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**Health Development in Africa**

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#### ABSTRACT

The aim of this paper is to provide a framework that national governments and international agencies can use to accelerate health development in Africa. It shows the respective roles of socioeconomic, political and medical factors in the determination of health status of a population. Using measures of health development such as infant mortality, crude death rate, fertility and longevity, the paper finds that there has been progress in health development in Africa over the past 15 years. In particular, life expectancy for the whole continent increased by some 5 years, a finding consistent with a steady decline in infant mortality over the same period. Even so, the level of health development in the continent remains quite low compared with measures of health status in continents at similar stages of socioeconomic development. Moreover, the quality of life in Africa may not have improved at the same rate as the indicators of health development because of probable increases in morbidity and in psycho-social stress due to economic hardships of the continent over the past 15 years.

#### RÉSUMÉ

Le présent document vise à offrir un cadre aux Etats et aux organismes internationaux pour accélérer le développement des services de santé en Afrique. Il présente le rôle joué par les différents facteurs socio-économiques, politiques et médicaux dans l'état de santé d'une population. A l'aide d'indicateurs de développement sanitaire tels que le taux de mortalité infantile, les taux bruts de mortalité, de fécondité et de longévité, l'étude conclut que l'Afrique a marqué des progrès en termes de développement sanitaire durant ces 15 dernières années. Plus précisément, l'espérance de vie s'est prolongée d'environ cinq ans sur l'ensemble du continent, conclusion concordant avec la baisse régulière de la mortalité infantile notée au cours de la même période. Néanmoins, le niveau de développement sanitaire du continent est encore faible en comparaison de la situation sanitaire qui prévaut sur les continents ayant atteint le même stade de développement socio-économique. En outre, la qualité de la vie en Afrique ne s'est sans doute pas améliorée au même rythme que les indicateurs de santé en raison de la croissance probable de la morbidité et du stress psychosocial dus aux difficultés économiques que le continent a connues ces 15 dernières années.

#### Introduction

Good health is important because it is an intrinsic element of human welfare. As a component of human capital, health is also a key factor in the creation of wealth. The close connection between health and wealth has been emphasized in a recent paper by Pritchett and Summers (1996) who explore a causal relationship between the two phenomena and conclude that wealthier nations are healthier nations. Wealthier nations are in a stronger position to provide better health to the population. Better health in turn increases labor productivity, thereby enhancing wealth.

Apart from being both a constituent part of human welfare and a factor of production, good health contributes directly to enjoyment of life. In this respect, it is in the same category as other goods and services such as housing and education that fulfil this function. As an intrinsic element of well-being, health is a good summary indicator of human development (see e.g., Sen, 1995). Health development -a process of sustained improvements in health status -should thus be an important target of development policy.

The aim of this paper is to provide a framework that national governments and international agencies can use to accelerate health development in Africa. It shows the respective roles of socioeconomic, political and medical factors in the determination of health status of a population. The remainder of the paper proceeds as follows. Section 2 explains the context of the study and section 3 provides the analytic framework, and highlights its use in policy design. The section also describes the study methodology, the data, as well as the estimation techniques. Section 4 presents the empirical results, including their discussion. Section 6 discusses the institutional and political economy issues in health development in Africa. Section 7 concludes with a summary and conclusions of the study.

## Context

In the 1980s and early 1990s African economies essentially stagnated relative to other developing economies in Asia and Latin America. The annual growth rate in per capita income in Africa barely rose above 1 percent over this period (World Bank, 1994), compared to growth rates of 2-3 percent in similar economies outside the continent. As a result of poor economic performance, poverty remains a serious problem in Africa with about 45-50% of the Sub-Saharan population below the poverty line (World Bank, 1997). Moreover, the growth rate in the African population over the two decades has been the highest among the developing countries -a situation which still obtains. One probable effect of the rapid increase in population and sluggish economic growth in Africa was to erode the ability of governments and households to spend adequately on provision of basic social services, health care included. The other effect might have been to worsen the distribution of these services in the population. Quantitative health effects of demographic and economic factors for the whole Africa are not available; however, see Cornia and Mwabu, 1997 for the case of Sub-Saharan Africa. Another relevant factor in a study of health development in Africa is the adoption in the continent of stringent economic reforms (structural adjustment programs) in the 1980s and early 1990s. These reforms generally reduced government spending on social sectors (World Bank, 1996) and increased user costs of primary health services in government health facilities (Reddy and Vandemoortele, 1996; Mwabu, et al., 1995). Over the same period, civil unrest and political instability also characterized many African countries and resulted in starvation and war related deaths (Nafziger, 1996). New deadly diseases such as AIDS and ebola emerged in Africa, resulting in substantial deaths especially in Central and East Africa (Ainsworth and Over, 1994).

However, despite the above unfavourable epidemiological, political, demographic and economic environments, indicators of health status in Africa (including Sub-Saharan Africa) show a steady improvement over the period 1980 to 1995. For instance, in Sub-Saharan Africa (with 46 of the 53 African countries), infant mortality rate fell from about 130 per thousand in 1980 to about 100 in 1995, with a corresponding increase in female life expectancy (Cornia and Mwabu, 1997). For the whole of Africa (Sub-Saharan and North Africa), infant mortality rate fell from 120 per thousand in 1980 to 86 in 1995 (Table 1). Over the same period, the overall crude death rate fell from 17 per thousand to 13; with similar gains in life expectancy at birth for both men and women (Table 1).

Despite the health gains for all men and women, health status of mothers deteriorated: maternal mortality in Africa rose sharply starting in the 1980s (Cornia and Mwabu, 1997). Further, although health status shows progression in terms of the level indicators, the annual rate of improvement actually fell between 1980 and 1995. For instance, the annual rate of decline in infant mortality rate for Sub-Saharan Africa slowed down from 1.7 per thousand during 1980-90 to 1.2 over the period 1990-95 (Cornia and Mwabu, 1997) while for Africa as a whole, it fell from 2.7 per thousand to 1.4 (Table 1). Moreover, in spite of the noted improvements in longevity, the quality of life in Africa is greatly diminished by heavy disease burdens: morbidity rates and risks to life are higher in Africa than in other regions of the developing world (World Bank, 1993).

