc.).
2. Make a number of key interventions necessary for improving the health status of low-income groups (for example, projects involving water supply, sewerage, nutrition, family planning, sites and services for low-cost housing and training of health personnel).
3. Conduct field experiments to test selected elements of reformed health promotion systems within projects concerned with rural development, population, nutrition and sites and services.

The Bank's policy on health, as in other fields, will require periodic reexamination. In the interim, Option One would enable the Bank to improve substantially its assistance in the health area and to gain experience which would enable it to assess whether it can effectively assist in the development of health systems that are appropriate to developing countries. This option would also enable the Bank to participate, under appropriate circumstances, in major disease-control projects and programs, such as the one relating to onchocerciasis in Western Africa.

ANNEXES

INTERNATIONAL ASSISTANCE FOR HEALTH PROGRAMS

International assistance for health programs began over a century ago with efforts to control communicable diseases.[1] As commercial relations expanded across national frontiers, the spread of great epidemics of smallpox, malaria, typhus, cholera, plague and yellow fever required international action. The International Sanitary Bureau—the parent of the Pan American Health Organization (PAHO)—was founded in 1902, and began to replace quarantine with preventive sanitation measures throughout the Americas. The Rockefeller Foundation started its activities in 1913 with heavy emphasis on endemic disease control. In its early years after World War II, WHO concentrated on the control and eradication of communicable diseases.

Later, multilateral and bilateral health assistance expanded support of research, development of health delivery systems and training of health manpower for developing countries, both locally and abroad. In recent years, following experience with family planning, many donor countries have placed growing emphasis on low-cost health delivery systems that can reach the poor. In many cases family planning and health activities are so interwoven that it is difficult to distinguish between aid expenditures on population and aid expenditures on health.

As shown in Table 1:1, the health sector receives a significant amount of assistance from a variety of donors. However, the assistance represents only a small proportion of public-sector health spending in recipient countries. The bulk of external aid has gone to training and technical assistance rather than to the financing of capital costs. Donor efforts are only now beginning to assist countries in improving their resource allocation and in increasing the effectiveness of health projects through comprehensive health sector planning.

WHO ranked first in health assistance in 1972, providing $115 million. The United States, working through the Agency for International Development (USAID) was in second place, although health constituted only 2.5% of its foreign aid commitments. Germany was third with $42 million. UNICEF spent $36 million—about 30% of its total age-specific program expenditures—on health. Through the Swedish International Development Authority (SIDA), Sweden spent 13.5% of

[1] *This annex provides a general picture of international health assistance. An exhaustive description is not possible because comprehensive data on health activities in various agencies frequently are not assembled and definitions are not always consistent among countries.*

Annex 1
Table 1:1

International Assistance for Health Programs from Major Donors Other than the Bank
(US$ thousands)

Donor	1969	1972	Description
WHO	77,736	115,274	Includes family planning activities. Figures include funds from UNDP and U.N. Fund for Population Activities (UNFPA).
PAHO	16,649	25,512	Excludes funds from WHO Regional Office. Includes family planning activities.
UNICEF	27,950	35,780	Includes family planning activities. Figures include UNDP and UNFPA funds.
Denmark	4,200	7,100	
France	n.a.	3,400	1973 figure. Excludes outlays of Office de la Recherche Scientifique et Technique d'Outre-Mer.
Germany, Federal Republic of	n.a.	42,000	Approximate average annual disbursement 1971-73. Total disbursements through 1970 amounted to $171 million.
Japan	–	9,000	
Sweden	6,897	12,685	Includes family planning activities.
United Kingdom	n.a.	8,000	Average annual disbursement in 1967-72. Excludes technical assistance.
United States	55,375	41,881	

its 1972 assistance on health and population planning; the sum was devoted to carefully focused and executed programs which sought primarily to reach the poor. The British, French, German and Finnish aid programs also contained allocations for health. The health programs of some private foundations, such as the Rockefeller Foundation, while highly innovative, have involved relatively small outlays.

Table 1:2 shows the distribution of expenditures, by region, for WHO and USAID. The WHO assistance is fairly widely distributed: Asia accounts for about 40%, Africa 21%, Latin America 13% and Europe 7%. Another 19% was spent by WHO on interregional activities in which the regional distribution cannot be identified. The bulk of USAID health expenditures, or about 72%, was devoted to interregional and supporting assistance, including medical schools in the United States and hospitals abroad. Other USAID efforts were concentrated in Latin America where 19% of its health expenditures were disbursed. Africa accounted for 7% and Asia for less than 2%. UNICEF's regional allocation pattern, which follows criteria of per

Annex 1
Table 1:2

Regional Distribution of Health Assistance by Major Donors, 1972

	Africa	America	Asia	Europe	Interregional activities supporting assistance	Total
WHO	16,186	10,625	30,455	5,702	14,280	76,887[1]
USAID	2,953	7,947	709	—	30,182	41,881

[1]Excluding nonproject outlays.
Sources: Annual and Financial Reports of WHO and USAID.

