

Disease Control Priorities in Developing Countries: Health Policy Responses to Epidemiological Change

ABSTRACT

Health systems in developing countries are facing major challenges in the 1990s and beyond because of a growing epidemiological diversity as a consequence of rapid economic development and declining fertility. The infectious and parasitic diseases of childhood must remain a priority at the same time the chronic diseases among adults are emerging as a serious problem. Health policymakers must engage in undertaking an epidemiological and economic analysis of the major disease problems, evaluating the cost-effectiveness of alternative intervention strategies; designing health care delivery systems; and, choosing what governments can do through persuasion, taxation, regulation, and provision of services. The World Bank has commissioned studies of over two dozen diseases in developing countries which have confirmed the priority of child survival interventions and revealed that interventions for many neglected and emerging adult health problems have comparable cost-effectiveness. Most developing countries lack information about most major diseases among adults, reflecting lack of national capacities in epidemiological and economic analyses, health technology assessment, and environmental monitoring and control. There is a critical need for national and international investment in capacity building and essential national health research to build the base for health policies. (*Am J Public Health* 1991;81:15-22)

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Introduction

The policy debate in international health has often been polarized around conflicting viewpoints on such issues as preventive versus curative services, selective versus comprehensive primary health care, or integrated versus vertical programs. As we approach the 21st century, it is becoming clear that framing the issues in these terms will not enlighten the policy process, primarily because it limits the options largely to actions that can be carried out directly by ministries of health. Profound social and economic transformations are projected to impact on health in the developing countries in the 1990s and beyond; implications for the epidemiological profiles of these countries will be dramatic.²⁻⁴ A more comprehensive analytical approach is required to formulate health policies that will not only respond to but actually guide the development process to maximize its health gains, minimize its potential adverse consequences, and deal cost-effectively with the emerging quantitative importance of noncommunicable diseases.

Over the next decade there will indeed remain perhaps 30 to 40 countries in the lowest income bracket where the health problems will be dominated by the infectious and parasitic diseases of childhood along with undernutrition and high fertility.⁵ Most of these are in Sub-Saharan Africa and South Asia, and intervention strategies must continue to focus on establishing basic infrastructures and delivering established, low-cost technologies.⁶ At the same time, however, there will be a larger group of countries, predominantly in Latin America and East Asia, that are newly emerging into the middle income category. Most of these countries are not free of the infectious dis-

eases, yet at the same time are beginning to face a new set of health problems related to rapid urbanization and industrialization.^{3,7,8} These include: injuries, occupational diseases and, increasingly, preventable chronic diseases among an aging population.⁹ Such a growing epidemiological diversity among and within countries in the developing world demands a flexible approach to international health policy formulation.

Policy Development

It is useful to consider health policy development as involving three complementary tasks: first, *identifying the major disease problems*, assessing their social and economic consequences, and evaluating the costs and effectiveness of alternative intervention strategies; second, *designing health care delivery systems* including establishing the human and physical infrastructures, providing for drugs and logistical support, and developing managerial capacities and funding mechanisms; and third, *defining and choosing what governments can do* through the full range of policy instruments that are at their disposal in the areas

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This paper, invited by the editor, draws in part on a forthcoming book edited by Jamison and Mosley¹; it is based on work undertaken and supported by the Population, Health, and Nutrition Division of the World Bank. The views expressed in this paper are those of the authors and do not necessarily represent those of the World Bank. The authors are indebted to Drs. D. A. Henderson and A. R. Measham for valuable comments.

of persuasion, taxation, regulation and the provision of services.

Like a three-legged stool, coherent health policies require a solid foundation of technical analysis in all three areas in order to identify effective strategies and establish sustainable programs. Through the 1960s and 1970s the second task, designing institution-based delivery systems, (generally following a Western medical model) was the dominant theme in health policy formulation for the developing world. It was in this period that the policy debates centered around the relative allocation of resources for preventive versus curative services and, when disease eradication programs were being implemented, vertical versus integrated programs. The Alma Ata Conference on Primary Health Care in 1978 introduced the principle of "Health For All."¹⁰ Conceptually this encompassed all health problems in the population, was community-based, and involved all sectors of government. Given the resource constraints in the health sector, many health professionals and donors narrowed the agenda, limiting consideration to childhood communicable diseases.¹¹ This led to selective primary health care programs focusing largely on population-based technical interventions such as oral rehydration therapy and immunizations for child survival¹² which, in turn, led to policy debates about the relative merits of selective versus comprehensive primary health care interventions.¹³

