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HEALTH FINANCING AND SUSTAINABILITY (HFS) PROJECT

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ABSTRACT

The report presents the findings of an econometric investigation into the demand for health care in Senegal, based on data from a nation-wide survey of 10,000 households carried out in 1991-92. The large size of the sample of patients, numbering some 14,500 individuals, made it feasible to stratify the analysis of health care demand between rural and urban areas in order to take account of rural-urban disparities both in the supply of modern health services and in income levels. The investigation shows inequalities in access not only to modern health services in general, but also to the services available at the various levels of the care delivery system. The findings suggest, on the one hand, that this inequality of access to modern health care is brought about primarily through the quantitative rationing of services stemming from the poor geographical coverage of the public health facilities in rural areas. On the other hand, the affordability of modern health care in urban areas is constrained by the low level of incomes and the poor coverage of the health insurance schemes prevalent in the modern sector of the economy. The data also suggest that Senegalese households spend sizable sums on the treatment of illness, equivalent to CFAF 4,700 a year on a per capita basis, or between US$8 and US$9, for visits and drugs alone.

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FOREWORD

The Health Financing and Sustainability (HFS) Project provides technical assistance and training, conducts applied research, and disseminates information to developing countries in health economics, health sector policy development, and health services management. The Applied Research (AR) component of the project provides opportunities to increase knowledge of the complex issues underlying health financing problems and augments the supply of qualified individuals who can contribute to policy analysis and reform. HFS has emphasized the following policy areas for applied research activities: cost recovery, productive efficiency, social financing, and private sector development in the health sector.

As part of the project's AR component, HFS will have completed almost 30 small applied research (SAR) activities between 1989 and 1994. These include studies undertaken by developing country researchers, HFS researchers, or academics at universities in the United States. The objectives of the SAR program are to carry out practically-oriented research in developing countries, and to encourage the development of local capacities to undertake research.

Most SAR activities have been initiated through proposals to the HFS Project. The proposals are evaluated by HFS staff, including criteria such as: practical policy orientation, resource and time requirements, and appropriateness to the HFS research agenda. Most proposals for SAR activities accepted by HFS have undergone several revisions, as the researchers refined their research objectives, hypotheses, and methodologies, based on suggestions and comments from the HFS staff. Once approved, SAR activities have been overseen by HFS task managers, who work closely with principal investigators to monitor the timeliness and quality of the work, and facilitate logistics.

Other small applied research studies are done in conjunction with technical assistance or major applied research activities of the HFS Project. In these cases, the SAR contributes to the technical guidance provided to clients or adds to the body of knowledge on topics of health financing and economics.

As with all HFS research, drafts of small applied research reports are reviewed by HFS staff. Drafts are then evaluated by external technical reviewers selected on the basis of area of substantive and/or geographic expertise.

Ricardo Bitran
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EXECUTIVE SUMMARY

OVERALL CONTEXT

Although Senegal's health situation has improved steadily over the last three decades, it still retains the typical characteristics of a poor country: at the beginning of the 1990s, 131 of every 1,000 children died before reaching their fifth birthday. This high mortality rate is attributable mainly to a combination of adverse epidemiological conditions, notably the incidence of transmissible diseases, relatively high levels of malnutrition, and the country's inadequate and uneven access to quality health care. Internal and external population movements and the future performance of the Senegalese economy will be critical in determining the health status of the people, health strategies and policies, and the scale of the national effort needed to maintain and expand health gains in the years ahead. Paradoxically, despite the growing needs in terms of access to basic health care, not only is the share of health expenditures in the national budget still low, but also the bulk of government resources is absorbed by the hospitals and the urban areas.

For several years efforts have been under way to shift a larger share of health resources to the basic health sector. This shift is consistent with the national health policy that has been in effect since 1989, which is built around a number of strategies, notably improvements in health coverage in rural and semi-urban areas. For the past few years, the primary health care strategy has been implemented more systematically with the launching of the Bamako Initiative in some regions of the country: one element of the BI, involving the mobilization of domestic resources, would undoubtedly ease the constraints on strengthening the capacities of the basic health system.

In the context of ongoing health financing reforms, including implementation of the Bamako Initiative, studies of the demand for health care could prove a valuable tool to underpin the shaping of policies and strategies for financing health care. The present study is being undertaken with this goal in mind. It is one component in a series of studies being carried out in cooperation with the Ministry of Health, USAID/Dakar, and the Health Financing and Sustainability Project, covering:

- the legal framework of health sector financing;
- analysis of the determinants of health financing;
- the costs, financing and effectiveness of public health facilities;
- comparative analysis of public and private health care providers;
- and the development of the private sector in Senegal.

RESULTS

The investigation into the demand for health care in Senegal is based on data from the Priorities Survey conducted in 1991-92 by the Department of Projections and Statistics. The survey covered a nation-wide sample of 10,000 households; approximately 86,000 individuals were interviewed as part of this operation, of whom 14,500 stated that they had been ill at some time during the month preceding the interview. Quite apart from the large size of the sample, the survey gathered data on several aspects and economic and social characteristics of the households, including use of health services and health-related expenditures.

Based on analyses of data from the Priorities Survey, the study of demand for health care yields information that can be used to answer the following questions:

1. What factors determine the use of modern health services and the choice of service provider in the modern health sector?

2. What are the relationships between prices and income, on the one hand, and the demand for modern health care, on the other? What are the implications of these relationships in terms of equity in the sector and access to modern health care?

3. What factors determine the quantity of health care requested? and

4. How much do the households themselves pay toward health financing?

Of the 6,331 individuals in rural areas who reported having been ill in the month prior to the visit by the enumerator, 50 percent did not seek care in the modern sector; 6 percent sought care from a modern private provider; 8 percent sought care at a hospital or public health center; and 36 percent sought care at a health post or public dispensary. In other words, the choice of care provider in rural areas is basically whether or not to resort to the modern sector. On the other hand, of the 8,191 individuals in urban areas who reported having been ill, 33 percent did not seek care in the modern sector; 17 percent sought care from a modern private provider; 25 percent sought care from a hospital or public health center; and 25 percent sought care from a health post or public dispensary. In other words, the three main kinds of modern care providers defined in this study have roughly equal shares of the modern health care market in urban areas.

The results of the econometric analyses presented in this study reveal that the modern private sector and the tertiary care facilities of the public health system serve primarily the relatively affluent segments of the country's urban areas. Conversely, the lower-level facilities of the public health system, the health posts and the district dispensaries, serve mainly the less well-off groups in urban areas and most rural households.

With regard to the rates charged by different providers during the survey period, the fees for visits were not so high as to discourage patients from seeking health care from modern-sector providers, in either rural or urban areas. The prices mainly influenced the choice of provider in the modern sector and not resort to the sector itself, since there were several alternatives available among providers. The results show, however, that private providers and hospitals and public health centers were perceived by consumers as substitutes: this phenomenon is more prevalent in urban areas where the private facilities and the tertiary and secondary public facilities are located.

The time needed to reach care facilities was found to have a rationing effect as far as health services were concerned, particularly in rural areas: in urban areas, the time factor did not seem to deter patients from seeking care in the modern sector given their relatively easy physical access to facilities and the density of the local transport networks. In the rural areas, however, access time had a greater impact than price on the demand for care: people living in villages remote from care facilities face relatively higher access costs than do other social groups. There is no doubt that the quantitative rationing of care by time and distance is still one of the main equity issues within the health system.

Although household income has only a minor effect on resort to the modern health sector in urban areas, it is one of the key determinants in rural areas, where a 100-percent increase in household income means patients are 26 percent more likely to resort to the modern sector. On the other hand, household income in urban areas for the most part influences the choice of care provider: a 100-percent increase in income results in (i) a 39-percent increase in the probability of a private provider being selected, (ii) a 19-percent increase in the likelihood that a health center or public hospital will be chosen, and (iii) a 30-percent lower probability that a public health post will be selected. In other words, the income-sensitivity of demand for the services of private care providers is twice as high as the demand for services from hospitals and public health centers in urban settings. Moreover, the negative elasticity of demand for services from public health centers suggests that such services are seen by patients as being of poor quality.

The relationships observed between income and demand for health care in rural areas, where most health care is subsidized, suggest that the more affluent groups in rural areas capture a larger share of public subsidies than the poorer groups. The same phenomenon is prevalent in urban areas, where the level of public subsidies is higher: in urban settings it is driven, however, by the fact that socioeconomic groups cannot equally afford care at the high prices charged by the tertiary facilities.

Apart from the economic determinants of demand for health care and the choice of provider, this choice is significantly affected by the existence of health insurance systems for the dependents of wage-earners in the private and public sectors: patients so covered make heavier use of the services of private care providers and hospitals — i.e. the most expensive care — than do patients without such coverage. The subsidization of care for beneficiaries of such systems, who make up the most affluent segment of the population and can therefore most easily afford to pay for their own health care, is seen as a central issue with respect to equity in the health system.