Table 1:3

WHO Project Costs by Area of Activity
(As percentage of total project costs)

	1969	1972
Public health services[1]	20.6	23.9
Environmental health	13.0	13.9
Education and training	12.3	13.8
Malaria	15.0	8.0
Family health	2.3	7.2
Smallpox	6.2	4.9
Nursing	5.4	4.8
Communicable diseases—general activities	2.5	3.3
Vital and health statistics	1.7	2.3
Nutrition	2.7	1.9
Tuberculosis	3.3	1.9
Other activities	15.0	14.1
	100.0	100.0

[1]Including WHO and zone representatives.
Source: WHO Financial Reports.

capita GNP and child population, strongly emphasized Asia. SIDA's bilateral health assistance is concentrated in a limited number of countries, mainly in Africa and Asia.

Table 1:3 gives the distribution of WHO's project costs by area of activity. Control of communicable diseases is still the organization's top priority. Funds allocated to malaria campaigns dropped in relative importance between 1969 and 1972. Public health services, environmental health, education and training, and family health rank high in project costs, and their relative importance has been growing in recent years. Similar changes in the "mix" of the program took place at USAID, as shown in Table 1:4.

Annex 1
Table 1:4

USAID Health Expenditures by Area of Activity
(As percentage of total health expenditures)

	1969	1972
Health services	56.8	69.4
Malaria eradication	15.2	11.8
Environmental health	15.4	7.4
Health manpower	4.0	6.5
Measles, smallpox	7.4	2.7
Other disease control	1.2	2.2
	100.0	100.0

Source: USAID. Reports on Health, Population and Nutrition Activities.

UNICEF is increasingly moving away from specialized campaigns (for example, milk feeding or vaccination) and small, isolated projects toward more integrated health programs with well-defined priorities (for example, primary level education in rural areas). Less emphasis is now placed on narrow, child-oriented programs. Instead, there are more programs with a broader focus (such as rural water supply or eradication of slum conditions) and with a cross-sectoral approach (such as health education in schools and nutrition training in agricultural extension).

The Rockefeller Foundation's health activities in more recent years have been in three major areas: (1) development of medical schools as part of its university development programs, with special emphasis on curriculum design (for example, in Colombia and Thailand); (2) planning of health care delivery (in Colombia and the Philippines); and (3) schistosomiasis control (in St. Lucia).

In 1973, French aid for health was distributed as follows: 40% for preventive health services, 58% for curative health services and 2% for research. Aid for preventive health went mainly to the Service des Grandes Endémies. As of March 1, 1974, 1,025 technical assistance personnel for health were posted; 403 were fulfilling their military service in this way. Although the French aid policy is to concentrate on preventive health, aid for curative health was the largest category of expenditure. French aid has also supported the establishment of full university-level medical schools in several Francophone countries. Another important component of French aid for health is research conducted under the auspices of the Office de la Recherche Scientifique et Technique d'Outre-Mer, which undertakes studies in many areas of special relevance to tropical countries.[2]

[2] *This research is not included in the assistance figures in Table 1.1.*

In the five years, 1967-72, the U.K. Ministry of Overseas Development disbursed bilateral grants for health totaling $12.7 million, and loans of $7 million, making an annual average disbursement close to $4 million. In addition, on June 30, 1972, 798 health personnel, plus 193 volunteers financed by U.K. bilateral aid, were working abroad. At the same time, 697 nationals from developing countries were receiving health training financed by Britain. A major feature of British aid is research into tropical medical problems; the U.K. spends an additional $4 million per year on this effort, some of it financed by the Medical Research Council. In the past, the U.K. has financed teaching hospitals, but interest is now growing in providing rural health services.

German aid for health comes under the two main heads of "Kapital Hilfe" and "Technische Hilfe." In recent years, the former has been just under $30 million per year, while the latter has fluctuated between $12 million and $15 million annually. A substantial part of this aid is channeled through church organizations. In addition, the Deutsche Entwicklungsdienst provides significant aid for the health sector in the form of personnel. In the past, a large proportion of the total aid has been for isolated hospital projects, partly in response to the perceived priorities of aid recipients. More recently, the policy has decisively shifted toward integrated basic health services for an entire region, although some of the hospital projects are still under way. Considerable emphasis is projected on the training of paramedical personnel.