The third task, assessing the full array of government instruments available, particularly those outside the traditional purview of ministries of health (such as regulation and taxation) to protect and promote the health of populations is not well established in much of the developing world. The full range of instruments is, however, fully entering the public debate on policy in a number of industrialized countries. For example, in the United States the process was initiated with the publication of "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention" in 1979 which defined a set of health goals for 1990 for infants, children, adolescents, adults, and the aged.¹⁴ To achieve these goals, 15 priority areas for intervention were identified and grouped under three strategic approaches: preventive health services, health protection, and health promotion.¹⁵ Preventive health services included: primary preventive interventions such as immunizations and family planning, secondary prevention for conditions like high

blood pressure as well as curative services for such conditions as sexually transmitted diseases. Health protection encompassed areas where regulation and taxation would be important including toxic agent control, occupational safety, accident prevention, and fluoridation. The health promotion strategies—involving behavioral changes related to smoking, alcohol and drug abuse, diet and exercise—required government interventions not only in education but also through regulation and taxation.

The process of setting national objectives in the US has now been extended with *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*.¹⁶ Based on three years consultation with more than 300 national organizations and state health departments, the goals have been reformulated to go beyond mortality reduction: to increase the span of healthy, disability-free life; to reduce disparities in health by giving more attention to the vulnerable high risk groups such as the poor, minorities, and the elderly; and, to increase access to basic health services.¹⁶ In this context, new priority areas have been added such as cancer screening, AIDS, preventive health services, and surveillance.

Three factors have been key to the successful mobilization of public and professional interest and debate in the United States.¹⁷ First, there was a clear definition of the health problems of concern and their social and economic as well as medical determinants. Second, the 15 priority areas selected for health improvement were further subdivided into 227 health promotion objectives for the 1980s.¹⁸ These detailed objectives represented precise, quantifiable management strategies which were realistic in terms of resource constraints and time frame for implementation, yet demanding enough to push the system to new levels of capability. Third, the *process* of problem identification and health policy formulation involved the broadest participation of all segments of society.¹⁹ On the one hand, a considerable breadth of expertise was drawn from the fields of epidemiology, management sciences, economics, behavioral sciences, and communications to define the problems and issues to be addressed and propose strategic alternatives. On the other hand, there was broad political and public participation in devising solutions. The necessity of this third step (which is rare in developing countries) cannot be overemphasized: the policy formulation process should be an educational experience

about the health problems for all concerned since it will be necessary to reach a wide national consensus on issues, policies and implementation strategies which will cut across many sectors including finance, trade, agriculture, transportation, industry, education, and others. It must also be emphasized that successful mobilization of debate and concern is far from sufficient, as the example of the US also, unfortunately, attests. Where the political will for public action is lacking and resources are unallocated, health outcome indicators, such as infant mortality rates among minority groups, can remain shamefully high.

A first task in a comprehensive analysis of the health sector requires an estimation of the burden of disease in the population. This should be done in a framework that considers not only the capacity of the health system to deal with these diseases but also the rapidly changing social, economic, and political context that may be influencing both the structure and organization of the health system as well as disease risks and health behaviors in the population. Because of the extraordinary diversity among developing countries, it is unrealistic and, indeed, inappropriate to come up with global policies; rather, what is presented here is a conceptual and analytical approach with illustrations of the range of factors which must be considered in any particular setting. This approach takes into account that there will be a continuing evolution of disease control priorities based on the social and economic transformations countries are undergoing with their accompanying demographic and epidemiologic transitions.²⁰

The Changing Determinants of Disease

A first determinant of the changing health picture developing countries will be experiencing is the demographic transition, largely driven by the rate of fertility decline. This will produce major changes in the age structure of populations which will have a large impact on the health picture.²¹ Table 1 taken from World Bank projections for the period 1985 to 2015 illustrates the changing demographic and health picture for developing countries worldwide.²² Overall, slower growth of the childhood population coupled with declining death rates are projected to reduce the health problems of all age groups. But this is more than counterbalanced by the