The foregoing discussion demonstrates the daunting challenge in the design of policies for health development. In particular, it can be seen that success in the area of health development is not merely a matter of ensuring economic growth, or an issue of increasing longevity. In the case of Africa for example, and in many other developing countries, health status improved under harsh economic conditions, deceptively suggesting that economic growth is not a major factor in health development. It is also evident that longevity and heavy disease burdens can co-exist side by side, a situation that makes it difficult to associate health development -a sustained improvement in health status- with increases in life expectancy at birth. Finally, health status is affected by factors outside the health sector so that a broad view of health status determination should be taken when formulating health policies.

In what follows, we present a model of health development that shows the respective roles of economic and non-economic factors at various levels of society.

## A Framework for Analyzing Health Development Policies

### Health determinants

Unlike other economic goods and services, the health of the population cannot be enhanced or maintained without active participation of individuals in the process of health service provision. Health development is highly intensive in personal time of health care providers and users. In many instances, service provision and use occur at the same time- requiring simultaneous time expenditure by providers and users. Health care giving and health care seeking behavior are critical elements in health development. Information on health care providers for instance, is useful in designing measures to expand the range and quantities of health care services available to the population. Similarly, information on users is important in the formulation of incentives for encouraging certain patterns of service utilization. Briefly, information on individual-level factors (for both health care providers and users) is needed in the design of health policies aimed at health development.

1. We denote individual-level variables -e.g., time endowment, personal heterogeneity, gender, education-as the first category of factors influencing health production. Health status improvement -as an outcome of a development process, is an inherently personal matter and must necessarily take place at the individual level. It is easily seen that in aggregate form, the above factors are also important determinants of health at the household, community and national levels. However, there is need to stress that health status at these higher levels is some aggregation of health status of various individuals.
2. A second set of variables that influence the level and rate of health development are factors specific to households or communities rather than to individuals, which in the literature (see e.g., Nafziger, 1997) are commonly known as quasi-public goods, e.g., safe water supplies, social infrastructure and public health services such as immunization, disease vector control and sanitation. Again, this category of factors is also an important determinant of aggregate health at the national level. Public spending is vital in guaranteeing broad availability of this category of goods and services to the population.
3. Private goods and services such as curative medical care, housing, nutrients/calories -which are typically purchased from the market -constitute the third factor influencing the health development of a country. The purchasing power of individuals, households, and communities is the fundamental factor in the acquisition of these goods as intermediate inputs in the process of health maintenance and development.
4. Region-specific factors constitute a fourth category of determinants of observed variations in health status across countries. Under this category may be included diseases that tend to be concentrated in particular regions, e.g., ebola, AIDS and malaria; climatic conditions; and natural disasters that repeatedly afflict particular areas, e.g., earthquakes, floods and droughts. Public policies can be designed to mitigate health effects of these factors or to remove some of the factors altogether.
5. Aggregate demographic variables such as population sizes and growth rates are the fifth set of determinants of health status we consider. High rates of population increase, when they occur simultaneously with sluggish growth in incomes, as in Africa over the past two decades, dilute both the public and private resources available for health care as well as for the provision of other basic goods and services. At the individual level, such rates are a further source of great strain on the health of mothers. Rapid rates of population increase are thus not conducive to health development and public policies to control them are desirable.
6. We denote the sixth set of health determinants as structural and institutional factors. These include urbanization, the public-private mix of health facilities in the overall health care system, and market structures for various health care services. These variables affect efficiency and equity in the provision and use of health services and thus have a bearing on the health of the population. For instance, monopolistic market structures, as may occur in the public sector when private medical practice is prohibited, encourage inefficiency by restricting competition in health care provision. Inefficiency in service provision and use may also occur in unregulated health care markets because providers may over-price their services, thereby restricting utilization or may induce service over consumption by patients that are able to pay. There is need therefore to have a health care delivery policy that balances the benefits of competitive health service provision with the benefits of regulated provision.
7. Armed internal conflict, due to political, cultural or ethnic factors is the seventh determinant of health development of a country that we identify. Internal conflict due essentially to weaknesses in political systems and processes, ethnic or racial misunderstandings, and cultural prejudices has been the cause of many deaths in Africa over the past 15 years (Nafziger, 1996). In addition to

- destroying formal sectors of economies, including food security, armed conflicts weaken health care systems and are the cause of much brain-drain in Africa. In particular, in situations of armed domestic confrontations, health sectors easily lose highly trained and very scarce personnel that are essential for health maintenance. Internal conflict (or peace) is an issue deserving serious consideration in formulating health development strategies.
8. External shocks (factors outside the domestic economy) are the eighth cluster of determinants of a population's health. These include changes in terms of trade and the net inflows of foreign development assistance. Changes in real exchange rates are good summary measures of the magnitudes of the external shocks. With regard to managers of national health care systems, the real exchange rate indicates the real cost (expressed in domestic resources) of purchasing foreign inputs for health maintenance. Since the real exchange rate is a price that health care managers must pay to import medical supplies, the higher the exchange rate, the smaller the quantity of supplies they can buy, a situation that in turn reduces their ability to provide health services. The exchange rate is also a price received by those in the export sectors so that the higher the exchange rate the greater the incomes from export earnings- incomes that can be used for health development. The theoretical health effect of exchange rate changes is therefore ambiguous. However, it is shown in a later section that increases in real exchange rates had unfavourable effects on health development in Africa over the period 1980-95, a result that suggests that exchange rate management may be an important determinant of health status.
  9. Population movements are the ninth category of health determinants we propose. Large population movements, as in the case of rapid rural-urban migration or of people displaced by internal strife can have adverse effects on health development. Such movements strain health care resources and food availability in the receiving areas and may trigger disease epidemics due to congestion and poor hygienic conditions. People left behind in the sending areas may also suffer from shortages of essential goods and services, including health care, if people with skills to provide them have moved. Thus, in addition to controlling population sizes, population movements need to be monitored and regulated as a strategy for health development.
  10. The tenth and final cluster of health determinants we consider are the social safety nets. These include food security systems, income maintenance programs such as public works schemes and social and health insurance. These systems cushion households from social and personal distress in times when incomes are insufficient to purchase basic goods and services. These systems alleviate psycho-social stress due to unemployment for instance, and generally can help reduce crisis mortality in periods of recession or famine (see e.g., Cornia, 1996). Social support systems, if their benefits are well targeted, can protect health status of the population in periods of transitory poverty and are thus important elements of health development policies. Underlying the above list of health determinants is the presumption that health status of the population is influenced by medical and non-medical factors. Before looking at the precise mechanisms through which these factors affect health status, it is helpful first to discuss the measurement of a population's health status.