During the period 1970-74, Finland sponsored a number of projects for health improvement in Tanzania, and organized health-related training programs. Over the period, approximately $1.4 million was provided to Tanzania for the construction of Rural Medical Aid Schools, assistance to the Kilimanjaro Christian Medical Centre and the Red Cross Society of Tanzania, and large water development projects in the provinces of Mtwara and Lindi. Finland has also contributed funds to such diverse health-related projects as construction of a milk-processing plant (India) and maternity units (Cuba), and to programs including pediatric field training, child feeding and vaccine supply.

Sweden's bilateral health assistance program is concentrated in a relatively small number of countries in order to achieve impact with limited financial resources. Bangladesh, Botswana, Chile, Cuba, Ethiopia, India, Kenya, North Viet-Nam, Pakistan, Tanzania, Tunisia and Zambia are currently "program countries" under this policy. SIDA sponsors children's hospitals and health centers, and rural and maternal-and-child health programs; it also assists in health sector planning.

Measures of Health Status by Level of Per Capita Gross National Product (GNP) in Selected Countries

Country	Per[1] capita GNP	Crude[2] birth rate	Crude[2] death rate	Infant[3] mortality	Life[2] expectancy
Burundi	60	41.8	24.9	150[4]	39.0
Upper Volta	70	48.5	24.9	180	39.0
Ethiopia	80	49.5	23.8	162	40.0
Indonesia	80	44.8	18.9	125[4]	45.4
Yemen Arab Republic	90	49.5	20.0	160	45.5
Malawi	90	47.7	23.7	148[4]	41.0
Guinea	90	46.6	22.8	240[5]	41.0
Sri Lanka	100	28.6	6.3	50	67.8
Dahomey	100	49.9	23.0	110[4]	41.0
Tanzania	110	50.1	23.4	122[5]*	44.5
India	110	41.1	16.3	139	49.2
Sudan	120	47.8	18.5	130	47.2
Yemen, People's Democratic Republic of	120	50.0	22.7	160	45.3
Uganda	130	46.9	15.7	160[4]	50.0
Pakistan	130	47.6	16.8	130	49.4
Nigeria	140	49.3	22.7	150-175[6]	41.0
Central African Republic	150	43.2	22.5	190	41.0
Mauritania	170	48.8	23.4	187[5]	41.0
Bolivia	190	43.7	18.0	60	46.7
Liberia	210	50.7	22.3	159	43.5
Sierra Leone	210	41.9	20.2	197[5]	43.5
Thailand	210	43.7	10.4	23	58.6
Egypt, Arab Republic of	220	37.8	15.0	120	50.7
Viet-Nam, Republic of	230	41.8	23.6	100	40.5
Philippines	240	43.6	10.5	62	58.4
Senegal	250	47.3	22.2	93[4]	42.0
Ghana	250	48.8	21.9	156[4]	43.5
Congo	270	45.1	20.8	180	43.5
Paraguay	280	42.2	8.6	39	61.5
Syrian Arab Republic	290	46.9	14.4	24[4]	53.8
Honduras	300	49.3	14.6	37[4]	53.5
Ecuador	310	41.8	9.5	87[6]	59.6
Tunisia	320	41.0	13.9	76	54.1
El Salvador	320	42.2	11.1	58	57.8
Ivory Coast	330	45.6	20.6	138[4]	43.5
Turkey	340	39.4	12.7	153	56.4
Algeria	360	49.4	16.6	86[4]	51.5
Iraq	370	49.2	14.8	26	52.6
Colombia	370	40.6	8.8	81	60.9
Zambia	380	51.5	20.3	259[4]	44.5

Measures of Health Status by Level of Per Capita Gross National Product (GNP) in Selected Countries (continued)

Country	Per[1] capita GNP	Crude[2] birth rate	Crude[2] death rate	Infant[3] mortality	Life[2] Expectancy
Guatemala	390	42.8	13.7	83	52.9
Malaysia	400	39.0	9.8	38	59.4
Dominican Republic	430	45.8	11.0	49	57.8
China, Republic of	430	26.7	10.2	18[7]	61.6
Iran	450	45.3	15.6	160[6]	51.0
Nicaragua	450	48.3	13.9	45[6]	52.9
Brazil	460	37.1	8.8	110[6]	61.4
Peru	480	41.0	11.9	67	55.7
Albania	480	33.4	6.5	87[4]†	68.6
Cuba	510	28.9	5.9	28	72.3
Costa Rica	590	33.4	5.9	56	68.2
Mexico	700	42.0	8.6	63	63.2
Jamaica	720	33.2	7.1	27	69.5
Portugal	730	18.4	10.1	50	68.0
Yugoslavia	730	18.2	9.2	44	67.5
Romania	740	19.3	10.3	40	67.2
Chile	760	25.9	8.1	71	64.3
Panama	820	36.2	7.1	34	66.5
Bulgaria	820	16.2	9.1	26	71.8
Hong Kong	900	19.4	5.5	17	70.0
Trinidad and Tobago	940	25.3	5.9	35[4]	69.5
Venezuela	1,060	36.1	7.0	52	64.7
Singapore	1,200	21.2	5.1	19	69.5
U.S.S.R.	1,400	17.8	7.9	23	70.4
Japan	2,130	19.2	6.6	12[4]	73.3
Israel	2,190	26.2	6.7	24	70.5
United States	5,160	16.2	9.4	19	71.3