TABLE 1—Health Problems of Different Age Groups

Age Group	Population in Developing Countries, millions		Deaths in Developing Countries, millions		Important Health Problems	
	1985	2015	1985	2015	Problems on the Unfinished Agenda	Neglected and Emerging Problems
Young children (0–4 years)	490	626	14.6	7.5	Diarrheal disease ARI Measles, tetanus, polio Micronutrient deficiencies Malaria	Injury
School-age Children (5–14 years)	885	1196	1.6	1.3	Schistosomiasis Geohelminth infection	Adolescent pregnancy Disability
Young adults (15–44 years)	1667	2918	5.0	6.0	Maternal mortality Malaria Excess fertility	Tuberculosis Injury AIDS STDs Mental Illness
Middle-aged (45–64 years)	474	1131	5.9	10.4		Cardiovascular disease Cancers COPD
Elderly (65+ years)	153	358	11.0	22.5		Disability Depression
TOTALS	3669	6229	37.9	47.7		

SOURCE: Jamison and Mosley, (forthcoming)¹

NOTE: Many of the conditions for older age groups manifest themselves clinically long after the processes leading to the clinical condition have been initiated; preventive intervention will therefore need to be directed to younger ages.

AIDS: acquired immunodeficiency syndrome

STDs: sexually transmitted diseases

COPD: chronic obstructive pulmonary disease

ARI: acute respiratory infection

rapid increase in the adult and aging population. Regionally the picture is much more diverse. The population of children under age five in Latin America and Asia will increase by only 2 percent to 5 percent, respectively, in size. By contrast, this age group is projected to grow 38 percent in the Middle East and 70 percent in Sub-Saharan Africa from 1985 to 2015. Clearly the future requirements for maternal and child health services will be quite different across these regions. At the other end of the age spectrum a very different picture emerges. In all of these regions the populations over age 65 will be dramatically growing in size with projected increases ranging from 134 percent to 164 percent. This continuing growth in the older age groups is due to a phenomenon called the “momentum” of population growth; it is a consequence of the large numbers of children born in the past when fertility was high who advance through older age groups over time. The result is that essentially all developing countries will have to provide for the health needs of a rapidly increasing adult and aged population for many years into the future.⁴ A

broad assessment of how to meet these needs may be found in Feachem, *et al*, (forthcoming).²³ At the same time, in those countries where the fertility transition is barely underway (largely in Sub-Saharan Africa), policymakers must simultaneously plan to continue to rapidly expand maternal and child health services.

A second determinant of the changing health picture is the major social and economic trends which are transforming the risk factors themselves.²⁴ The most obvious indicator of these trends is the shift from rural to urban living. In 1985, barely over 30 percent of the population of the less developed regions lived in urban areas, but this pattern is changing rapidly.²⁵ The urban population will reach 40 percent by the year 2000 and surpass 50 percent by the year 2015. Already seven of the world's 12 megacities (population 10-million or more) are in developing countries. By the year 2000 the developing world will add six more cities to this number.

A shift from a rural subsistence economy to an urban market-oriented industrial economy is generally associated with

reductions in risks to communicable diseases because of better sanitation in urban areas. At the same time, however, economic growth brings with it new health problems.²⁶ Very high rates of injuries related to motor vehicles, industrial accidents, and toxic chemicals (e.g., pesticides) are usually seen in developing countries because of a lack of resources and institutions to establish and enforce safety measures.²⁷ Undernutrition may diminish because of improved markets, only to be replaced by overnutrition with rising risks of death due to obesity, hypertension, atherosclerosis, and diabetes.²⁸ Rising incomes also bring changes in lifestyle including increases in smoking, alcohol use, and substance abuse, all of which are expected to increase the risk for chronic diseases.

An analysis of the tobacco-related diseases provides an excellent illustration of how a disease-oriented approach can inform health policy.²⁹ In the United States it is now well established that tobacco use is responsible for more than 30 percent of all cancer deaths as well as being among the strongest risk factors for

chronic obstructive pulmonary disease and ischemic heart disease.^{30,31} In recent years, rising rates of lung cancer associated with cigarette consumption have been observed in Japan, Singapore, and Shanghai.³² A recent analysis by the World Bank has documented a direct relationship between tobacco consumption and higher levels of national income among developing countries.³³ This relationship is not coincidental. Rather, it is driven by promotion, pricing, tax policies, and even international trade relations. The impact of the latter is best attested by the rapid increases in cigarette consumption among young people in several east Asian countries where multinational tobacco corporations have recently opened new markets, assisted in some cases by aggressive (even coercive) trade policies of the United States Government.³⁴