### Measuring health status

It has been known for a long time that health is an inherently personal phenomenon, for it is part and parcel of human beings (Schultz, 1961). Health status can therefore properly be measured only at the individual level. As a preliminary matter, it should further be noted that health is a dimension of human capital (Schultz, 1961), theoretically defined as unobservable general ability of the people (Lucas, 1988). Unobservability of health greatly complicates its measurement, as there is no direct way of assessing its magnitude. Even so, health economists have recently made great progress in designing informative indicators of health status at the individual level. In a recent conceptual paper for instance, Schultz (1997) has distinguished between several measures of health, as indicated below.

In the case of children, the key indicator of health status is the net childhood nutritional status, which is cumulatively measured by early physical growth and development, such as height-for-age and weight-for-age (Schultz, 1997, p. 147; 1984; 1993). Childhood nutrition status is the sum of several factors, including the extent of nutritional intake, exposure to infectious diseases, and child's work load. Nutritional status of children is strongly correlated with infant and child mortality rates and is a good predictor of adult height (Fogel, 1997). In the case of adults, the appropriate measure of health status is body mass index (BMI), which is obtained by dividing body weight in kilograms by the square of height in meters. Thus, BMI is simply the weight of the body (in kilograms) that is supported by a square meter of body height. If this weight is 'too small' -typically less than 20 kilograms -a person is 'too light' for a her height and consequently her health is at risk. Similarly, if BMI is 'too large' - typically greater than 30, a person is 'too heavy' for his height, and his health is at risk. Body mass index, which is a good proxy for current health and nutritional status of adults is highly correlated with adult mortality rates (Schultz, 1997a; Fogel, 1997). In particular, people with extreme values of BMI face higher than population average mortality rates. A relatively new measure of adult health is a person's performance in activities of daily

living (ADL), such as use cleaning, walking, lifting simple loads, and climbing stairs or other elevated places (Strauss and Thomas, 1995). People performing well in ADL are typically healthier than those unable to do so. Adult height is another proxy for adult health, for height is strongly correlated with longevity and with labor force productivity (Fogel, 1997; Thomas and Strauss, 1997; Schultz, 1997b).

Capacity to avoid unwanted fertility -especially in the case of women- is another measure of health status identified by Schultz (1997, p. 148). This capacity may be proxied by information women possess about birth control, and the extent to which they use contraceptives to avoid unwanted births. Unwanted fertility adversely affects other dimensions of human capital, especially those that can be attributed to schooling, because unplanned births reduce the time that people -women in particular -spend studying. Since there is a synergistic relationship between labor productivity and health, by restricting market opportunities of women, unwanted fertility can severely damage women's health. Excessive fertility also hurts women's health directly by not allowing the body sufficient time to recover between births.

All the above measurements of health are at the individual level. To secure them however, it is necessary to conduct time intensive household surveys in which anthropometric information of individuals is obtained. Once health status indicators are available at the individual level, they can be aggregated to any desired level of society, e.g., household, community, regional, or national level.

Since individual-based health indicators, such as body mass index, weight or height-for-age, ADL and fertility are observed, we will label them as actual measures of health status, in contrast to probabilistic measures such as mortality rates and life expectancies at birth-statistical measures which are not directly observable. There exists however a close, and well known association between actual and probabilistic sets of health indicators so that one set can be substituted for the other in an empirical analysis of the type undertaken in a later section. In particular, there is a strong negative association between statistical measures of health status such as crude death rates and age-specific mortality rates and improvements in individual-based health measures such as BMI, ADL, weight-for-age (Schultz, 1997b, Fogel, 1997). Similarly, there exists a strong positive correlation between statistical indicators of health such as life expectancy at birth, and improvements in observable health indicators such as BMI and height-for-age. Use of probabilistic or actual health indicators in empirical work is dictated by data availability.

In the present study, we use national-level probabilistic measures of health status, which, as already noted, are good mirror images of actual, aggregate indicators of health. We have also used one actual aggregate indicator of health-the national level fertility rate (number of children ever born per woman)-the only non-probabilistic indicator that was available.

The foregoing indicators of health status-actual and statistical-are all proxies for the extent of health development at the particular level of society at which the measurements are undertaken. We have already stated that in this study, the measurements are at the national level.

### **Model Specification and estimation issues**

It now remains to specify the precise nature of the relationship between health development (as proxied by health status indicators) and its various determinants, identified and discussed in detail at the start of this section. Specification of this relationship is an essential requirement in the determination of the direction and magnitudes of the effects of public policies on health development, and thus an important aspect in the prioritization of such policies.