Symbols: * for 1968
† for 1965

Note:
Crude birth rates and death rates are births and deaths per 1,000 population per year. Infant mortality rate is number of deaths of children under one year of age per 1,000 live births per year. Life expectancy is expected length of life in years at birth.

Sources:

[1]World Bank. *World Bank Atlas,* 1973: "Population, Per Capita Product and Growth Rates," pp. 6-14. Washington: World Bank, 1973.

[2]United Nations projections, 1973. Unpublished data: averages for 1970-75.

[3]World Health Organization. *The Fifth Report on the World Health Situation, 1969-72—Part II: Review by Country and Territory,* "Population and Other Statistics," by country, except where other sources are indicated. Unless otherwise noted, figures are for 1970-72. Geneva: WHO, 1974.

[4]United Nations. *Statistical Yearbook 1972,* Table 21, latest available year. New York: United Nations, 1973.

[5]World Health Organization. *Malaria Control in Countries Where Time-limited Eradication is Impracticable at Present.* Report of a WHO Interregional Conference. WHO Technical Report Series No. 537, Annex 2, Table 2; figures are for 1971. Geneva: WHO, 1974.

[6]World Bank estimates, latest available year.

[7]United Nations. *Demographic Yearbook 1970,* Table 16; figure is for 1969. New York: United Nations, 1971.

Annex 3

Health Expenditures in Developing Countries

Country	Source	Health budget as percentage of national budget	Health budget as percentage of GNP	Government health expenditures per capita (US$)
Rwanda	a	8.7	0.8	0.45
Upper Volta[1]	b	4.8	0.7	0.56
Somalia	c	6.7	2.0*	1.40
Ethiopia	a	6.9	0.8	0.67
Burma	a	6.2	1.1	0.85
Malawi	a	6.1	0.8*	0.50
Sri Lanka	b	8.1	3.6*	3.76
Tanzania	c	6.3	1.5*	1.68
India	c	4.9	0.9	0.91
Haiti	c	13.7	0.7*	0.78
Uganda	c	9.6	1.7*	2.24
Togo	c	6.5	1.0*	1.51
Central African Republic	b	8.4	1.9*	2.81
Kenya	a	6.4	1.7	0.14
Bolivia	b	3.6	2.0*	3.74
Cameroon	c	7.8	1.0*	2.02
Liberia	c	7.4	1.4*	2.90
Sierra Leone	c	6.2	0.9*	1.95
Thailand	b	6.0	1.2	2.45
Egypt, Arab Republic of	c	8.4	1.8*	3.91
Viet-Nam, Republic of	b	2.3	0.4*	1.00
Philippines	a	5.4	0.5	1.06
Senegal	b	9.1	1.4*	3.49
Ghana	a	7.3	1.3	3.76
Jordan	b	9.5	2.8	10.10
Congo	b	6.1	1.8*	4.82
Paraguay	b	26.4	2.4	6.77
Mozambique	c	4.9	0.9*	2.47
Korea, Republic of	a	1.4	0.5	1.33
Syrian Arab Republic	a	2.6	0.7	2.03

Health Expenditures in Developing Countries (continued)

Country	Source	Health budget as percentage of national budget	Health budget as percentage of GNP	Government health expenditures per capita (US$)
Honduras	a	7.6	1.3	3.33
Ecuador	c	2.8	0.3	1.04
El Salvador	b	12.6	1.5	4.40
Turkey	b	21.4	2.6	8.21
Algeria	a	5.3	1.4	4.53
Colombia	a	10.4	0.6*	2.04
Angola	c	5.1	1.1*	3.95
Malaysia	b	6.7	2.5	7.18
Dominican Republic	b	8.6	1.4	7.71
Iran	c	2.5	0.6*	2.60
Brazil	c	1.4	0.2*	0.80
Lebanon	c	3.5	0.6*	3.80
Mexico	c	5.9	0.4*	2.64
Jamaica	c	10.0	2.7*	19.54
Yugoslavia	a	38.2	10.1*	73.75
Romania	a	5.7	2.5	18.56
South Africa	c	1.8	0.3*	2.61
Panama	b	16.7	2.2	16.70
Trinidad and Tobago	a	7.8	1.8	14.27
Venezuela	b	18.4	4.1*	43.18
U.S.S.R.	c	5.8	3.4*	47.04
Libyan Arab Republic	c	5.8	2.4*	35.00
Japan	c	1.9	0.3*	5.45
United Kingdom	c	9.5	4.3*	105.16

*Calculated by dividing "per capita expenditure" figure in last column by estimates of per capita GNP for 1971, as published in *World Bank Atlas,* 1973.