Most of the patients treated at health posts and public dispensaries are children and women. This demographic structure of health care demand has major implications for public health in general and for the preventive and promotional programs in particular. Indeed, it could well serve the purposes of promoting mother and child health care. However, the potential health gains could be realized only if lasting improvements are made in the quality of care and if the corresponding care facilities are developed as integrated care centers.

Finally, households spend substantial sums on health financing. For the year in which the Priorities Survey was carried out, households spent an estimated CFAF 6.1 billion on visits and 28.9 billion on the purchase of drugs, for a combined total of CFAF 35 billion. Based on an estimated population of 7.5 million inhabitants in 1992, this level of private expenditures on visits and drugs is equivalent to CFAF 4,700 per head: in 1990, public expenditure on health was estimated at CFAF 4,000 per capita.

There is a wide disparity between rural and urban areas in the amount spent on visits and drugs. Indeed, though they represent only 40 percent of the population, residents of urban areas account for

more than two thirds of expenditures on drugs (69 percent) and 81 percent of the expenditures on visits. In the urban areas, however, individuals not covered by any kind of health insurance spend on average more than civil servants and employees in the modern private sector, including their dependents, all other things being equal.

POLICY IMPLICATIONS

The behavior of the demand for care in general, as summarized in the present report, and the relationships between income and the demand for care and estimated household expenditures on health, in particular, have far-reaching implications for health policies in Senegal. In view of the substantial resources expended on health activities by households, one of the key policy issues is to assess whether Senegalese households receive health care of a quality commensurate with what they spend. A second issue relevant to implementation of the Bamako Initiative (BI) concerns the potential impact of the BI program on the level of these private expenditures. It would also be helpful to find out whether recycling part of these resources through the basic health centers involved in the implementation of the BI might serve to strengthen the capacities of these centers as part of the effort to expand preventive and promotional care. The question, in other words, is whether the BI can prove instrumental in improving the use made of public and private resources committed to health activities and the efficiency of the health system.

Given the current structure of public health expenditures, where a large share of the budget is absorbed by the hospitals, the structure and the behavior of demand for health care raise issues related to equity of access and the efficiency of public health spending. From the equity standpoint, the well-off groups, which can most readily afford to pay for their own care, derive more benefit from government subsidies than the less well off. Thus, if the public health system is to serve as a vehicle for transferring resources in kind from the country's most affluent to its poorest, then both the financing system and the allocation of resources need to be overhauled. From the efficiency standpoint, the predominance of infectious and parasitic diseases in the country's epidemiological profile, its widespread malnutrition, and its fertility patterns suggest that government expenditures would be more cost-effective if there were an increase in the share of the national budget earmarked for subsidies to primary care facilities, which serve 74 percent of those in rural areas and 34 percent of urban dwellers.

Implementation of the Bamako Initiative could mark the first step toward enhancing the efficiency of the health system, if only by raising the productivity of health personnel in the primary care facilities and stepping up preventive and promotional activities. Its impact on the equity of the health system might, however, be dampened unless steps are taken to safeguard access to care for the poorest and effective hospital financing reforms are not undertaken.

Reforms in hospital financing are even more important from the equity standpoint because the rationing of care due to the effect of access time is particularly pronounced in rural areas. In other words, the best strategy for improving the equity of the health system would be to expand the geographical coverage of the basic public health system in rural areas. In Senegal's current fiscal context, however, significant gains in this respect are unlikely to be forthcoming unless government resources at the hospital level are first freed up so as to ease the fiscal constraints on broadening the basic health system.

1.0 INTRODUCTION

Senegal is a Sahelian country with about 7.5 million inhabitants in 1992. Most of the population derives its livelihood directly or indirectly from agriculture. The country's vulnerability to the vagaries of the weather and to fluctuations in world markets has held its economy to poor levels of performance in relation to the high rate of population growth. As a result, the per capita gross domestic product has risen only slightly over the last three decades: it stood at an estimated $770 in 1992. The young age of the country's population will produce rapid demographic growth over the decades to come, and this growth will probably intensify the urban drift that began in the 1950s, particularly in the region around Dakar. Population dynamics and the future performance of the economy will have far-reaching repercussions on the situation, on health strategies and policies, and the national effort needed to maintain and expand health gains in the years ahead.

The health situation has improved steadily over the last three decades, but still retains the typical characteristics of a poor country: at the beginning of the 1990s, 131 of every 1,000 children died before reaching their fifth birthday. The risks of mortality before the age of 5 are twice as high in rural areas as in the cities; moreover, children born to mothers who have received no schooling face mortality risks three times higher than those born to women with at least a secondary education. This high mortality rate and marked variations are attributable mainly to a combination of adverse epidemiological conditions, notably the incidence of transmissible diseases, relatively high levels of malnutrition, and the country's uneven access to quality health care. Paradoxically, despite growing needs in terms of improved access to basic health care, not only is the share of health expenditures in the national budget still low, but also the bulk of government resources is absorbed by the hospitals and the urban areas.

For several years efforts have been under way to shift a larger share of health resources to the basic health sector. This shift is consistent with the national health policy that has been in effect since 1989, which is built around a number of strategies, including improvements in health coverage in rural and semi-urban areas in particular. For the past few years, the primary health care strategy has become more effective with the launching of the Bamako Initiative in some regions of the country.

Although there have been several health investigations in the country, the demand for health care is very poorly documented in Senegal. In the context of ongoing health financing reforms, including in particular implementation of the Bamako Initiative, studies of the demand for health care could serve as a tool to shape policies and strategies for financing health care and to install policies that will help to promote a more efficient and equitable health system.

The present study is being undertaken with this goal in mind. It is one component in a series of studies being carried out in cooperation with the Ministry of Health, USAID/Dakar, and the Health Financing and Sustainability Project, covering:

- the legal framework of health sector financing;
- analysis of the determinants of health financing;
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- and the development of the private sector in Senegal.

The investigation into the demand for health care in Senegal is based on data from the Priorities Survey conducted in 1991-92 by the Department of Projections and Statistics. The survey covered a nation-wide sample of 10,000 households; approximately 86,000 individuals were interviewed as part of this operation. Quite apart from the large size of the sample, the survey gathered data on several aspects and economic and social characteristics of the households, including use of health services and health-related expenditures.

The survey was carried out before the Bamako Initiative was launched in Senegal. It thus provides baseline data on the demand for health care prior to the start-up of the Initiative in the rural areas of the country; these data will be crucial when it comes to evaluating the program. Moreover, the large size of the urban sample in the survey and the heterogeneity of the care providers in the cities should lead to a more detailed investigation and a better understanding of the demand for care in the country's urban areas. It was with this in mind that the present study of demand for care was systematically stratified as between rural and urban areas. The study seeks to answer the following questions:

1. What factors determine the use of modern health services and the choice of service provider in the modern health sector?

2. What are the relationships between prices and income, on the one hand, and the demand for modern health care, on the other? What are the implications of these relationships in terms of equity in the sector and access to modern health care?

3. What factors determine the quantity of health care requested? and

4. How much do the households themselves pay toward health financing?

The rest of the report is organized as follows. Section 2 summarizes Senegal's overall health context. The methodology and data used in the study are presented in Section 3. The fourth section presents the findings of the econometric analyses with respect to resort to the modern health sector and choice of care provider. Section 5 describes briefly the quantity of care requested. The health-related expenditures of households and their determinants are analyzed in Section 6. Finally, the conclusions and policy implications of the findings are discussed in Section 7.

2.0 OVERALL CONTEXT

2.1 ECONOMY AND POPULATION

Senegal is a Sahelian country with about 7.5 million inhabitants (January 1992). Most of the population derives its livelihood directly or indirectly from agriculture. Aside from the processing of agricultural products, fisheries development, phosphate-based mining activities, chemical industries and tourism form the pillars of the modern sector of the economy, centered around the capital, Dakar. Because of its geographical location and limited water management, the country's economy is highly vulnerable to the vagaries of the weather; it is also highly sensitive to fluctuations in world markets. This vulnerability is partly to blame for the country's weak economic performance since gaining its independence in 1960, in spite of having fairly well developed physical and social infrastructure and productive capacities in the early years of independence. After the fluctuations of the 1970s due to adverse climatic conditions, the gross domestic product grew by 3.1 percent between 1986 and 1992 (World Bank, 1994b). In the same period, the annual rate of population growth remained steady at about 3 percent. As a result, the per capita gross national product rose very little, standing at an estimated US$770 in 1992.

Two of the most striking features of Senegal's population are its youth and its geographical distribution. To begin with, mortality has been on the decline since the 1960s; recent data from demographic and health surveys suggest that this decline gathered momentum during the 1980s (Department of Projections and Statistics, 1988, 1994). Moreover, despite some signs that fertility is tending to decrease among urban and young women, it remains high in Senegal. Consequently, natural population growth is on the high side, which accounts for the relative youth of the population. Secondly, as factors behind the economic and social changes since the 1950s, the intensity and directions of internal population movements have given rise to a steady pace of urbanization, with a marked concentration in the region around Dakar: it is estimated that 40 percent of the population live in urban communities, and the urban population is growing at an annual rate of 5 percent (Department of Projections and Statistics, 1994). Looking ahead, the young age of the country's population will produce rapid demographic growth over the decades to come, and this growth will probably intensify the concentration of people living in urban areas, especially in the region around Dakar.