Health development, like the general development process, is a cumulative process. Body heights and masses, for instance, take time to accumulate; life expectancies cannot be improved overnight; lowering of fertility rates is a painfully slow process; disease treatments for some illnesses, e.g., cancers and AIDS may take ages to find and so on. This observation is important because outcomes of successful public policies aimed at health improvement may not be observed for a long time. Similarly effects of bad policies may not be manifest for a considerably long period. There is yet another consideration here. The relationship between health and its determinants is highly non-linear (Musgrove, 1987; Murray and Chen, 1993; Anand and Chen, 1996; Mwabu, 1996). This non-linearity is one source of the observed insensitivity of health indicators to short-run changes in health determinants. Musgrove (1987) for example, has noted that health status in developing countries, Africa included, have actually improved in times of economic hardship.

Several explanations have been given to account for this phenomenon (see e.g., Cornia and Mwabu, 1997). One explanation invokes the delayed effects of past investments in health and in health care

infrastructure, which outweigh adverse effects during periods of hardship. A second and related explanation relies on the concept of health threshold. If at the time of difficulty, as in a recession for instance, the health stock of the population is far above the level required for survival, delayed effects from past health investments would likely improve it. If however the health stock is at the survival level, the health benefits from past investments would likely be overwhelmed by adverse effects of the recession and a deterioration in the health status of the population would be observed. A third explanation is that foreign assistance is the source of health improvements when the domestic economy is in distress.

A critical consideration in a model of health status determination is the distinction between changes in health status due to transitory (short-lived) and permanent (long-lived) variables. Transitory variables in this case are the factors which cause abrupt changes in measures of health status, e.g., changes in adult or infant mortality rates. Examples of such factors include famines, epidemics, wars, natural disasters and 'unreasonable' economic and political reforms. These short-lived factors can substantially raise crisis mortality within a very short time. Similarly, their removal can improve health status rapidly. However, long-lived stock variables such as investments in women's education and social infrastructure, and improvements in environmental conditions, enhance health only very slowly; they are the factors that change time trends in health status indicators. Cornia and Mwabu (1997) report a sharp increase in long-term maternal mortality in Sub-Saharan Africa during 1980-90, a period over which female literacy rates were falling, and over which there was poor maintenance of health care infrastructure in many African countries mainly due to public expenditure restrictions imposed by structural adjustment programs.

In model specification, there is also need to consider health effects of unobservable factors that may be specific to countries over time or to particular time periods across countries. Failure to consider such factors may result in biased and inconsistent estimates of health effects of the observed factors. The reason is that the unobserved variables are essentially included in the error term, a situation which makes that term correlated with some of the factors influencing health status (the omitted variables), contrary to common assumptions in model specification. Needless to say, estimation results from a misspecified model can lead to implementation of wrong policies.

To account for unobservable country-specific factors that may vary or remain constant over time, we estimate a random effects model of health status determination for all of Africa for the period 1980-95; the time panels for all the 53 African countries are for 1980, 1990 and 1995. See Cornia and Mwabu (1997) for a longer panel in the case of Sub-Saharan Africa.

Variations in crisis mortality across African countries is investigated using standard cross section regression methods. Another reason for this approach is that panel data for some of the relevant variables are not available, a situation that makes ordinary least squares the practical estimation method.

A final specification matter concerns the mathematical form and economic structure of the equations estimated. Regarding the mathematical specification, all the equations representing the various measures of health status (infant mortality rate, crude death rate, birth rate, fertility rate, female and male life expectancies) are expressed in double-log form. This simple form captures the important fact that the various causal factors in each of the models we estimate interact together in influencing health status. It also has the advantage that its estimation yields health status elasticities directly, thereby facilitating a comparison of the relative impacts of various covariates on health status. Concerning the economic structure, the estimated equations are reduced-form health production functions. All the health status determinants are treated as exogenous, after preliminary tests of exogeneity.

## **Data**

Two types of data were collected: (a) a panel data set for all the 53 African countries over the period 1980-95, the panel for each country being for the periods 1980, 1990 and 1995; and (b) cross-section data for each of the 53 countries for the period 1990-95. The sample countries and their regional classification into West Africa, North Africa, Central Africa, East Africa and South Africa, following the African Development Bank classification are in Appendix Table 1. Virtually all the data come from the various tables of the 1997 African Development Report (African Development Bank, 1997, pp. 183-185, 198-199, 203, 208, 212-213, 215) and from tables of the 1997 Human Development Report (United Nation's Development Programme, 1997, pp. 160-161, 164-165, 176-177, 194-195). Information on refugees and displaced persons for the period 1995-used to construct dummies for the refugee status of countries -were obtained from Nafziger (1996, Table 2).

The data sets (which are attached to the paper, both in levels and logs) cover nearly all the variables discussed here in the first two sub-sections (health determinants and indicators of health status). It has

already been noted that the model of health development elaborated in previous sections has a micro-foundation, even though the data used to implement it are aggregative and probabilistic in nature. As argued in Lucas (1988), there may be several advantages in using macro-level data to estimate parameters of an aggregate model that rests on a micro-foundation. The main advantage in the present case is that the estimation results can be interpreted with reference to the behaviour of providers and users of health services- precisely the economic agents who are typically the targets of public policies aimed at health development.

The next section reports the results of the analysis, grouped into sample and regression statistics. The results show variation of health status indicators and determinants over time and across regions. In a later section empirical results are used to discuss general health development issues such as the use of multiplicity of providers (civil-society organizations, the private practitioners, and the state) to deliver basic health services to the populations and mechanisms for financing health services in low income areas.

## **Empirical Results**

### **A. Trends in Health Development Indicators, 1980-95**

It has already been noted that health development -a sustained improvement in the health status of the population -can reasonably be proxied by several variables: infant mortality rate, crude death rate, birth rate, fertility rate, and life expectancy. Table 1 shows an improvement in all these variables for African countries over the period 1990-95. For example, infant mortality rate fell from 120 deaths per thousand in 1980 to about 86 in 1995 and life expectancy at birth for men and women rose by nearly 5 years over the same period. However, there was very little decline in fertility rate, which persistently remained high at around 6 children per woman over the period analyzed. Despite the noted improvement in health status indicators, the quality of life in Africa may not have improved proportionately due to offsetting effects of disease burdens and socioeconomic problems.