(1)GNP extrapolated from 1968.

a=World Bank estimates.
b=World Health Organization. *The Fifth Report on the World Health Situation, 1969-72.* Geneva: WHO, 1974.
c=World Health Organization. *World Health Statistics Report,* Vol. 26, No. 11, Table 2. Geneva: WHO, 1973.

Annex 4

Analysis of Government Health Expenditures in Selected Countries

Country	Year	Total public expenditures ($ millions)	Percentage for public health or prevention	Percentage for curative care	Percentage for training and research
Sri Lanka	1957-58	34.3	23.3	74.4	2.3
Tanzania	1970-71	19.5	4.9	80.3	4.4
India	1965-66	236.0	37.0	55.5	7.5
Laos[1]	1971-72	2.3	14.3[2]	19.9[3]	44.8
Kenya	1971	27.8	5.2	83.8	11.0
Thailand[1]	1971-72	83.6	28.1[4]	46.6[3]	19.1
Paraguay[1]	1972	10.0	10.5[5]	84.6[3]	–
Tunisia[1]	1971	15.8	–	86.3[3]	–
El Salvador[1]	1971	30.4	3.3[6]	52.9[3]	1.1
Turkey[1]	1972	303.7	16.3[7]	–	13.5
Colombia	1970	203.0	18.7	79.3	2.0
Mongolia[1]	1972	–	–	–	7.2
Chile	1959	63.8	18.3	77.0	4.0
Panama	1967	28.4	30.0	---- (70%) ----	
Venezuela	1962	–	18.0	76.5	5.5
Israel[1]	1959-60	82.7	4.9	80.3	4.4

[1]Classification of residual categories of expenditure is unknown.
[2]Expenditure for "environmental health services."
[3]Expenditure for government hospitals only.
[4]Expenditure for "control of communicable diseases, laboratory services, environmental health services and occupational health services."
[5]Expenditure for "campaigns against communicable diseases, maternal and child health and vaccinations and laboratory services."
[6]Expenditure for "immunization and vaccination activities, laboratory services and environmental health services."
[7]Expenditure for "mass campaigns against communicable diseases, immunization and vaccination activities, laboratory services and environmental health services."

Sources: Sri Lanka, Chile, Venezuela and Israel: Abel-Smith, Brian. *Paying for Health Services.* WHO Public Health Paper 17, Table 13. Geneva: WHO, 1963. Abel-Smith, Brian. *An International Study of Health Expenditures.* WHO Public Health Paper 32, Tables 12-14. Geneva: WHO, 1967.

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Annex 5

Percentage Distribution of Health Expenditures in Selected Countries, 1961

(By focus of service)

Country	Personal medical services		Public health services (%)	Teaching and research (%)
	Inpatient (%)	Outpatient (%)		
Kenya	---- 89 ----		8	3
Sri Lanka	50	44	5	2
Tanzania	45	50	4	1
Yugoslavia	43	50	4	3
Czechoslovakia	48	44	2	6
United Kingdom	52	44	2	2
France	41	56	2	2
Sweden	53	42	1	4
United States	38	57	1	5

Source: Winkelstein, Jr., Warren. "Epidemiological Considerations Underlying the Allocation of Health and Disease Care Resources." *International Journal of Epidemiology*, 1(1), (1972): Table 1. London: Oxford University Press. (Data from the Epidemiology Program, School of Public Health, University of California, Berkeley.)