Taking China as an example, Peto projects that if current smoking trends continue due to a failure to introduce the array of policies necessary to reduce tobacco consumption in the next several years, an estimated two million Chinese men will die annually from tobacco-related health problems by the year 2025.³⁵ Cumulatively, one may anticipate 50 million tobacco-related deaths among the 500 million Chinese now under the age of 20. National policies to protect populations from tobacco-related diseases clearly must move beyond the usual realm of the health sector into areas of regulation and taxation of the industrial enterprise related to the manufacture and distribution of tobacco products and, in many countries including the United States, ultimately into a restructuring of rural economies where tobacco is produced.³⁶⁻³⁸

The AIDS (acquired immunodeficiency syndrome) epidemic provides another illustration of some of the links between economic development and disease transmission. In assessing the situation in Sub-Saharan Africa, Over and Piot document a strong correlation between the rate of HIV infection in 18 cities, a high ratio of males to females in urban centers and a low level of female education.³⁹ The implications of these findings are that AIDS transmission is facilitated by development strategies which favor males for urban employment. This generates a high demand for prostitutes; prostitution, in turn, is facilitated by low levels of female education so that women have few alternative economic opportunities open to them. An AIDS-control program must go beyond promoting the use of condoms and treating sexually transmitted diseases (STDs)

and consider broader social policies relating to female education and labor force participation.

Epidemiologic Polarization

The epidemiologic transition in the developing world is neither a steady nor a uniform process. The great variations in life expectancy between countries attests to this; as of 1988, a dozen Sub-Saharan African countries still had life expectancies under 50 years, while an equal number of countries in Latin America and Asia (including China) had life expectancies of 70 years or greater.⁴⁰ Additionally, within developing countries (and developed countries as well) wide disparities in health conditions across different social classes or different regions are not uncommon. Frenk and colleagues have referred to these disparities as "epidemiologic polarization" and "epidemiological stagnation."^{3,41} These disparities are not limited to the infectious diseases of infants and children but include the chronic diseases of adults as well.^{7,23} A centrally important conclusion for health policy is that in most developing countries pre- and post-epidemiological transition problems will co-exist.⁴¹ As Foege and Henderson have observed, the developing countries ". . . will not have the luxury of dealing with two kinds of problems sequentially. For the remainder of this century they will be dealing with both simultaneously."⁴²

The increasing burden of chronic disease is initially likely to affect the relatively more affluent and politically vocal older groups who are growing in numbers. This being the case, governments will need to take great care to assure that the infectious diseases which predominantly affect children and the poor are not neglected in the face of resource demands placed in large measure by the more affluent. The challenge is to develop equitable policies and strategies to meet these unprecedented conditions in the developing world.

Assessing Disease Control Priorities

The World Bank, as a part of an exercise to assess the cost and effectiveness of alternative intervention strategies for over two dozen acute and chronic diseases of adults and children, commissioned a series of analytical studies, each co-authored by individuals combining economic, epidemiological, and clinical

expertise. Cost effectiveness was expressed in terms of dollar cost per discounted healthy life years gained (DHLY). The details of these studies are reported elsewhere.⁴³ Several general conclusions which emerged from this undertaking will be described here in terms of their implications for the process of policy development in developing countries.

First, while child survival interventions (immunizations, provision of antenatal and delivery care, vitamin A supplementation, improvements in domestic hygiene, oral rehydration therapy [ORT] for diarrheal diseases in high mortality environments, and antibiotic therapy for acute respiratory infections) appear to be highly cost-effective (\$5-50 per DHLY), there were a range of adult health interventions which were estimated to be equally cost-effective. Among the most prominent are: anti-smoking campaigns plus tobacco taxes, passive case finding and short-course chemotherapy for tuberculosis, the targeted management of sexually transmitted diseases, cataract surgery, the use of condoms to prevent HIV transmission, and hepatitis B immunization to prevent liver cancer and cirrhosis. At the other extreme, the cost per DHLY for a number of adult diseases is so high (greater than \$1000) that public policy should probably discourage their use in settings where health resources are severely constrained. Among these are coronary bypass surgery, mitral valve replacement for rheumatic heart disease, medical management for hypertension, and tertiary management of lung, liver, esophageal, and stomach cancer. With reference to cancer, it should be noted that cancer pain control appears to be a relatively cost-effective intervention for adults (\$150 per DHLY) reaching the same level as: maternity care services for maternal mortality; public preventive campaigns to prevent cardiovascular disease; medical management of angina; and insulin management of insulin-dependent diabetes melitis.