Table 2 shows regional variation in health development in Africa. Central African countries emerge as nations with the poorest indicators of health development.

Infant mortality rate is highest in Central African countries, which stands at about 115 per 1000 there. Health development is lower in West Africa than in other region irrespective of the health status indicator used. For instance, the region has the highest crude death rate (17.1/1000) and the highest birth and fertility rates (46/1000 and 6.34/woman respectively). Life expectancy for women and men is also lower in West Africa than in any other African region. The Central Africa region is the next poorest in health endowment; it follows West Africa quite closely in all health development measures. The North Africa region has the best indicators of health development.

In overall terms, the level of health development in Africa is quite low. Even including North Africa, the mean life expectancy in Africa is around 50 years, compared with means of 60-70 years in other developing continents. The mean overall infant mortality rate (IMR) of 100 per thousand is also unacceptably high relative to rates of less than 40 in Latin America and Asia.

Table 3 shows an interesting evolution of health status trends in the five regions over the period 1980-95. In 1980, West African countries had the highest infant mortality (135/1000); in 1995, the region's IMR had declined substantially, but it was still the highest in Africa at nearly 100 per thousand. By 1995, North Africa, which had the same IMR as East Africa in 1980 (108 and 109 respectively), had made much greater progress in improving child health than East Africa. The IMR in North Africa in 1995 was 63 per thousand while in East Africa it was 81. Differences in health development strategies might be the reason for observed differentials in health outcomes across regions. It is also interesting to note the intertemporal regional differences in fertility rates over the study period. Central Africa had the lowest fertility rate in Africa in 1980 (5.96) followed by North Africa (6.14). By 1995, Central Africa had the highest fertility rate (6.00)-the only region in which fertility rate was actually higher in 1995 than it was in the base year. North Africa in contrast had the lowest fertility rate, despite having had one of the highest rates in the 1980s. Again, alternative health development policies adopted by the regions are likely to be the main factors behind these differences.

### **B. Regional Variations of the Factors Influencing Health Development**



The previous three Tables have described the level and pattern of health development in Africa. Tables 4 and 5 below provide information as to the magnitudes of the key factors influencing health development, as well as the variations in these magnitudes across regions. Two of the critical factors affecting the rate and pattern of health development of a country is the size and growth rate of the population.

As can be seen from Table 4, nearly one half of Africa's population resides in Western and Northern regions of the continent. The two regions will continue to have the bulk of Africa's population in the early part of the next millennium because of persistently high population growth rates in West Africa. The population growth rate per year in West Africa is projected to have declined only slightly by the start of the 21st century (from 2.66 over the period 160-94 to 2.64 over the period 1994-2000).

The most dramatic decline in population by the 2000 is expected to occur in East Africa, the region which had the highest growth rate during the previous three or so decades. It has been suggested that female education, combined with public support for family planning services is the principal factor responsible for the drop in population growth rate in Eastern Africa (Thomas and Muvandi, 1996). Botswana, Kenya, Zimbabwe and South Africa are cases in point. Central Africa, which had the smallest annual rate of population growth in 1960-94 (2.26%) is expected to have the highest rate (2.99%) by the year 2000.

The above population dynamics have implications for health service planning and financing. In countries where population is increasing rapidly, as in the case of West and Central Africa, special attention should be paid to the provision of mother and child health services -both to improve maternal and child health as well as a strategy to reduce fertility because fertility is negatively associated with improvements in child health (Scultz, 1997). Since such services are known to have large social externalities, there is also the implication that the service are best financed by the state (see e.g, Cornia and Mwabu, 1997). Support for the provision of these services by the International development agencies is also implied because many of the countries experiencing high rates of population increase are also among the poorest in Africa (see regional per capita incomes in Table 4).

Other factors influencing the level and pattern of health development are shown in Table 4. Table 4 shows the diversity of African countries in terms of background variables that have a bearing on health development. As can be seen from Table, North Africa stands out as the only region with a significant population with secondary school education (the enrolment rate at that level of schooling is 50.7%). In other regions, secondary school enrolment rate is below 25%; it is lowest in Central and West Africa (where it is 13.6% and 17.4%). In contrast, primary school enrolment in Africa is above 80%, except in West and East Africa, where it is in the 65% and 66% respectively. Needless to say, the variances of these variables are very high within regions.

The population coverage with modern health services is generally good (greater than 53% in all regions). Consistent with this fact is the high immunization coverage rate, which is over 60% (except in the case of measles immunization which is below 50% in Central Africa). In general, it appears from Table 4, that gross inaccessibility to basic health services by the population may not be the principal constraint on health development in Africa. However, the quality of the available services is an issue about which information is not collected. AIDS and ethnic tensions afflict South Africa, East Africa and Central Africa; AIDS is generally not a problem in North Africa. Table 4 also shows that official foreign assistance goes to rich rather than the poor regions. The Table further reveals that calorie supply and intake are lowest in the Central and Eastern regions so that malnutrition related health problems are likely to be most severe in these areas.

### **C. Changes in Health Development Indicators: Results from correlation Analysis**

Table 5 reports degrees of associations between the variables shown in Table 4 with several dimensions of health development, proxied by IMR (infant mortality rate), CDR (crude death rate), TFR (total fertility rate), CBR (crude birth rate), FLIFE (female life expectancy), and MLIFE (male life expectancy).

With a few exceptions, all the correlation coefficients of all the variables are of the expected signs. For example, infant mortality is negatively correlated with per capita income, secondary school enrolment rate, primary school enrolment, and with immunization coverage rates-just to select a few of the coefficients in Table 5. The strongest associations in the Table are between health development, per capita income and secondary school enrolment. The association between per capita income, and all indicators of health development is consistently stronger than that between these indicators and secondary school enrolment. Specifically, it should be noted that higher incomes and higher secondary school enrolments are associated with lower death rates and with lower fertility. Consistent with this finding, higher incomes and secondary education are both positively, and strongly correlated with life expectancy of both men and

women. Primary school enrolment has the same patterns of associations, but degrees of associations here are much weaker than those of the first two. Other variables with the same patterns, and almost same strengths of associations, include access to sanitation facilities, access to safe water, access to health services and adult literacy rate.