Annex 6

Health Resources in Developing Countries

Country	Population per hospital bed	Percentage of government hospitals in total number of hospitals	Population per physician	Percentage of government-employed physicians in total number of physicians	Population per non-physician primary health workers	Support personnel per physician
Rwanda	769	64	58,000	99	4,910	7.3
Burundi	787	–	59,066	–	11,770	7.5
Mali	1,389	–	41,471	100	43,630	15.9
Upper Volta	1,667	–	92,828	–	88,260	27.7
Bangladesh	8,333	–	8,932	–	87,250	0.1
Somalia	571	–	21,424	–	16,440	7.5
Afghanistan	6,667	94	17,698	100	19,670	1.0
Ethiopia	3,030	67	73,289	–	24,800	10.5
Indonesia	1,724	83	26,367	49	10,230	7.0
Burma	1,190	–	8,976	86	3,940	1.6
Chad	775	92	61,695	–	30,330	13.5
Nepal	6,667	–	50,045	–	11,830	0.8
Malawi	637	50	75,254	47	5,170	4.8
Zaire	318	50	26,184	–	10,460	13.1
Guinea	813	–	51,688	–	4,570	25.4
Niger	2,222	94	58,261	100	68,140	8.5
Sri Lanka	311	–	3,860	–	2,480	1.5
Dahomey	862	–	29,118	81	14,100	10.0
Tanzania	699	53	20,702	53	8,360	4.1
India	1,612	–	4,805	–	11,500	0.6
Haiti	1,369	71	13,481	–	20,200	4.1
Sudan	1,041	–	15,934	86	4,180	8.2
Laos	1,190	61	16,547	6	7,350	3.8
Khmer Republic	917	73	17,529	87	5,280	6.9
Uganda	641	69	9,215	33	5,410	0.9
Pakistan	1,667	–	4,329	–	10,200	0.3
Nigeria	1,851	81	20,525	32	3,830	4.9
Malagasy Republic	352	90	31,645	75	6,310	9.2
Togo	820	–	27,943	100	8,930	7.0
Central African Republic	465	–	36,952	–	3,910	27.8
Kenya	775	58	7,829	–	3,360	5.3
Mauritania	2,778	–	17,206	92	6,000	4.3
Bolivia	490	86	2,301	–	58,010	0.9
Cameroon	480	67	25,938	60	59,550	10.7
Liberia	526	51	13,818	–	5,020	4.8
Sierra Leone	1,041	69	17,148	67	1,630	6.7
Thailand	847	94	8,397	61	1,700	1.6
Egypt, Arab Republic of	463	87	1,913	–	2,130	1.2
Viet-Nam, Republic of	478	74	9,203	–	2,630	2.8
Philippines	855	45	9,097	–	7,880	1.9

Health Resources in Developing Countries (continued)

Country	Population per hospital bed	Percentage of government hospitals in total number of hospitals	Population per physician	Percentage of government-employed physicians in total number of physicians	Population per non-physician primary health workers	Support personnel per physician
Senegal	730	–	14,715	–	12,990	9.0
Ghana	758	67	12,954	59	2,840	12.8
Jordan	962	68	3,805	34	3,870	2.9
Morocco	690	–	13,244	–	–	–
Congo	171	94	57,368	–	181,670	15.9
Paraguay	625	–	2,326	–	9,950	1.4
Mozambique	636	89	15,520	–	26,740	3.1
Korea, Republic of	1,923	–	2,207	8	3,370	1.4
Syrian Arab Republic	1,010	81	3,757	–	6,700	0.9
Honduras	568	76	3,621	–	21,720	3.6
Ecuador	434	–	2,929	–	58,030	1.9
Rhodesia	395	62	6,375	–	1,580	6.0
Tunisia	410	–	5,874	–	25,000	8.2
Papua New Guinea	152	47	11,635	–	5,280	6.6
El Salvador	526	94	4,039	–	–	4.5
Ivory Coast	676	–	13,918	81	26,140	4.9
Turkey	490	66	2,222	53	3,110	1.2
Algeria	341	–	8,439	–	21,290	3.1
Iraq	775	98	3,348	80	3,430	1.8
Colombia	446	77	2,285	–	2,500	2.1
Angola	362	42	8,463	–	26,070	4.9
Mongolia	108	–	–	–	510	2.3
Zambia	314	55	13,472	–	2,130	5.0
Guatemala	457	91	3,617	–	–	3.1
Malaysia	380	–	4,347	–	1,730	3.7
Dominican Republic	348	64	2,102	41	32,540	0.5
China, Republic of	2,941	–	3,224	–	7,430	0.3
Iran	775	56	3,297	90	7,820	1.5
Nicaragua	410	89	2,065	–	–	2.9
Brazil	262	–	1,963	–	46,570	0.6
Peru	474	84	1,978	–	13,670	2.6
Albania	167	–	1,875	–	1,330	3.5
Cuba	213	–	1,199	–	–	1.7
Saudi Arabia	1,136	–	9,558	–	10,950	2.2
Costa Rica	254	96	1,619	–	–	14.5
Lebanon	260	15	1,435	–	5,940	1.2
Mexico	935	–	1,491	–	–	0.9
Jamaica	244	92	2,659	–	21,950	1.7
Portugal	164	47	1,181	–	6,050	1.1
Yugoslavia	179	–	1,008	–	4,200	3.0

Sources: Derived from World Health Organization. *World Health Statistics Annual–Vol. III: Health Personnel and Hospital Establishments,* Table 1. Geneva: WHO, 1974. World Health Organization. *World Health Statistics Report,* 26(3). Table 2. Geneva: WHO, 1973.