This analytical approach revealed a number of neglected and emerging health problems which should be accorded far higher priority. Topping the list of emerging problems are the tobacco-related diseases which, interestingly enough, were not even mentioned in the 1980 World Bank Health Sector Report.⁴⁴ Tuberculosis appears to be the greatest "neglected" disease.⁴⁵ In 1990 there will be an estimated 8.4 million new cases and 2.7 million deaths, over two-thirds of which will be among productive adults (ages 15-59), primarily the poor. Significantly, this dis-

ease alone accounts for about 37 percent of an estimated seven million avoidable adult deaths in the developing world.

Some findings challenge the current international donor commitment to global priority setting. Provision of ORT in *low mortality environments* (at \$200 per DHLY) is estimated to be about 20 times less cost effective than tuberculosis control (using passive case detection and short course chemotherapy) or leprosy rehabilitation. Even cervical cancer screening (Papanicolaou smears) are estimated to be an equally good buy for the money. In *high mortality environments*, in contrast, ORT can be quite cost-effective, underscoring the need for analysis at the country or even district level.

A major observation from the World Bank exercise is the paucity of empirical data from a majority of the developing countries about most of the major chronic diseases of adults.^{23,46} Considering that, on a global level, more than half the world's deaths due to cancers and cardiovascular diseases, three-fourths of the injury deaths, and 85 percent of the chronic obstructive pulmonary disease deaths occur in developing countries, the virtual absence of any information about the levels, trends, and determinants of these conditions for the majority of the world's population is truly tragic. Given this lack of developing country data, most of the estimates of the cost-effectiveness of interventions for the World Bank study had to be derived from research carried out in the industrialized world. While these estimates are probably reasonable in grossly illustrating the relative cost-effectiveness of alternative interventions, the actual cost-effectiveness of a particular intervention could easily vary by two- to tenfold or more in any given situation, depending on a host of local factors. For example, with interventions, like immunizations, that require total population coverage, cost-effectiveness is strongly conditioned by the underlying level of disease incidence and case fatality rates. For therapeutic interventions, cost-effectiveness is determined not only by the institutional costs of reaching the target group and then making the correct diagnosis, but also by the probability that appropriate therapy will be prescribed by the caregiver and that the patient will actually comply with the treatment regimen.⁴⁷⁻⁵⁰ Similarly, the costs of monitoring and enforcing regulatory approaches depend upon the reach and capability of the governmental infrastructure.

Implications for National Governments

It should be clear that there is an urgent need to reassess health sector priorities in developing countries. National health policy assessment can be usefully informed with a consideration of global trends and findings such as presented above, but it must quickly evolve to a critical analysis of the local epidemiological picture cast in its social-cultural, administrative, economic, and political context. Such an approach to policy formulation must begin by assessing the full range of health problems in a society; examining broadly their demographic, social, and economic determinants; and identifying alternative courses of action in all of these areas which could improve the situation. This last step must take into consideration the costs and effectiveness of all possible instruments of government intervention including taxation and regulation as well as persuasion and the direct provision of services.⁴

Many governments will need to create new institutions and reconfigure old ones to build the capacities required for policy analysis and implementation. Among the analytical and technical capacities required are the following:

- *Demographic analysis*—These capabilities provide the fundamental underpinnings for a population-based health system. Demographic data provide the basis for designing intervention strategies as well as for assessing the impact of the disease burden on the population.

- *Epidemiological surveillance*—While some epidemiological surveillance is carried out in most developing countries, it is usually limited to selected infectious diseases. These capacities will need to be greatly strengthened as health program strategies move more toward interventions involving regulation, taxation, subsidies, and information programs in order to reduce acute and chronic disease risks by changing behaviors and improving environmental conditions.

- *Economic and financial analysis*—These capabilities will be essential to measure the cost-effectiveness of alternative intervention strategies as well as to assess the overall claim of the health sector on scarce development resources.