A notable result from Table 6 is that high population growth rates are strongly associated with higher mortality rates and with higher fertility, and in consequence, with lower life expectancy. That is, higher population growth rates are negatively associated with health development. Ethnic conflicts, AIDS cases, and real depreciations in local currencies (increases in real exchange rates) have the same associational patterns. The signs of the correlation coefficients in Table 5 are entirely consistent with the signs of the regression coefficients reported in the next sub-section.

#### **D. Changes in Health Development Indicators: Results from regression analysis**

##### **Results from pooled data**

Table 7 shows estimation results from random-effects models of health status determination. As explained in an early section, the data set is a panel of all the 53 African countries for 1980, 1990, and 1995. However, as can be seen from the table, eleven countries were deleted from the final sample due to missing data on some of the variables. Since the data were missing randomly from the sample, we believe any estimation bias due to deletions is minor.

The estimation results show that economic growth is good for health development: all indicators of health development improve with increases in per capita income. However, there is an issue here about reverse causation (Pritchett and Summers, 1996; Benefo and Schultz, 1996). The problem arises because health status -as a dimension of human capital -does influence per capita income, a consideration that necessitates instrumentation of per capita income in the estimation process. As Pritchett and Summers point out, the reverse causation problem does not arise in the case of the dimension of human capital proxied by infant mortality since infant are not in the labor force. Per capita income (a proxy for parents' income) is truly exogenous to them. Since life expectancy is closely linked to infant mortality, attention will now be focused on parameters of the infant mortality model, the estimation of which does not suffer from the simultaneity bias.

Looking at the first column, it can be seen that infant mortality is inelastic with respect to income. A 10% increase in per capita income would lower IMR by 2.18%. This response is slightly higher than that for primary schooling, which has an elasticity of 2.04 for the same increase in primary enrolment rate. Note that the primary school elasticity of mortality is greater than that for secondary school enrolment. Income and education are the key determinants of infant mortality in Table 7 (column 1).

The effects of real exchange rate and official development assistance should be noted. The elasticity of infant mortality rate with respect to official development assistance is .06 (which is significant at about 10% level). A comparison of this effect with those of income and education suggests that local-based initiatives -those that improve households incomes and education, are more important in stimulating health development than foreign-based initiatives those that increase transfers to health sectors in Africa. An increase in real exchange rate increases infant mortality, even though the effect is insignificant. The finding however is important because it suggests that fluctuations in foreign exchange rate have a bearing on health development. In this particular instance, the price effect of the exchange rate outweighs the income effect. That is, the negative health effect of the increase in the real cost of buying foreign medical supplies such as drugs, outweighs the positive effect of the increase in purchasing power that the export sector experiences.

It is interesting further to compare the effects of secondary and primary school enrolments on fertility. Secondary school enrolment reduces fertility, while primary school enrolment increases it; but it is only the effect of secondary education is significant. This points to need to consider carefully the various aspects of education in the process of development. Provision of universal primary schooling as a merit good, could exacerbate the population problem in Africa, if its fertility enhancing effects are not anticipated. The additional results in Table 8, are similar to those reported in Table 7. They reveal that the slopes of health status indicators are not changed by the inclusion of region-specific factors in the estimating equations. However, regional heterogeneity is an important determinant of infant mortality in parts of Africa. In particular it accounts for much the variation in health status indicators between Central and East Africa.

A comparison of coefficients on income and education reported in Tables 6 and 7 shows that inclusion of region-specific factors in the IMR equation increased these coefficients. Generally changes in other coefficients were modest.

### **Results from cross-section data**

Cross-section regression results are reported in Table 1. As will be recalled, the cross-section is for all African countries and for the period 1990-95. The cross country regressions show that secondary school education is a key determinant of health development. Infant mortality rate declines with secondary school enrolment rate, and as expected secondary education significantly enhances longevity. A striking result from Table 8 is that safe water supply reduces infant mortality rate more than any other factor. The elasticity of the infant mortality decline with respect to safe water supply (0.49) is larger than the elasticities for income and for secondary school education, which respectively stand at 0.06 and 0.24. That is, a 10% improvement in the access to safe water would reduce IMR by nearly 5%, whereas the same increase in income and education would reduce IMR by only .6% and 2.4% respectively. It should further be noted that the effects of income in the cross-section regressions are insignificant.

The increases in real exchange rate has a strong negative effect on health development, as it increases mortality and reduces longevity. This result summarizes the health effect of exchange rate policies in Africa, which comes out as strongly negative. There is need to explain the process that generates this result. As noted in an earlier section, the exchange rate is a price variable; and that a change in this variable has both an income and substitution effect on demand. Real depreciations in local currencies (relative to US dollar) increased the prices of obtaining drugs and other medical supplies and hence via the substitution effect reduced the utilization of modern sector health services by the population. (The prices of traditional health services, which are not intensive in the use of imported inputs), must have been affected very little by foreign exchange movements). The increase in the real exchange rate is likely to have reduced demand for other goods and services, whose consumption enhances health. A reduction in demand for modern sector health care, combined with a decrease in demand for other basic services as a result of an exchange rate appreciation, should affect health status adversely. This health effect of macroeconomic policies has not been given much attention in health economics literature.

Additional cross-country regressions (not reported here) show that armed ethnic conflicts, which displace people, some of whom become refugees, have negative effects on health development. Specifically, life expectancy was lower in countries plagued by ethnic conflicts. Moreover, longevity of men is affected more by conflicts than that of women. (These results are available on request).