2.2 HEALTH

2.2.1 Health situation: an overview

Although Senegal's health situation has improved steadily over the last three decades, it still retains the typical characteristics of a poor country. Infant mortality (between 0 and 1 year) stands at 68 per thousand; moreover, the rate of child mortality (between 1 and 5 years) is also 68 per thousand (Department of Projections and Statistics, 1993). In other words, 131 children out of every thousand die before reaching their fifth birthday. In addition, maternal mortality is still fairly high in Senegal: the rate of maternal mortality was somewhere between 500 and 600 deaths per 100,000 live births during the period 1986-92 (Department of Projections and Statistics, 1994). These mortality rates explain in part the low life expectancy at birth, which stands at approximately 50 years.

These high maternal and infant and child mortality rates reflect the combined effect of the country's prevailing epidemiological conditions, nutritional status, and demographic behavior. The most common diseases are still malaria, diarrheas, respiratory infections, measles, etc., which are also the leading causes of death. In addition, the nutritional status of children is poor: 1 child in 5 suffers from retarded growth or chronic malnutrition (Department of Projections and Statistics, 1994). Finally, fertility continues to be characterized by premature age at first delivery and by the high number of births to individuals by the time they cease to be of reproductive age. The epidemiological situation is thus driven by transmissible and parasitic diseases, the prevention and control of which can be handled more effectively by primary and secondary health services; moreover, these levels of the health system are well suited to serve as centers for supervising promotional activities aimed at combating malnutrition and promoting the use of assisted contraceptive techniques. In other words, given the internal and external dynamics of the population, enhancing and expanding improvements in health over the coming decade will require not only a stepped-up national effort in the sector but also a restructuring of the way in which resources are allocated so as to favor the primary sector.

2.2.2 The health system

The share of health in the national budget has varied irregularly over time, usually trending downward. It was 5.7 percent for 1992-93 (Unicef, 1993). Almost two-thirds of the health budget is absorbed by personnel expenditures, 40 percent of it for hospital staff. Expenditures on drugs account for a bare 14 percent: paradoxically, 80 to 86 percent of the spending on drugs is earmarked for the hospitals, with the remaining health facilities receiving only 14 percent. These figures illustrate the sharp distortions that have been commonplace in the use of public resources, which remains skewed in favor of the hospitals.

In tandem with the movement toward decentralization, some local authorities play a greater or lesser role in financing health. Among the grass-roots local communities, for example, rural communities are supposed to allocate 8 percent of their budget to health: however, this policy has yet to be implemented.

The people themselves participate in the health effort in a variety of ways: the construction of infrastructure facilities, making community personnel available, paying part of the cost of visits, deliveries, hospitalization, and other forms of care. In 1990, Du Moulin and Lagace estimated private participation in the health effort at CFAF 27 billion, CFAF 15 billion of which was through the purchase of pharmaceutical products: these figures represent 68 percent and 38 percent, respectively, of all health spending (Du Moulin and Lagace, 1990). Moreover, in 1989 the people were running 1,265 health booths, 53 rural maternity kiosks, 61 health posts, and 2 mother-and-child protection centers (DPS, 1994).

Experiments with new health financing instruments are under way in the modern employment sector. Attempts to extend health insurance coverage are being tried out through the development of sickness provident funds in companies operating in the modern sector of the economy. In addition, a number of companies are providing employees and their dependents with health services in company-owned care facilities.

Finally, some nongovernmental organizations and lending agencies in particular play an important role in health financing through subsidies, loan support, and technical assistance.

Notwithstanding the scale of public and private health efforts, the supply of services is still beset by a lack of facilities (***Exhibit A-2***). The public health facilities are organized in the shape of a pyramid. At its base is the health post: this may supervise a number of improvised facilities, such as health booths or rural maternity kiosks. At the next level up is the health center; there is usually a mother-and-child protection center linked to the health center. At the apex of the pyramid is the hospital.

Exhibits A-1 and A-2 reveal a great disparity in the distribution of infrastructure and personnel. First, the hospitals are concentrated in Dakar, while the regions of Kolda and Fatick have none (***Exhibit A-2***). On the other hand, the disparities are smaller in the case of the regional distribution of health posts, albeit with better coverage in the Saint-Louis region. Second, doctors, like the hospitals, are bunched around Dakar. By and large, there is a pattern of understaffing, with the shortfall seeming to worsen in recent years. Civil service employees leaving the service permanently for various reasons (retirement, resignation, death, voluntary separation) are not being replaced. Finally, the country is still a long way from achieving the passive coverage standards recommended by WHO, as illustrated in ***Exhibit A-1***.

However, it should be noted that the number of staff in the private sector has increased considerably. Indeed, more than half of the doctors are working in the private sector, and almost all pharmacists are employed in the private sector (***Exhibit A-1***). Development of the private sector has expanded not only through the establishment of corporate-based medical services but also through not-for-profit services, including centers run by Catholic missions and other nongovernmental organizations. Further expansion of the private sector, however, faces a number of constraints, such as access to credit and the lack of well-developed health insurance systems (Yazbeck et al., 1994).

2.2.3 Outlook

A general effort to restructure the allocation of health resources to benefit the primary sector appears to have been initiated in the latter half of the 1980s (World Bank, 1994b). This effort was intended to be consistent with the adoption by Senegal of the Alma Ata Declaration. The national health policy pursued since June 1989 is based on several strategies, including improvements to health coverage, particularly in rural and semi-urban areas. However, the fact that hospitals still absorb the lion's share of the health budget suggests that implementation of this policy is fraught with difficulties: the health system is still dominated by curative care dispensed in facilities that are, for the most part, located in urban areas.

For the last few years, however, the primary health care strategy has become more effective with the launching of the Bamako Initiative (BI) in some parts of the country. This policy is being implemented in an increasingly difficult economic context, despite the structural adjustment programs introduced from the early 1980s. The devaluation of the CFAF in January 1994 could conceivably thwart its implementation by raising the costs of equipment and drugs unless monitoring measures are put into effect with a view to keeping down the cost of health inputs and raising rural incomes. Implementation of the BI has had the effect of extending a decentralized approach to health that has been the subject of local experiments for several years: experiments of Pikine and Sine Saloum. Execution of the BI could result in improved harnessing of the health effort by recycling household expenditures into strengthening the capacities of the primary health centers, which represent the people's first point of contact with the promotional and preventive programs of the health system.

In this general context, studies of the demand for health care could be used as a tool to shape the formulation of policies and strategies for financing health care. In this respect, measurements of the elasticity of demand for health care to access time, pricing and the quality of services. on the one hand, and to income, on the other, would provide health-sector policy-makers with information on the options available in terms of strategies for financing care and their implications for the equity of the health system. Moreover, data on the demand for services from the different care providers in the health system could be used to guide the allocation of government subsidies and measures to improve the equity and efficiency of the health system.

3.0 METHODOLOGY

3.1 ANALYTICAL FRAMEWORK

Since the work of Grossman (1972) and Acton (1972), the study of demand for health care has been enriched by a wealth of empirical studies on both developed and developing countries (Heller, 1982; Akin et al., 1986; Dor and van der Gaag, 1993; Mwabu, 1986; Gertler et al., 1988; Litvack and Bodart, 1993; Lavy and Germain, 1994). The knowledge accumulated from these studies is based essentially on the premise that the health of the members of a household is a commodity that directly enhances the well-being of the household; moreover, health enhances the well-being of a household indirectly by increasing the productive capacities of its members and putting them to profitable use. On the one hand, over time, the members of a household use a combination of health goods and services (both traditional and modern) to prevent or treat illness, based on their knowledge of health technologies. On the other, access to these goods and services is limited by the constraints which the market imposes on the household; these include those of the health market itself (price of visits to doctors, drugs, time needed to reach health centers, etc.), the time element, and the financial resources available to the household. Against this setting, the demand for health care by members of the household is a derivative of the demand for the underlying commodity, namely the health of the household's members.

The studies referred to above paid special attention to the sensitivity — or elasticity — of demand for health care to the prices charged by different care providers, access time and waiting time at the various providers, and income; more recently, attention has been focused increasingly on the effects of the prices for, and the quality of, services on the demand for care. For developing countries in general, and African countries in particular, the empirical findings consistently point to the negative impact of time on the demand for health care: based on these results, the time needed to reach health facilities is increasingly recognized as a de facto means of rationing health care, especially in settings where health care is not paid for, where the geographical coverage of the facilities is poor, and where transportation systems are still limited. Such settings are typical of Africa in general, and of rural areas in particular.

The findings with respect to the impact of prices are somewhat looser. Theoretically, if health goods and services were normal, an increase in their prices ought, all other things being equal, to result in a drop in demand for them. Some studies have presented findings where price effects were negative, as expected, but were rather too weak to support the conclusion that the price-elasticity of demand for care was low. Moreover, it has been argued that the price-elasticity of demand varies considerably with individual income, elasticity being low at high income levels and relatively high among low-income groups. At the other extreme, situations have been documented in African settings where the demand for health care increased with prices for services, reflecting to some degree the covariation of prices with the quality of services. In fact, there are very few studies in which the empirical models included measurements of the quality of the services available from alternative care providers: consequently, given the covariation between price and quality, estimates of the impact of prices have often been skewed on the low side. The existence of this skew was recently confirmed by a study, based on data from Ghana, in which quality indicators were introduced into the empirical model (Lavy and Germain, 1994).