- *Health technology assessment and control*—Institutional capabilities in this area must include not only the assessment of the effectiveness of new drugs, vac-

cines or treatments, but also their costs and benefits when introduced into the health system.

- *Environmental monitoring and control*—In most developing countries capabilities in this area must be greatly expanded beyond the traditional water and sanitation activities to monitor and control (through taxation as well as regulation) a much broader range of environmental risks including air pollution, toxic wastes, traffic hazards, and other injury risks.

- *Occupational safety*—Rapid urbanization and industrialization in developing countries is often associated with risks of work-related injury five to 10 times higher than in developed countries. There is a major need to develop the capacity to monitor and control occupational health risks.

While many of these institutional capacities exist in some measure in health ministries, their functions are limited for a variety of reasons including lack of professionally qualified personnel, limited resources and, particularly, lack of enforceable statutory authority. If health systems are to be transformed to meet the challenges of the future, a high priority must be given to empowering health ministries to carry out the monitoring and regulatory tasks needed to effectively function in new areas. In addition, mechanisms need to be established that will give them an appropriate voice in tax policy. Ultimately these capacities will need to be developed at regional and local levels within countries as well as at the national level.

Implications for International Aid

Official development financing for health by bilateral and multilateral donors in 1986 amounted to \$3.7 billion with the US contribution accounting for 16 percent of the total.⁵¹ While external support represents only a small fraction of the total public and private sector health expenditures in developing countries, in fact, because much of the donor assistance is directed toward the poorest countries, its proportional impact in influencing health policies and program strategies is relatively large. This is particularly true when it promotes policies which lead to a reallocation of national resources. The impact of the donor-driven child survival initiative in promoting immunizations and oral rehydration therapy worldwide is an excellent illustration of this.⁵²

TABLE 2—Instruments of Aid

Objectives	Modality of Assistance	
	Program Implementation	Capacity Strengthening
1. Service Delivery	Supports acquisition of drugs, equipment, and technical assistance, for delivery of EPI, vector control programs, hospital services, etc.	Invests in institutional development and staff training to improve efficacy of service delivery—e.g. through improved logistics and supply systems.
2. Policy Improvement	Identifies specific areas of policy improvement (e.g. tobacco advertising bans or introduction of cost-recovery mechanisms) and includes them (usually with conditionality) as part of an assistance package.	Invests in development of policy and planning departments in ministries or universities; invests in staff training and advanced education.
3. Undertaking Research (including epidemiologic, evaluational and economic analyses)	Conducts (perhaps with involvement of aid agency or expatriate staff) research or analyses to strengthen formulation of policy or delivery of service.	Invests in national (and international) capacity for undertaking research relevant to epidemiological and economic conditions of developing countries. This capacity strengthening involves both institutional and human resource development.

In looking to the future, it is useful to categorize international aid on the basis of whether its objective is to: 1) support the provision of services; 2) influence the policy environment; or 3) support research. Table 2 divides approaches to meeting these three objectives into two modalities of assistance: program implementation and capacity strengthening. Program implementation is largely oriented toward short-term results, while capacity strengthening generally requires long-term investments in institutional development. Traditionally, the dominant role of international assistance has been to provide services and related commodities where they were unavailable or inadequate; most donor support to child survival programs falls in this category. Recently, more attention is being given to structuring aid to change the policy environment, either directly, for example, by channeling more support to private and non-profit NGO (nongovernmental organizations) sectors, or indirectly by attaching conditions to aid packages, for example, by requiring cost recovery or extension of services to underserved populations. Presently only a small fraction of aid is directed toward research, much of

which, in fact, is in specialized programs such as the Tropical Disease Research Program or in a few institutions like the International Center for Diarrheal Disease Research, Bangladesh.⁵³

The earlier discussion has highlighted the fact that developing countries are now moving through the epidemiologic transition at very different paces and often incompletely. As a result there is a great diversity both in health conditions and in institutional capacities among and within countries.² This creates a far more diffuse planning environment than existed when most of these countries were still in a pre-transitional stage two or three decades earlier. No longer can a few strategic objectives command central importance for health policy. Rather, a much broader range of relatively less prominent health conditions and associated interventions will compete for resources and attention. In light of this, and given the fact that extremely little is known about the levels, trends, and determinants of the majority of diseases afflicting populations in the developing world, the conclusion is inescapable that as far as donor assistance is concerned, far higher priority should be given to research, both building research capac-

ity and conducting research to strengthen the formulation of health policy. This, in fact, is the conclusion reached by the Commission on Health Research for Development in its recent report.⁵³ The Commission specifically placed a high priority on local epidemiological and operational analyses which they labeled as "Essential National Health Research" (ENHR).