## **Institutional and Political Economy Issues in Health Development in Africa**

### **General Issues**

In section 3, an economic framework for analyzing how various public policies might affect health development was presented. The results of the estimation of health determination models constituting that framework have been presented and discussed in Section 4. It should be noted that sections 3 and 4 deal with technical economic matters. The key issue there is the measurement of health effects of a range of potential policy instruments.

The present section discusses the institutional and the political economy framework, in which the technical economic models of health determination in sections 3 and 4 are embedded. That is, the economic models of mortality, fertility and longevity are exercised, for policy design, within a broader framework of political economy and social institutions. Features of political and social institutions such as the legal system, cultural norms, and structure of property rights, comprise what might be called the rules of the game in the process of health development. [North (1990, 1995) has been very influential in popularizing the development process as a form of a game of strategy].

The technical economic framework of health determination, and the results of its estimation in section 4, constitute the strategy sets of players of the game. That is, they are the basis for determining the best response to the existing health care challenges in Africa, given the available resources and state of medical technology. In its simplest form the structure of the game is as follows.

The players. For each country, these would normally consist of the central government; the ministry of health; other ministries; the non-governmental organizations; the private sector; political parties,

including those in opposition; local governments; welfare associations; households and individuals; and 'nature'. Nature is an extremely important player in the society's game of health development. It can be visualized as the source of disease profiles that are observed in the population (see Mwabu, 1997). For instance, emergence of new diseases such as AIDS and ebola, or the disappearance of certain diseases in some areas (e.g., small pox and river blindness) can be thought of as resulting from play strategies of nature given the play strategies of the other players (the rest of the players apart from nature). Needless to say the players may have different objectives and play strategies.

The aim of the game. For each player, the objective of participating in the game is health status improvement of the self or the principal. In the case of participation by an individual, the self and the principal are the same person. However, in the case of the central and local governments, the people are the principal and the governments are the agents. In that case, the play objective of the government is to improve the health status of the population.

Play strategies. These are the actions that each player takes in response to play strategies by other participants in the game. For example, the actions of other players against nature might comprise health policies of the central government, health programs of local governments, health care initiatives of the non-governmental organizations, health service provision by the private sector and health practices of households and individuals. In the particular case of this game, all other participants in it (other than nature), form a coalition to play against nature (see Mwabu, 1997). The essential requirements of the strategies is that they be feasible and best.

The payoffs (benefits) from the play. These are simply the health outcomes (as measured for example, by a reduction in mortality or an increase in longevity) resulting from play strategies. As already noted, strategies are actions that best improve the health status of the population, given the action profile of nature. The estimation results reported in sections 4 for instance show health benefits (in terms of reduced mortality and improved life expectancy) that can be expected to accrue to the community if certain actions -strategies against 'nature' (diseases, unsanitary environment, ignorance, ethnic tensions) were pursued.

The view of health development process as a game, brings out the group conflicts involved in the actual practice of development policies. Implementation of certain health policies may impose losses on some social groups, who would then normally oppose or resent such policies. Moreover, even in the absence of such losses, the numerous groups and individuals in society may not, on their own, act in furtherance of social goal -for example a reduction in fertility. There is therefore a need to develop a social system that would coordinate and regulate all the participants in the play of the game. It is such a system that (North, 1990) calls institutions -the formal and informal rules- that structure the actions of the various members of society in the play of the game. (In this case, the health development game). There is need to note that the term institutions has come to be used more broadly to include also organizations (e.g., public school systems) and formal and informal social networks (e.g., self-help groups) that facilitate orderly interaction and communication among people in society (Harris et al., 1995).

It is evident that a set of formal rules such as the legal system that provides the basis for ownership and protection of property in all sectors of the economy (health sector included) can only be enacted by the government. Public school and health systems, from which all people benefit without the possibility of exclusion, can only be provided by the government. Thus, the government has a critical role to play in setting rules that facilitate broad-based participation in the process of health development. It is also the government that is better placed to coordinate (via an incentive system) activities of various groups aimed at health development.

Robinson and White (1997) have proposed the concept of synergy in health care provision and financing to show how the various groups in society can make a contribution to the process of health development in a coordinated fashion. The concept of synergy (mutual reinforcement) of the various participants in the process of improving health status, requires co-determination of the type of health services to be produced, and their co-production and co-financing. Other dimensions of this participatory process include devolution and delegation of responsibilities in decision-making in health matters, pressured provision of services, contractual arrangements between the health ministries and the private sector, among others (see Robinson and White, 1997, pp. 26-29). The state is indispensable in creating an environment in which these mechanisms of cooperation can evolve and grow. The essential point here is that health development is a highly participatory process, which can also be conflictual. The technical economic framework in sections 3 and 4 is only but one of the many inputs in the society-wide process of health development. Issues of health care financing modalities; the incentives for appropriately using the available health services; and strategies for offsetting adverse health effects originating outside the health sector (e.g., industrial pollution) need to be determined by polity before the economic framework in

sections 3 and 4 can be used to design strategies for health development. Many African countries at the moment lack institutional mechanisms for ensuring broad-based process of health development. Broad issues of political and social development such as democratization, good governance, and cultural heritage of a people have implications for health sector development. Health development policies should be designed taking these broad dimensions of society into account.