Empirical analyses of demand for care in which the effects of the quality of services are measured support the thesis that, as expected, the quality of services exerts a positive influence on the demand for health care. In an experiment conducted in Cameroon by Litvack (Litvack and Bodart, 1993), it was even suggested that quality had a greater impact on demand than price. Such findings, however, will require further studies before they can be confirmed.

In the majority of studies, the empirical data, as expected, systematically bear out the positive effect of income on demand for health care. Even in contexts where health care is not paid for, the demand for such care increases with income: the effect of income may be high in these settings if the quality of the services, especially the availability of drugs, is inadequate. In such a situation, the prescriptions that prescription-writers write to soften the poor availability of drugs reduce the affordability of drugs for the population at large and for poor patients in particular.

3.2 DATA

The present study uses exclusively data from the Priorities Survey (PS) carried out in 1991-92 by the Department of Projections and Statistics (DPS). The PS was a horizontal survey involving a probabilistic sample of some 10,000 households, or 86,000 individuals throughout the national territory. It was the largest nation-wide survey, both in size of sample and in diversity of topics covered, ever conducted in Senegal. The large scale of the sample, combined with the wide range of household and individual characteristics measured, makes sophisticated analyses possible of the demand for care at disaggregated levels.

Of the 86,000 individuals interviewed, approximately 14,500, or 18 percent, stated that they had been ill at some time during the 30 days before the enumerator visited their household. The health module of the survey questionnaire was completed for these 14,500 individuals. The health module included data on the number of visits made by the individual during the month, the type of care provider first visited, the type of provider visited on the last occasion, the amount spent on visits over the preceding month, and the amount spent on drugs. These data on care received in the last month were combined with the economic, demographic and social characteristics of the individuals and their households to form the data base for this study.

The dependent variables — first resort to the modern health sector, choice of care provider, and quantity of health services and related expenditures — are described in detail in the sections in which the findings of the analyses are presented. The independent variables selected for the different models adopted are presented in ***Exhibits D-2 and D-7***. They comprise market factors (price and time), per capita household income, demographic factors, cognitive factors, factors related to economic activity (professional standing of the head of household), cultural factors, and geographical factors. Their distribution and the justification for including them in the models are discussed below.

Price of visits (see Annex C)

Based on responses from individuals who paid ***only one visit to a given care provider*** during the survey reference month, the payments made for the visit to this provider were taken as a proxy for the scale of charges for visits to the provider. In rural areas, the average consultation fee charged in the

private sector was CFAF 340. Fees for private consultations were substantially higher than those charged in the tertiary public sector (CFAF 244) and greatly exceeded those at health posts (CFAF 98). In urban areas, average fees for visits per person varied between CFAF 1,160 for the private sector and CFAF 138 for health posts. They amounted to CFAF 370 for health centers and hospitals. The greater variability of charges for visits in urban areas attests to the diversity of care providers in these areas.

Time needed to reach the closest public health service

The 10,000 heads of household in the survey were asked whether they used the public health service closest to where they lived; if so, they were asked how long it took them to get there: the time needed to reach the nearest public health service for a given cluster was calculated from the responses obtained from the cluster ***among individuals who stated they had walked to the health facility***. This was then used as a proxy for all care providers. This access time did not include time spent waiting before being examined once the patient had reached the care provider. On average, patients took 48 minutes to reach the nearest public health service in rural areas, compared with an average of 15 minutes in urban areas.

Household income

The survey devoted considerable effort to measuring monthly expenditures and levels and sources of household income. Under this study, per capita average monthly household expenditures are used as an indicator of long-term household income: long-term household income is far more relevant than a household's income at any particular time when it comes to calculating household demand.

Age and sex structure

Several categories were created to allow for differences in the use of health services depending on sex and age: boys aged from 0 to 4 years, boys aged from 5 to 14 years, men aged from 15 to 49 years. The same age groupings were used for females. For a variety of reasons, notably morbidity, the types of health facilities used, the quantity of care received, and the amounts spent in the respective health facilities varied, probably as a function of the individual's demographic characteristics: diarrheas and measles, for example, which are among the primary causes of morbidity in children, are treated at health posts, whereas the elderly tend to be hospitalized in tertiary facilities.

Education of the Head of Household (HH)

In rural areas, 6 percent of those who were ill lived in households whose head had had primary schooling. The figure is three times as high in the cities. In rural areas, there are very few persons (3 percent) who are dependents of heads of household with a secondary level of education. In urban areas, on the other hand, one in five of those who were sick was a dependent of a head of household with a secondary education. Finally, it should be noted that, in both rural and urban areas, the majority of individuals live under the authority of a head of household without any schooling at all: 91 percent in the case of rural areas and 60 percent in the cities.

Professional standing of the HH

In rural areas it is the persons who are dependent on independent working HHs who are by far the most numerous: they make up 85 percent of those who reported being ill. In urban areas, on the other hand, a sizable number of individuals are dependent on Hhs who are wage earners in the public sector (15 percent) and the modern private sector (19 percent). In the case of most wage-earning Hhs in the modern sector, either their access to health services is free or heavily subsidized, or they enjoy coverage under insurance schemes and social benefit funds organized by corporations.

Ethnic factors

Cultural factors essentially reflect ethnic groupings for nationals and nationality in the case of non-Senegalese. Incorporation of this factor provides a basis for capturing the behavior of patients with respect to their resort to health services.

Region of residence

Regions of residence were divided into four main categories: Dakar, West Central (Thiès, Louga and Fatick), East Central (Kaolack and Diourbel), South (Ziguinchor and Kolda), and Northeast (Louis and Tambacounda). This variable was designed to capture regional disparities in the distribution of health services.

Finally, the sample was subdivided into a rural stratum and an urban stratum to allow for major differences between the two strata in terms of access to health services.

The analysis was based for the most part on econometric techniques: multiple linear regressions, logistical regressions, and polynomial logistical regressions. The advantage of regressions is that they make it possible to calculate: (a) to what extent the factors being considered account for the dependent variable; (b) the magnitude and direction (positive or negative) of the relationship between each factor and the dependent variable, after the effects of the other factors in the model have been checked; and (c) the extent to which each factor helps to explain the dependent variable over and above the other factors used in the model. The empirical models are presented in detail in combination with the findings with respect to: entry into the modern health sector, choice of care provider, quantity of care sought, and health-related expenditures.

3.3 LIMITATIONS OF THE DATA

Since the PS was not specifically a survey of demand for health care, the specificity of the empirical models and the estimation of the effects of certain determinants of demand are naturally constrained by the data available. In this respect, the information on the type of care provider and the prices charged by each, and the lack of data on the quality of the care received from alternative providers call for special comment.

In the PS, responses regarding the types of care provider visited were precoded. First, the choices of "public hospital" and "public health center" were precoded as a single category. The technical level of care, the functions, and the costs of delivering care at these two types of health facilities differ significantly; the fees charged at these two levels of the public health system are also different. Among the characteristics that these levels have in common and that distinguish them from the other care facilities within the public health system are the availability of diagnostic support units, technical supervision of care by physicians, and facilities for admitting patients to hospital. Second, choices involving primary level public health facilities were also precoded as a single category: the only difficulty this creates is uncertainty whether respondents placed health booths — which are a source of primary care for some rural areas of the country — on the same footing as dispensaries.

The fact that no information is available on the quality of care received from providers is bound to affect estimates of the impact of pricing on the demand for health care. There is a covariation between price and quality of health care: this covariation has been confirmed in the study by Bitran, Brewster and Bâ in the context of Senegal (1994). Accordingly, the estimates of the effects of price on the demand for health care will reflect the absence of quality measurements in the empirical models: in all probability, they will be skewed toward private sector prices in the results for the urban areas in which the modern private clinics are located. Moreover, the primary public-sector health facilities that charged fees during the survey period had a better supply of drugs available than the other health facilities: indeed, these health facilities introduced payments precisely because of the need to raise local funds so as to improve the availability of drugs. Consequently, the same kinds of skew will probably be found in the results for both rural and urban areas.

4.0 ENTRY INTO AND CHOICE OF CARE PROVIDER IN THE MODERN SECTOR

The modern sector comprises public health posts and centers, public hospitals, Catholic health services, facilities run by nongovernmental organizations, and private clinics and pharmacies.[1] Of the 14,522 individuals, 6,331 live in rural areas and 8,191 in urban areas. The analyses whose findings are reported in this fourth section are based on the respective samples from rural and urban areas.

The findings of the econometric analyses are reported in Annex D. In order to present the findings in a homogeneous manner and make it easier to discern the effects of the independent variables, the results were summarized in this section by calculating the marginal effect of the relevant variables on the probability of entry into the modern sector, on the one hand, and the probability of selecting a given type of modern care provider, on the other. The findings on entry into the modern health sector are presented first, followed by a discussion of those on the choice of a modern provider.