Annex 7

Indices of Hospital Utilization

Country	Year	Beds	Discharges	Patient days	Average days of stay	Occupancy rate (%)
General Hospitals						
Malawi	1965	1,025	24,528	293,817	12.0	78.5
Morocco*	1965	12,157	267,835	3,469,668	13.0	78.2
Senegal*	1967	2,424	33,944	813,237	24.0	91.9
Tunisia*	1967	6,655	222,813	2,059,619	9.2	84.8
Colombia	1967	34,399	871,911	7,226,563	8.3	57.6
Honduras	1967	3,408	78,488	980,737	12.5	78.8
Jamaica*	1967	3,034	82,565	914,679	12.5	78.8
Jordan	1967	1,980	43,087	293,618	6.8	40.6
Thailand	1967	20,161	790,338	4,606,036	5.8	62.6
Turkey	1967	32,686	895,912	7,235,542	8.1	60.6
Local and Rural Hospitals						
Dahomey*	1965	250	2,143	44,196	20.6	48.4
Malawi	1965	3,620	153,335	1,592,593	10.4	120.5
Morocco*	1965	1,639	30,826	288,255	9.4	48.2
Senegal	1967	591	14,327	132,575	9.3	61.5
Tunisia*	1967	2,317	86,364	602,640	7.0	71.3
Chile	1967	1,500	38,788	329,757	8.5	60.2
Costa Rica	1967	204	6,286	14,862	2.4	20.0
Surinam	1966	225	4,109	31,413	7.6	38.3
Cyprus*	1967	94	610	2,997	4.9	8.7
Laos*	1967	267	3,764	33,630	8.9	34.5

(*)Government hospitals only.
Source: World Health Organization. *World Health Statistics Annual, 1967—Vol. III: Health Personnel and Hospital Establishments,* Tables 4 and 5.2. Geneva: WHO, 1970.

Annex 8

Population per Medical Doctor in Urban and Rural Areas, in Selected Countries

Country	Year	Population /medical doctor		
		Nationwide	Urban	Rural
Pakistan	1970	7,400	3,700	24,200
Kenya	1969	12,140	800	50,000
Philippines	1971	3,900	1,500	10,000
Honduras	1968	3,860	1,190	7,140
Colombia	1970	2,160	1,000	6,400
Iran	1967-70	3,752	2,275	10,000
Panama	1969	1,790	930	3,000

Sources: Panama, Honduras, Philippines: United States Office of International Health, Department of Health, Education and Welfare. *Syncrisis: The Dynamics of Health. Vol. I, Panama,* p. 59, Tables 6 and 37a; *Vol. II, Honduras,* p. 11, Tables 1 and 27; *Vol. IV, The Philippines,* pp. 37, 52-53, Tables 14 and 45. Washington: Government Printing Office, 1972.

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Annex 9

Distribution of Medical Doctors between the Capital and the Remainder of the Country in Selected Countries, 1968

Country	Population/medical doctors		
	Nationwide	Capital city	Remainder of country
Haiti	14,700	1,350	33,300
Kenya	10,999	672	25,600
Thailand	7,000	800	25,000
Senegal	19,100	4,270	44,300
Ghana[1]	18,000	4,340	41,360
Tunisia	6,486	2,912	10,056
Colombia[1]	2,220	1,000	6,400
Guatemala	4,860	875	22,600
Iran	3,750	906	6,220
Lebanon	1,470	650	3,000
Jamaica	2,280	840	5,510
Panama	1,850	760	4,400

[1]Major urban centers instead of capital city.

Sources: Panama, Colombia, Guatemala, Haiti: Pan American Health Organization. *Health Conditions in the Americas 1965-1968.* Scientific Publication No. 207, Table 58. Washington, D.C.: PAHO/WHO, 1970.

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Annex 10

Comparative Costs of Medical Education in Selected Countries, 1965

(US$)

Country	Per medical doctor graduated[1]	Per medical assistant	Per nurse graduated	Per auxiliary nurse	Per health assistant	Per auxiliary sanitarian
Senegal	84,000	–	835	–	–	–
Jamaica	24,000	–	1,385	–	–	–
Guatemala	19,200	–	2,700	–	–	–
Thailand	6,600	–	1,200	–	700	350
Kenya	22-28,000	2,890	3,380	2,167	787	1,680
Pakistan	12,600	–	2,960	–	–	–
Colombia	29,000	–	3,000	1,000	–	–
United States	19,630	–	–	–	–	–

[1]Obtained by dividing total recurrent costs as assignable to medical education by number of students graduating.