### **Specific Issues**

This sub-section looks at specific health care issues in a political economy setting.

a. Health care financing. The question of how best to pay for health services, was the most controversial issue in health sectors in Africa during the 1980s and in the early 1990s (see Reddy and Vandemortele, 1996; Mwabu et al., 1995). The issue illustrates well the need to use technical health economics models in conjunction with broad political economy frameworks. Econometric studies (see e.g., Akin et al., 1986; Shaw and Griffin, 1996) had shown that the financing of health services through user charges would improve service quality and lead to greater utilization, which in turn, would improve health. Policies were also designed for implementation in Africa and elsewhere on the basis of this finding (World Bank, 1987). However, implementation of this policy faced strong opposition from various sections of society in many countries. In some countries, notably Kenya, the policy of charging fees for medical care was implemented but quickly reversed due to political considerations. The policy was reinstated after several years, but did not begin to take hold, until after receiving political and grassroots support (see Collins et al., 1996). Experience with the user charges in Uganda, Zimbabwe, Swaziland, Ghana, Egypt, Cameroon, Tanzania, Mali, Benin, Burkina Faso, Congo (Democratic Republic), Rwanda, Sudan, Lesotho, Nigeria, Cote d'Ivoire, and so on, shows that political element (the coercive powers of the state and of pressure groups) and grassroots support are important in the success of any health care financing scheme in the public sector (see e.g., Reddy and Vandemortele, 1996; Shaw and Ainsworth, 1995; Bolduc et al., 1996; Wouters, 1991; Litvack and Bodart, 1993). In the case of Kenya, people could not use national insurance fund to pay for medical care in government hospitals until the insurance law had been changed by the government. Health insurance is a key requirement for viability of a system of user charges as a mechanism for paying for health services. However, great difficulties in instituting private health insurance schemes in rural areas in Africa, where most people still live (see e.g., Vogel, 1988), have greatly diminished the role private financing of health services among the poor. Compulsory public medical insurance schemes, financed via general taxation, are still the feasible mechanisms for financing broadly accessible health services in Africa. The government will continue to play a dominant role in health care financing in Africa over the next several decades because institutions that support private health care financing such as private insurance schemes do not as yet exist in many parts of Africa.

b. Health services provision. Another issue concerns the appropriate mix of public and private provision of health services (Kutzin, 1994). The discussion here centers around merit and public goods characteristics of health care as a commodity. As a merit good, health care should be available to everyone. Ideally, this is possible if it is provided by the government free of charge. Health care can also be broadly available if it is provided by the private sector, and heavily subsidized by the government. The private sector however may not provide services with strong primary health care components such as immunizations, because private demand for them is typically weak. For this reason such services are best provided by the government. This however is a familiar argument. The contribution of this paper here is the argument that the political process for allocating resources between primary care and other health care may be such that too little may be allocated to primary health care even when technical economic calculations (as undertaken in section 4) show that it is the most beneficial. Institution of a broad-based process of people's participation in health care decisions would tend to guard against inefficient allocation of health care resources.

c. Water, nutrition, sanitation, and food security. Political economy issues of the role of power and social groupings (e.g., rural versus urban groups) in the provision and financing of these services are important. Technical, economic demonstration of the superior role of these services in enhancing health status of the population (as in section 4) is not in itself sufficient to ensure their provision (at all); or guarantee that they would be provided equitably to all social groups. The political processes of resource allocation and of policy implementation need to be understood and manipulated so as to have the above services provided at adequate levels.

In any case, issue of food security is a matter that is best handled through political actions such as land reforms, establishment of social security systems, and of free press that can report situations of famine. Sen (1981), in his seminal work on famines, has demonstrated that hunger and malnutrition are not primarily due to food shortages. Rather, these health reducing phenomena occur mainly because of poor food distribution and lack of people's entitlement for food which is available through the market system.

Sen has also argued that free press is important in alerting the government and international agencies (of good will) of potential situations of severe hunger and malnutrition.

d. Pharmaceuticals and generic drugs. This is yet another area in health care where the political economy framework throws considerable light. The public needs proper information about pharmaceuticals and drugs to be able to use these commodities well, especially when they are being sourced from the free market. The government is better suited than any other player (in the health development game) to regulate the pharmaceutical industry to ensure that harmful drugs are not supplied to unsuspecting public by firms that deviate from ethical standards of behavior in health care. However, both the design and implementation of such a regulation are subject to strong political influences. There are likely to be groups lobbying against such regulation. Technically speaking, the regulation that constrain the behavior of the pharmaceutical industry may not be exogenous to the industry, since the industry can influence its nature and scope. An understanding of the various forces and processes that bear on the formulation of policies to 'govern' the pharmaceutical industry is an essential aspect of health development of a nation.

In addition to its regulatory role, the government can greatly reduce the cost of medical care by stocking public health facilities with generic drugs and by encouraging private clinics and pharmacies to do the same.

Briefly, technical information about determinants of health status should be combined with information about the political economy structure of a country in formulating health development policies.

## Summary and Conclusion

The paper has empirically examined the process of health development in Africa using cross-section and time series data from 53 African countries. The measures of health development identified in the paper include infant mortality rate, crude death rate, fertility and longevity. Using these measures, it has been found that there has been progress in health development in Africa over the past 15 years. In particular, life expectancy for the whole continent increased by some 5 years, a finding consistent with a steady decline in infant mortality over the same period. Even so, the level of health development in the continent remains quite low compared with measures of health status in continents at similar stages of socioeconomic development. Moreover, the quality of life in Africa may not have improved at the same rate as the indicators of health development because of probable increases in morbidity and in psychosocial stress due to economic hardships of the continent over the past 15 years. Measures of health status in Africa vary substantially by region. North Africa has the best indicators of health status, while West and Central Africa have the lowest indicators of health development.

The main determinants of health status identified in the paper include per capita income, secondary school education, safe water supply, AIDS, official development assistance, population growth rates, exchange rate changes, calorie supply, and access to health and sanitation facilities. Improvements in incomes, secondary school enrolment rates and safe water supply have powerful benefits effects on health status.

It has been argued that the economic model of health status determination developed in the paper should be combined, in application, with a political economy model of participatory development process. It has not been possible to develop the latter model fully. Its main features are multiplicity in the provision and financing of health services; consideration of health effects of activities outside the health sector; and active state regulation and coordination of participants in the process of health development. In our tentative political economy framework, the various players in the health development game (e.g., the state, the private sector and non-governmental organizations) are not alternatives (as was mistakenly believed in the 1980s), but are partners who function in a synergistic relationship.

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