4.1 ENTRY INTO THE MODERN HEALTH SECTOR

4.1.1 Empirical model

Entry into the modern health sector is a "yes or no" proposition: either an individual **i** enters the modern sector or he does not. The relevant variable indicator in this situation can be coded "1" if the individual has consulted a modern provider; otherwise "0." Consequently, the demand for health care by the individual **i** is measured by the probability of entering the modern sector, $\mathbf{P_i}$. The empirical model whose results are presented in this subsection is based on the premise that two individuals with different economic, demographic and social characteristics, say $\mathbf{X_i}$, will not be equally likely to enter the modern sector: for example, all other things being equal, the probability that a wealthy patient will resort to the modern health sector for treatment of an illness is greater than that of a poor patient entering the same sector.

For purposes of statistical estimation, the logistical model was generally used to summarize the relationship between the probability $\mathbf{P_i}$ and the characteristics $\mathbf{X_i}$ of the individual **i** (see Annex). The logistical model is thus written:

$$\ln\{\text{Prob}[Y_i = 1] / \text{Prob}[Y_i = 0]\} = \alpha + \beta X_i$$

where Y_i = 0, if the individual did not enter the modern health sector;
= 1, if the individual sought care from a modern provider.

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[1] Of the 14,522 individuals who reported having been ill during the 30 days preceding the enumerator's visit to their household, 5,334, or 36 percent, said they had received care at home; 492, or 3 percent, reported having first received care from a traditional medicine-man or marabout. Given the low incidence of the alternative "traditional medicine-man or marabout," this category was combined, in the analyses carried out under the present study, with the alternative "care at home."

The estimate of each coefficient ß measures, respectively, the effect of the associated independent variable x_i on the probability of entry into the modern health sector for treatment of an illness. The findings for rural areas are presented first, followed by those for urban areas.

4.1.2 Rural areas

Of the 6,331 individuals in rural areas who stated they had been ill during the 30 days prior to the visit by the enumerator, 50 percent used the services of a modern care provider to treat their illness. Virtually all individuals who did not resort to the modern sector received care at home (see Note 1). The results of the logistical regression are presented in ***Exhibit D-3*** of Annex D. It can be seen that, in rural areas, the factors that significantly determine entry into the modern health sector are the time needed to reach the nearest service, per capita household income, demographic variables, and geographic variables. The marginal effects of these variables on the probability of seeking care in the event of sickness are summarized in ***Exhibit 4-1***.

The marginal effect of charges for visits to modern care providers on the probability of entering the modern sector is measured by the elasticity of such probability to the respective charges for visits to the different providers. For example: an increase of 100 percent in charges for visits to private providers in rural areas would produce a 3.4 percent drop in the probability of entering the modern sector. This supports the finding that charges for visits do not appear to play a major role in the decision to enter the modern sector in search of treatment. When private sector prices and those of the health posts increase, the use of modern services declines, as expected, even if the effects of these two variables are not significant. On the other hand, the positive effect of charges in the tertiary and secondary public sectors (hospitals and health centers) in rural areas could indicate that the services of hospitals and health centers are perceived by patients as being of good quality in a rural setting dominated by health posts and booths. This weakness is essentially related to substitution effects as between different modern care providers, as we shall see in ***Section 4.2***.

If prices constitute an instrument of qualitative rationing of health care, access time is seen to ration care in quantitative terms. The longer the time (in minutes) needed to reach the nearest service, the less health services are used. A 100-percent increase in access time to health facilities produces a 25-percent lower probability of entry into the modern sector in rural areas.

Household income is one of the most significant determinants of entry into the modern sector in rural areas. Increases in household income result in greater use of modern services: a 100-percent increase in household income raises the probability of entry into the modern sector by 26 percent.

Institutional determinants have only a weak effect on the likelihood of entry into the modern sector in rural areas: this is chiefly due to the small size of the subpopulations of wage earners in the modern sector in those areas. Nevertheless, the effect of the HH's professional standing, even though it may not be very significant, does work in the direction expected: patients from a household led by an independent worker, who constitute a majority in the countryside, use the modern sector less than patients from households led by wage earners in the public or private sector.

Children and adults tend to use modern services more than the elderly. The effect of age is noticeably more significant among boys and girls aged below 5 years, and among women of reproductive age, than among those aged 50 and over. In fact, in rural areas, in the case of a boy aged below 5 years and

a person aged 50 or over with the same characteristics other than age and sex, the probability of the boy entering the modern sector when ill is 22 percent higher in absolute terms than for the elderly person. It is conceivable that the effects of age on the probability of entering the modern sector reflect the pricing effects on demand for care: indeed, if the anticipated fees for visits and payments for drugs are on average lower for a sick child than for an adult or elderly person, the likelihood of resorting to the modern sector would probably be higher for children than for adults.

All other things being equal, the educational level of the head of household does not appear to affect the probability of the household members resorting to the modern sector in search of health care.

Residence in the rural zone of Dakar (rural community of Sangalcam and Sébikotane) correlates positively, albeit only modestly, with greater use of the modern sector. On the other hand, residence in the West Central (Thiès, Louga and Fatick) and East Central (Kaolack and Diourbel) regions has a negative correlation with resort to the modern health sector, compared with residence in the Northeast region (Saint-Louis and Tambacounda). Patients living in rural areas in Casamance do tend to use the modern health sector, a fact explained by the presence of Catholic services, especially in the Ziguinchor region.

These results are consistent with the data on the availability of health services by region, which are summarized in ***Exhibit A-2***. Aside from the region around Dakar, the regions of Saint-Louis and Tambacounda, the Thiès region, and the Ziguinchor region are relatively better equipped with health centers and posts than the other regions of the country.

4.1.3 Urban areas

The independent variables used in the regressions for urban areas were the same as those for 1 rural area, except for education, which comprises more categories (no schooling, primary, first cycle of secondary, second cycle of secondary, and higher), and region of residence, which was not incorporated here. The dependent variable was defined in the same way as for rural areas.

Of the 8,191 individuals who reported having fallen ill during the month prior to the enumerator's visit to their household, 67 percent sought care from a modern provider during the same reference period. The results of the logistical regression are presented in ***Exhibit D-4*** of Annex D; they are summarized in ***Exhibit 1***.

As in rural areas, the effect of charges for visits to modern care providers on the probability of entering the modern sector is weak. In addition, the elasticity of demand for modern health care to the time needed to reach health facilities is very low: this is in contrast to the findings in rural areas. The fact that time has such a weak effect can be attributed to the relatively broad geographical coverage of health facilities and to the density of the mass transportation system in urban areas. Indeed, the average time needed to walk to a health facility is 14 minutes in urban areas, compared with an average of 48 minutes in rural areas.

Similarly, income does not appear to play in important role in the decision to seek health care in the modern sector, even though the impact of income is statistically significant, in contrast to the findings in rural areas. However, entry into the modern sector for health care is significantly sensitive to the professional standing of the head of household. After the effects of income and the other variables

have been discounted, patients from households led by wage earners in the modern public and private sectors are more likely to seek care from a modern provider than patients from households led by independent workers, who are essentially part of the informal sector, or individuals who have no occupation. This phenomenon can no doubt be traced to the health insurance institutions, corporate medical services, and other coverages for wage earners and their dependents, that are commonly available to employees in Senegal today.

EXHIBIT 4.1
Demand for Health Care
Marginal Effects of Independent Variables*
on the Probability of Entry into the Modern Health Sector

Variables	Rural Areas	Urban Areas
Elasticity		
Private fees	-.034	.115
Fees at hospitals and public HCs	.183	-.085
Fees at HPs and pub. dispensaries	-.054	-.068
Time	-.253	-.047
Income	.264	.096
Marginal Effects		
Professional standing (HH)		
Independent	-.022	-.027
Public sector wage earner	.042	.108
Private sector wage earner	.011	.064
Marginal Effects		
Males		
< 5 years	.215	.248
5-14 years	.058	.131
15-49 years	.075	.060
Females		
< 5 years	.172	.139
5-14 years	.069	.060
15-49 years	.159	.090

* The marginal effects of the independent variables were calculated using the results of the adjusted models presented in Annex D. For a given independent variable **X**, the marginal effect on the probability of entering the modern sector (**P**) was measured by calculating the derivative:

$dP/dX = \beta_x.P(1-P)$.

In the case of economic determinants, elasticity was measured by calculating the average value of the independent variable **X** in:
$(X/P)(dP/dX) = \beta_x.X(1-P)$;

For income, the natural logarithm for which was incorporated into the models, the elasticity of demand was calculated by $\beta_x.(1-P)$.

The same patterns of relationships between entry into the modern sector and individuals' demographic characteristics that are found in rural areas are replicated in the cities. Children below the age of 5 and women of reproductive age have a higher propensity to resort to the modern health sector than other demographic groups in urban areas.