Sources: Bryant, John. *Health and the Developing World,* Tables 27 and 43. Ithaca, New York: Cornell University Press, 1969. Fendall, N. R. E. "The Medical Assistant in Africa." *Journal of Tropical Medicine and Hygiene,* 71(4), (April 1968):90.

Annex 11

Percentage of Deliveries Attended by a Physician or by a Qualified Midwife in Selected Countries

Country	Year	In hospital	At home	In hospital or at home
Sri Lanka	1972	75.0[1]	20.0[1]	95.0[1]
Sudan	1971	–	–	10.0[2]
Malagasy Republic	1971	–	–	71.1[1]
Bolivia	1971	5.5[3]	12.8[3]	18.3[3]
Thailand	1971	19.2[3]	–	–
Viet-Nam, Republic of	1972	80.3[1]	0.7[1]	81.0[1]
Paraguay	1972	–	–	55.4[1]
El Salvador	1972	26.0[1]	–	–
Iraq	1971	6.5[3]	21.7[3]	28.2[3]
Guatemala	1970	–	–	25.0[2]
Dominican Republic	1972	40.2[3]	–	–
Peru	1971	15.2[3]	–	–
Panama	1972	–	–	69.2[1]
Venezuela	1972	61.5[2]	0.0[4]	61.5[2]
Singapore	1972	80.0[1]	8.2[1]	88.2[1]
Poland	1972	–	–	99.9[1]
Libyan Arab Republic	1972	48.8[2]	3.7[2]	52.5[1]
Israel	1972	–	–	98.3[1]
France	1971	97.0[1]	3.0[1]	100.0[1]

Note: Percentage figures which have been calculated from the total number of live births may overestimate the actual percentage by one or two points.

[1]Percentage figure given in the source.
[2]Percentage figure calculated by dividing number of deliveries by total number of live births.
[3]Percentage figure calculated by dividing number of deliveries given in the source by World Bank estimates of total number of live births.
[4]Only 141 deliveries out of 412,435 live births.

Source: World Health Organization. *The Fifth Report on the World Health Situation, 1969-1972—Part II: Review by Country and Territory,* "Population and Other Statistics" and "Specialized Units," by country. Geneva: WHO, 1974.

Annex 12

Utilization of Official Health Services in Selected Countries, 1962

Country	Population (millions)	Hospital admissions	Outpatient attendances at hospitals, health centers and dispensaries (millions)	Average visits per person per year
Jamaica	1.8	68,828	1.1	0.6
Guatemala	3.8	136,154	0.9	0.2
Senegal	3.1	65,673	7.8	2.5
Thailand	28.0	541,000	17.5	0.6
Kenya	9.3	146,740	5.2	0.5
Tanzania	10.0	231,598	26.0	2.6
Uganda	7.2	172,279	9.6	1.4

Source: Fendall, N.R.E. "Primary Medical Care in Developing Countries," *International Journal of Health Services,* Vol. 2(2), (1972): Table 4.

Annex 13

Emigration of Medical Doctors to the Developed World

Country	Years	Medical doctors emigrating each year (as percentage of total graduates)	Permanent loss each year (as percentage of total medical doctors)
India	1961-64	18	7
Thailand	1968	67	4
Philippines	1962-67	20	13
Turkey	1964	22	17
Latin America,[1]	1965-68	5	–
comprising:			
Haiti		20	–
Colombia		14	–
Guatemala		8	–
Dominican Republic		16	–
Nicaragua		18	–
Brazil		1	–
Peru		2	–
Mexico		5	–
Jamaica		–	–
Chile		10	–
Argentina		3	–

[1]Some 80% of all Latin American medical doctors are produced by six countries—Argentina, Brazil, Colombia, Cuba, Mexico and Venezuela—and 67% are produced by Argentina, Brazil and Mexico alone.

Source: The Committee on the International Migration of Talent. *The International Migration of High-Level Manpower.* New York: Praeger Publishers, Inc., 1970.

India: Loc. cit. Domrese, Robert J. "The Migration of Talent from India," Table 9.1.

Thailand: Loc. cit. Ruth, Heather Low. "Thailand," p. 111.

Philippines: Loc. cit. Idem. "The Philippines," p. 63.

Turkey: Loc. cit. Franck, Peter Goswyn. "Brain Drain from Turkey," p. 305.

Latin America: Loc. cit. Kidd, Charles V. "Migration of Highly Trained Professionals from Latin America to the United States," Table 16.8.

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