Broadening the array of diseases for consideration to encompass all ages and expanding the arena of policy options to include the full range of instruments for government intervention will demand a diversity of analytical skills. National governments will require broad technical competence not only in the biomedical and clinical sciences including epidemiology but also in economics, sociology, anthropology, the management sciences, and communication. In most countries, new institutions may need to be developed. The international donor community generally, and the United States in particular, could most effectively use its limited resources in the areas of education, training, research, and technical assistance, where it has strong comparative advantage.⁵⁴ Furthermore, because most of the major disease problems are actually of global concern (e.g. tobacco-related diseases, substance abuse, AIDS, injuries, occupational diseases, cardiovascular disease, cancer, malnutrition) much could be gained through international collaborative endeavors in these disease control efforts.

Conclusion

For over a decade the international public health community has given a priority to the communicable childhood diseases. This had been appropriate. The problems are major, the technological and epidemiological tools have become powerful, and the payoff for adapting and applying what is known is high. While the implementation strategy for selective primary health care as originally proposed by Walsh and Warren may have been oversimplified and too narrowly concerned with infectious diseases, the problem-oriented, population-based conceptual approach is fundamentally correct.^{11,55} Furthermore, as more and more governments have seriously addressed the problem of child survival, the range of interventions has broadened.⁵⁶ For example, diarrhea control programs have moved from simply relying on packets of oral rehydration salts to the use of homemade fluids, the dietary management of diarrhea, the promotion of personal hygiene, and use of

soap. More importantly, policy recommendations supporting child survival have now expanded widely, encompassing such issues as female education and the status of women.

The rapid demographic transition that many developing countries are undergoing is now producing great epidemiological diversity among developing countries; this demands that health policymakers consider a broader range of options. Over the next 25 years it is not unreasonable to project a 50 percent to 60 percent decline in the numbers of deaths among infants and children related to advances in child health coupled with rapidly declining birth rates which will stabilize the numbers of newborns from year to year over much of the world. Overall, however, there will be a rise in the total number of deaths as the population evolves toward an older age structure. The epidemiological transition is not occurring uniformly, however, and most countries will have a large lingering burden of communicable diseases among children, particularly in Sub-Saharan Africa where the fertility transition has hardly begun. This situation will impose the greatest challenge on health systems operating under constrained resources to select the most effective and efficient means of disease prevention, case management, and rehabilitation.

It must be emphasized that extending the range of choices means not only choosing to implement new initiatives but also choosing to reduce investments of public funds in health care activities that are clearly not cost-effective. While this may be difficult, given the traditions of Western medical practice, the fundamental issues of equity as well as efficiency are involved. Efficient resource allocation is desirable in every sector. In the health sector, however, in a very direct way, unnecessary death, disability, and illness occurs if resources are committed to one intervention when another has higher health gains per unit of expenditure. The human cost of uneconomic resource allocation is very real and very large. Perhaps even more than in other sectors, then, the imperative exists for policymakers in the health sector to undertake constant assessment of intervention cost-effectiveness.

Probably the most important advance in policy formulation that could come from a disease-control strategic approach is a willingness to consider a range of options available to governments beyond the direct provision of health serv-

ices. Particularly important as countries are moving through an accelerated process of economic development is the judicious use of regulation, legislation, taxation and subsidies to promote or discourage enterprises, activities, or behaviors which may have health consequences. Also, the importance of mass communication for social mobilization to promote health cannot be over-emphasized. A high priority problem demanding such multi-faceted policy intervention and global cooperation is tobacco consumption.

It is universally recognized that improved health in the broadest sense is a fundamental indicator of the development process. As the Nobel Laureate T. W. Schultz observed, "...the wealth of nations (has) come to be predominantly the acquired abilities of people—their education, experience, skills, and health."⁵⁷ The task of health policy is to define clear, realistic, and measurable objectives which can guide the development process toward effectively and efficiently producing good health for all. □

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