In summary, the data from the PS suggest that in rural areas the chief economic determinants of entry into the modern health sector for the treatment of illness are the time needed to reach health facilities and household income. Within the range of fees for visits charged by the different modern care providers in rural areas, the effects of pricing on resort to the modern sector are weak. The only economic determinant which appears to have an effect on the probability of entry into the modern sector in urban areas is household income: this effect, however, is relatively weak in comparison with that found in rural areas. Moreover, access to modern care providers in urban areas is significantly affected by the professional standing of the head of household. The relationships between demographic characteristics of patients and resort to the modern sector are comparable between rural and urban areas. Children below the age of 5 and women of childbearing age have higher probabilities of entering the modern sector than do other demographic groups.

4.2 CHOICE OF CARE PROVIDER

Health care providers comprise traditional medicine-men and marabouts, public health booths and posts, health centers and public hospitals, private services encompassing private clinics, Catholic services, corporate medical services, pharmacists, and private neighborhood nurses. Bearing in mind the needs of the study and the limitations of the data from the PS (see subsection 3.3), these providers were grouped into four main categories: the category "**no care in the modern sector**," comprising care in the home and from traditional medicine-men and marabouts (see Note 1), "**private modern care providers**," "**public hospitals and public health centers**," which form the upper and middle layers, respectively, of the pyramid of public health infrastructure, and "**health posts and public dispensaries**," which form the bottom layer. The results presented in this subsection describe the factors that influence how patients choose among these different alternatives as they seek treatment for their illnesses.

4.2.1 Empirical model

In their search for treatment, individuals and their households had a number of alternative providers to choose from, whose care varies in quality, effectiveness and price.[2] Their choices were constrained by the financial resources at their disposal and their knowledge of the technologies available to treat their illness. In addition, the choice of provider varied depending on the social and demographic characteristics of the individual and his household. For example, dependents of heads of household employed in the modern sector of the economy enjoy health insurance coverage, or other institutional arrangements, that guarantee them access to particular care providers, which undoubtedly influenced their choice of provider.

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[2] This investigation was conducted without the benefit of information on the quality of care dispensed by the alternative providers, still less on the effectiveness of the care they provided: consequently, in view of the differences in quality between private and public health services, these constraints are bound to be reflected in the results of the analysis, especially in the observed effects of pricing variables of the different care providers on the likelihood of a particular choice (Bitran et al., 1994).

A polynomial model was constructed to identify the determinants of choice of provider in rural and urban areas, respectively. Using the alternative "**no care in the modern sector**" as benchmark, the polynomial model was written as follows:

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private care provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary.

Parameters α_j and β_j are associated with alternative j. Parameters β_j measure, respectively, the effect of the associated independent variable x_i on the probability that the individual i will select alternative j. The results of the polynomial regressions for rural and urban areas are presented in ***Exhibits D-5*** and ***D-6***, respectively, of Annex D and summarized in ***Exhibit 4-2***.

4.2.2 Rural areas

Of the 6,331 individuals in rural areas who stated they had fallen ill during the 30 days preceding the visit by the enumerator, 50 percent did not seek care in the modern sector; 6 percent sought care from a private modern provider; 8 percent sought care from a hospital or public health center; and 36 percent sought care at a health post or public dispensary. In other words, the choice of care provider in rural areas is basically whether or not to resort to the modern sector;[3] accordingly, the findings presented in the preceding subsection summarize quite accurately the behavior of the demand for care in rural areas. It is interesting, however, to examine the relationships between the economic determinants and the choice of care provider.

Among the variables used to measure charges for visits, the results of the variable "fees at health posts and rural public dispensaries" suggest that the effects of quality must have skewed the findings: indeed, if patients perceive the fees charged for visits to rural health posts as signals of a better quality of service, the results obtained would be consistent. This would explain why the measurements of elasticity to fees at public health posts are in the opposite direction to what one might expect.

The results obtained with the prices of the "private" and "hospital or public health center" alternatives, however, are quite consistent. In rural areas, a 10-percent increase in the fees for private visits produces a 14-percent lower probability that a private care provider will be chosen; similarly, a 10-percent increase in fees for private visits yields a 3-percent higher probability that a public health post will be selected. Moreover, a 10-percent rise in fees for visits to hospitals and public health centers lowers by 8 percent the likelihood that a hospital or public health center will be selected, while increasing by 8 percent the probability of a public health post being chosen. These findings are highly consistent with the theory of demand for health care: they suggest the prevalence of a substitution effect among the various care providers depending on variations in charges for visits to them

[3] It was precisely the disparity in this phenomenon as between rural and urban areas that prompted stratification of the analysis of health care demand in this study.

The findings with respect to the effects of income are interesting on more than one count. The low income elasticity of the choice "private care provider" is linked to the fact that this alternative is seldom found outside the Dakar region and urban areas: indeed, it is virtually confined to the not-for-profit Catholic health services, which charge curative-visit fees on a par with those of the regional hospitals (Bitran et al., 1994). Income elasticity measurements for choices involving public care providers, however, are relatively high. The income elasticity of demand for services from hospitals and public health centers is almost twice as high as that for services from public health posts.

4.2.3 Urban areas

Given the extensive presence of private care providers in the cities, there is a much greater wealth of data on determinants of the choice of provider in urban than in rural areas. Of the 8,191 individuals in urban areas who reported being ill during the 30 days prior to the visit by the enumerator, 33 percent did not seek care in the modern sector; 17 percent sought care from a modern private provider; 25 percent sought care at a hospital or public health center; and 25 percent from a health post or public dispensary. In other words, in terms of the number of people using modern health services, the three main kinds of modern care providers defined in this study have roughly equal shares of the modern health care market in urban areas.

Pricing, household income, demographic variables, and professional standing of the HH are the most significant factors in determining what modern care providers are selected in urban areas. The effects of these determinants of provider choice are discussed in turn in the paragraphs which follow.

In the absence of quality measurements, the high fees charged for visits to private care providers seem to be perceived by patients as indicators of a superior quality of service. This accounts for the positive elasticity between the choice of private provider and fees for private visits. More consistently, however, a 10-percent increase in fees for visits to hospitals and public health centers results in a 4-percent higher probability of a private care provider being chosen. This substitution effect between private providers, on the one hand, and hospitals and health centers, on the other, is corroborated by the cross-elasticity between the choice of hospitals and public health centers and the fees charged in the private sector: indeed, a 10-percent increase in fees for visits charged in the private sector results in a 5-percent greater probability that hospitals or public health centers will be selected. Finally, a 10-percent increase in fees at hospitals or public health centers lowers by 4 percent the probability that patients will select this type of care provider when seeking treatment.

Unlike the findings with respect to entry into the modern sector, a 10-percent increase in the time needed to reach public health posts lowers by 4 percent the likelihood of patients choosing this type of service. In other words, the demand for services from public health posts is sensitive to access time in both rural and urban areas. This finding in urban areas is probably attributable to the scope for substitution available not only from private care providers but also from public health centers.

EXHIBIT 4-2
Demand for Health Care
Marginal Effects of Independent Variables*
on the Probability of Selecting a Given Type of Care Provider in the Modern Sector

VARIABLES	RURAL AREAS			URBAN AREAS		
	Private	Public: Hospital+HC	Public: HP+Dispensary	Private	Public: Hospital+HC	Public: HP+Dispensary
Elasticity						
Private fees	-1.400	-.222	.288	.104	.452	-.243
Fees at hospitals and public HCs	.752	-.818	.841	.400	-.418	-.085
Fees at HPs and pub. dispens.	-3.061	-.425	.308	-.080	-.287	.224
Time	-.427	.016	-.292	.126	.106	-.383
Income	.048	.230	.132	.385	.192	-.299
Marginal Effects						
Professional standing (HH)						
Independent	-.025	-.011	.019	.007	-.087	.059
Public sector wage earner	.081	-.028	-.128	.081	-.008	.027
Private sector wage earner	.078	-.031	.009	.096	-.156	.103
Males						
< 5 years	.045	.007	.193	.051	-.043	.218
5-14 years	-.001	-.012	.077	-.009	-.036	.177
15-49 years	.026	-.010	.085	-.021	.019	.006
Females						
< 5 years	.060	-.020	.146	-.018	-.034	.195
5-14 years	-.019	-.032	.118	.013	-.106	.155
15-49 years	.013	.030	.137	-.008	-.008	.114

* In the context of the polynomial model, the probability of the alternative j (P_j) being selected is written: $P_j = \exp(\beta_j.X) / \Sigma_j \exp(\beta_j.X)$, where j=0,1,2,3. For a given independent variable **X**, the marginal effect on the probability of alternative j (P_j) being selected is measured by calculating the derivative: $dP_j/dX = P_j(\beta_j - \Sigma_j \beta_j.P_j)$, where j=0,1,2,3.

In the case of economic determinants, elasticity was measured by calculating the average value of the independent variable **X** in: $(X/P_j)(dP_j/dX) = X(\beta_j - \Sigma_j \beta_j.P_j)$: for income, the natural logarithm was incorporated into the models, the elasticity of demand was calculated by: $(\beta_j - \Sigma_j \beta_j.P_j)$.

The relationships between household income and choice of modern care providers indicate that the services of public health posts are perceived as being of poor quality in urban areas. Indeed, a 10-percent increase in income results in a 3-percent lower probability of patients selecting a public health post. This contrasts with the increased probability of alternative providers being chosen as household income rises. Even with these alternatives, it can be seen that the effect of income on demand for services from private care providers is twice as large as its effect on demand for services from hospitals and public health centers. Indeed, a 10-percent increase in household income increases the likelihood of a hospital or public health center being selected by only 2 percent; moreover, a 10-percent increase in household income makes it 4-percent more likely, all other things being equal, that a private care provider will be selected.

As might be expected, the likelihood of patients opting for private care providers is higher when they belong to a household led by either a public or a private sector wage earner, after allowing for the effect of household income. Moreover, patients from households led by private sector wage earners or independent workers — most of whom are employed in the informal sector — make less use of hospitals and public health centers than do patients from households led by civil servants or unemployed persons. The same finding can be made with respect to the selection of public health posts.

The choice of a modern care provider is highly sensitive to the demographic characteristics of individuals. By and large, individuals below 50 years of age, both male and female, are less likely to opt for hospitals and public health centers than those 50 and over. On the other hand, the opposite is observed with respect to the choice of public health centers. This contrast is consistent with the fact that the different levels of the public health system specialize in primary, secondary and tertiary care, respectively.

In summary, the general lack of private alternatives and the high levels of fees in the public health system restrict the choice of care provider when patients seek care from public health posts in rural areas. The findings in rural areas, however, do suggest that rural patients are quite sensitive to the fees charged by the different care providers. In urban areas, the findings show that the services of hospitals and public health centers, on the one hand, and of private care providers, on the other, are seen by patients as substitutes. However, in urban settings, the income-elasticity of demand for private services is twice as high as that for services from hospitals and public health centers: moreover, the negative elasticity of demand for services from public health posts indicates that these services are perceived by patients as being of poor quality. Aside from the economic determinants of demand for health care and choice of provider, the existence of health insurance systems for dependents of wage earners in the private and public sectors has a marked influence on the choice of provider: covered patients use the services of private care providers more than those without such coverage.

5.0 QUANTITY OF CARE SOUGHT

The quantity of care was measured by the number of health-related visits taking place during the 30 days preceding the enumerator's visit. This analysis is limited to the number of persons who reported that they had been ill during this period and had consulted a modern sector care provider during their initial visit. The vast majority of patients paid only one visit, so that the distribution of the number of visits shows a long queue to the right. To comply with the normality hypothesis of the dependent variable, the logarithm of the number of visits was incorporated into a linear regression model. The results are presented in ***Exhibits D-8*** and ***D-9*** and summarized in ***Exhibit 5-1***.

EXHIBIT 5-1
Demand for Health Care
Marginal Effects of the Independent Variables
on the Quantity of Care Sought in the Modern Health Sector
(Individuals Entering the Modern Sector)

Variables	Rural areas	Urban areas
Economic Determinants (Elasticity)		
Time	-.020	-.008
Income	.060	-.019
Institutional Determinants (Marginal Effects)		
Professional standing (HH)		
Independent	.048	-.010
Public sector wage earner	-.185	-.140
Private sector wage earner	-.180	-.038
Demographic Determinants (Marginal Effects)		
Males		
< 5 years	-.025	-.004
5-14 years	-.088	-.036
15-49 years	.002	-.023
Females		
< 5 years	-.050	.001
5-14 year	-.093	.015
15-49 years	.084	.010

5.1 RURAL AREAS

Although the model constructed fits the data, there is only a small degree of variation (about 4 percent) in the dependent variable which the model plots. The time needed to reach the nearest provider has a significant effect on the quantity of care sought: the longer a patient takes to reach the closest health service, the fewer visits there are. Moreover, income has a very positive effect. As people living in the countryside always have to pay for their health care, it can be appreciated that the more income they have at their disposal the more likely they are to seek treatment when ill.

The educational level of the HH correlates inversely to the number of visits, which declined as the educational level increased. Similarly, the number of visits went down among members of households led by public or private sector wage earners. These two relationships appear to corroborate the hypothesis whereby persons with higher educational levels are more proficient in treating illness at home and tend therefore to pay fewer visits (Dor and Van der Gaag, 1993).

5.2 URBAN AREAS

Whereas in rural areas income correlates positively with quantity of care, in urban areas the two variables correlate negatively. The quantity of care decreases, albeit not significantly, with youth. As explained earlier, the elderly need more intensive care. The quantity of care also decreases as educational levels increase, as well as among members of households led by wage earners.

In summary, the number of visits is found to vary as a function of access time to health facilities, household income, and certain demographic characteristics of individuals. It is remarkable, however, that this variability is relatively slight. The number of visits is unquestionably an aspect of health care demand that is more sensitive to other determinants, such as the seriousness of the illness or the behavior of care providers, in other words, variables not among those available from the PS data.

6.0 HEALTH EXPENDITURES

One goal of this study is to assess how much households spend on the health of their members.[4] Health-related expenditures during the 30-day reference period were reported for individuals in the "health" module of the Priorities Survey questionnaire: individual expenditures comprise payments for visits and payments for drugs. In addition, collective household expenditures, including those of individual members of the households, were recorded in the module "expenditures on non-consumption products."[5] This studies focuses its analysis on expenditures by individuals.

Expenditures on drugs and visits were calculated for the entire sample, and the results are presented in ***Exhibits D-10, D-11*** and ***D-12*** for rural areas, urban areas, and the country as a whole, respectively. It should be remembered that may people incur expenditures without being ill. Such outlays should therefore be taken into account if the aim is to assess the financial capacity of households.

6.1 ESTIMATING THE FINANCIAL CAPACITY OF HOUSEHOLDS

Expenditures were split into two main categories: those related to visits and those related to the purchase of drugs. The reference period adopted was the 30 days preceding the visit by the enumerator. Average health-related expenditures during the preceding month were calculated at CFAF 71 per individual for visits and CFAF 330 for drugs. These expenditures were higher among children and the elderly. Their pattern according to age is similar to the age distribution of morbidity rates and mortality rates. This finding confirms that health status determines, among other things, the level of expenditures.

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[4] It should be borne in mind that the Priorities Survey employed a restrictive concept of health expenditures. Apart from payments for visits and drugs, certain illness-related outlays, such as travel, lodging, subsistence and examination expenses, can run quite high. Moreover, household contributions to health insurance schemes, which ought to be included in any comprehensive definition of total private health outlays, were not included. In other words, the levels of health expenditures presented in this subsection are lower-bound estimates of the expenses incurred by households for protection against and/or treatment of illness.

[5] It is instructive to compare aggregate individual expenditures with total household expenditures:

	Average monthly household expenditures (CFAF)	
	Aggregate Expenditures	Expenditures Reported
Rural areas	1,796	1,874
Urban areas	5,359	5,900

It is noteworthy that the levels of reported total expenditures and aggregate expenditures are very close; moreover, total reported expenditures are slightly higher. On average, aggregate individual expenditures represent 91 percent of total reported expenditures in urban areas and 96 percent in rural areas. Within these two areas, these proportions vary only slightly from one income group to another. In other words, there is a highly satisfactory degree of internal consistency in the health-related data from the Priorities Survey.

Whereas per capita expenditures on visits vary very little with age, per capita spending on drugs increase with age from 15 years onward and are also high for infants.

This information can be used to estimate a household's ability to afford the costs associated with the health of its members. On the assumption that expenses are spread evenly over the year, annual per capita expenditures on drugs and visits can be estimated at CFAF 3,854 and CFAF 847, respectively. On the same working assumption, households spent some CFAF 28.9 billion on the purchase of drugs and CFAF 6.1 billion on visits.[6] Household contributions thus totaled CFAF 35 billion of health-related expenditures. These figures represent an order of magnitude of the ability of households to assume financial responsibility for their state of health. The estimates might be compared with the value of official imports of drugs, but it should be emphasized that a sizable volume of drugs flows through unofficial channels and thus bypasses the system of national accounts, even though it is part of the households' budget.

It can be seen that the cost of drugs accounts for 82% of what households spend on health. Senegal is thus no exception to the trend toward overprescribing seen throughout Africa (World Bank, 1994). The overwhelming burden of drug costs in household spending on health shows that households and individuals alike spend more on treating illness than on preventing it.

Moreover, there are major disparities between the urban and the rural population in terms of ability to pay. With only 40 percent of the population, city dwellers account for more than two-thirds (69 percent) of expenditures on drugs and 81 percent of expenditures on visits. The most expensive services are those provided by hospitals, almost all of which are located in cities.

6.2 DETERMINANTS OF HEALTH-RELATED EXPENDITURES

Regressions of health expenditures were also carried out on the basis of certain variables for persons who had paid at least one visit to a modern facility. The results are presented in ***Exhibits D-13*** and ***D-14*** of Annex D and summarized in ***Exhibit 6-1***. The variables with significant effects are: time, income, age, sex, professional standing, and region.

6.2.1 Rural areas

In rural areas, the impact of access time on health-related expenditures is positive. All other things being equal, the greater the time needed to reach the nearest health service, the more households spend on the treatment of illness. First, since access time reduces resort to modern care providers, time probably influences the composition of patients who use modern providers according to the seriousness of their illness: again, all other things being equal, if, the farther they are from health facilities, the more the patients who use the health facilities include serious cases, expenditures on health are bound to rise in step with access time. Second, it is possible that patients who live far from health facilities spend more

[6] When it was not feasible during data gathering to segregate the costs of drugs and visits — as was often the case with visits to medicine-men and marabouts — the entire expense was imputed to drugs. This may have inflated expenditures on drugs.

on buying alternative services (traditional medicine-men, marabouts); such a phenomenon lead to higher health spending as distance from health facilities increases.

EXHIBIT 6-1
Demand for Health Care
Marginal Effects of Independent Variables on Expenditures
on Visits and Drugs in the Modern Health Sector
(Individuals Entering the Modern Sector)

Variables	Rural areas	Urban areas
Economic Determinants (Elasticity)		
Time	.228	-.279
Income	.575	.822
Institutional Determinants (Marginal Effects)		
Professional standing (HH)		
Independent	-122.0	3.4
Public sector wage earner	-190.9	-394.7
Private sector wage earner	-322.8	-390.9
Demographic Determinants (Marginal Effects)		
Males		
< 5 years	-277.0	-538.3
5-14 years	-418.5	-1150.8
15-49 years	-37.6	-778.8
Females		
< 5 years	-158.2	-552.6
5-14 years	-376.5	-1077.1
15-49 years	140.8	-117.4

The income effect observed operates in the direction expected: households with greater financial resources spend more than those with fewer. A 10-percent increase in household income leads to a 6-percent increase in health spending. From this standpoint, it is interesting to note that dependents of heads of household who are civil servants or modern private sector employees spend less than others, after allowing for income and time effects.

Moreover, the demographic and social characteristics of individuals appear to influence how much they spend when they are ill. Households spend less for children than for adults and the elderly, and more for women of childbearing age. Education has no significant effect in rural areas. The effect of ethnicity is not significant either, even though both positive and negative effects are observed according to ethnic grouping. For example, the Serer and Diola tend to spend less than the other ethnic groups, whereas the Wolof tend to spend more. Households spend more in all regions than in the Northeast.

6.2.2 Urban areas

Whereas time has a positive effect in rural areas, its effect is negative in urban areas. As for income, its effect is positive and of greater magnitude in urban areas. A 10-percent increase in income in urban areas results in an 8-percent increase in health-related expenditures.

After discounting the effects of the other variables in the model, the effect of professional standing varies significantly. As might be expected, members of households led by civil servants or private sector employees, who are probably covered under one insurance scheme or another, spend less than members of households led by independent workers or by persons who are unemployed. This finding also holds good for rural areas and is fully consistent with the effect of social-security/health insurance institutions (SSHII) and that of corporate medical services in the private sector, as well as with the fact that the government pays on behalf of its employees.

The effect of age is universally negative: households spend more for the elderly, and the coefficients by sex for each age group are of the same order of magnitude. Education has a negative effect, though it not a significant one after discounting the effects of other variables, notably income.

7.0 CONCLUSIONS AND POLICY IMPLICATIONS

The present study of demand for health care in Senegal is based on data from the Priorities Survey conducted in 1991-92 by the Department of Projections and Statistics. The survey covered a probabilistic and representative nation-wide sample of 10,000 households; 86,000 individuals were interviewed as part of this operation. Aside from the large size of the sample, the study gathered information on several economic and social aspects of the households, including their use of health services and their expenditures on health. Of the 86,000 individuals surveyed, 14,500 stated that they had been ill during the month preceding the enumerator's visit to their household. The data analyzed under this study are based on the information provided by these 14,500 individuals on how they went about obtaining health care and what they spent on health during the reference period.

The results of the econometric analyses conducted as part of this study reveal that the modern private sector and the tertiary care establishments of the public health system serve primarily the relatively affluent segments of the country's urban areas. Conversely, the lower-level facilities of the public health system, the health posts and the district dispensaries, serve mainly the less well-off groups in urban areas and most rural households. This polarization of the health sector results not only from the relative costs of accessing health services and the financial constraints facing households, but also from the prevalence of third-party institutions which assume responsibility for paying the health care costs of civil servants and wage earners and their dependents in the modern sector.

The primary factor that constrains the affordability of care and determines the choice of alternative care providers is pricing. The results of this study with respect to the elasticity of demand for health care as a function of charges for visits are made less transparent not only by the method of imputing prices, but also by the absence of quality indicators for services from the different care providers. The findings reveal, however, that, in terms of the fees charged by the different providers during the survey period, the charges for visits were not so high as to discourage patients from seeking treatment from modern providers, in either rural or urban areas. The results show, however, that private care providers and hospitals and public health centers are perceived by consumers as substitutes: this phenomenon is more widespread in urban areas where the private facilities and the tertiary and secondary public facilities are located. The immediate implication of these findings is that initiatives aimed at overhauling the hospital sector and strategies for developing the private sector should be based on more detailed studies of the demand for health care in urban areas.

The time needed to reach care facilities was found to have a rationing effect as far as health services were concerned, particularly in rural areas: in urban areas, the time factor did not seem to deter patients from seeking care in the modern sector given their relatively easy physical access to facilities and the density of the local transport networks. In the rural areas, however, access time had a greater impact than price on the demand for care: people living in villages remote from care facilities face relatively higher access costs than do other social groups. The quantitative rationing of care by time and distance remains central to the issue of equity within the health system.

Although household income has only a minor effect on resort to the modern health sector in urban areas, it is one of the key determinants in rural areas, where a 100-percent increase in household income

means patients are 26 percent more likely to resort to the modern sector. Household income is a primary determinant of the choice of care provider in urban areas. The income-sensitivity of demand for the services of private care providers is twice as high as for services from hospitals and public health centers in urban settings. Moreover, the negative elasticity of demand for services from public health centers suggests that such services are seen by patients as being of poor quality. The relationships observed between income and demand for health care in rural areas, where most health care is subsidized, suggest that the more affluent groups in the rural areas capture a larger share of public subsidies than the poorer groups. The same phenomenon is prevalent in urban areas, where the level of public subsidies is higher.

Apart from the economic determinants of demand for health care and the choice of provider, this choice is significantly affected by the existence of health insurance systems for the dependents of wage earners in the private and public sectors: patients so covered make heavier use of the services of private care providers and hospitals — i.e. the most expensive care — than do patients without such coverage. The subsidization of care for beneficiaries of such systems, who make up the most affluent segment of the population and can therefore most readily afford to pay for their own health care, is seen as a central issues with respect to equity in the health system. This issue lends urgency to the need for a study of the financial performance of these third-party paying institutions.

Most of the patients treated at health posts and public dispensaries are children and women. This demographic structure of health care demand has major implications for public health in general and for the preventive and promotional programs in particular. Indeed, it could well serve the purposes of promoting mother and child health care. However, the potential health gains could be realized only if lasting improvements are made in the quality of care and if the corresponding care facilities are developed as integrated care centers.

Households spend substantial sums on health financing. For the year in which the Priorities Survey was carried out, households spent an estimated CFAF 6.1 billion on visits and 28.9 billion on the purchase of drugs, for a combined total of CFAF 35 billion. In view of the substantial resources expended on health activities by households, one of the key policy issues is to assess whether Senegalese households receive health care of a quality commensurate with what they spend. A second issue relevant to implementation of the Bamako Initiative (BI) is to find out, on the one hand, whether the BI program has reduced or increased the level of these private expenditures, and, on the other, whether recycling part of these resources through the basic health centers might serve to strengthen the capacities of these centers as part of the effort to expand preventive and promotional care.

In short, given the current structure of public health expenditures, where a large share of the budget is absorbed by the hospitals, the structure and the behavior of demand for health care raise issues related to equity of access and the efficiency of public health spending. From the equity standpoint, the well-off groups, which can most readily afford to pay for their own care, derive greater benefits from government subsidies than the less well off. Thus, if the public health system is to serve as a vehicle for transferring resources in kind from the country's most affluent to its poorest, then both the financing system and the allocation of resources need to be overhauled. From the efficiency standpoint, the predominance of infectious and parasitic diseases in the country's epidemiological profile, its widespread malnutrition, and its fertility patterns suggest that government expenditures would be more cost-effective if there were an increase in the share of the national budget earmarked for subsidies to primary care facilities, which serve 74 percent of those in rural areas and 34 percent of urban dwellers.

Implementation of the Bamako Initiative marks a step toward enhancing the efficiency of the health system, if only by raising the productivity of health personnel in the primary care facilities and stepping up preventive and promotional activities. It would be instructive, however, to find out whether its implementation is having a meaningful impact on the use not only of government resources but also of the private resources that are used to obtain health care. Its impact on the equity of the health system might be dampened unless, first, steps are taken to safeguard access to care for the poorest and, second, effective hospital financing reforms are not undertaken.

It is too early, in fact, to discern what the long-term effects of the CFAF devaluation will be on income and the cost of drugs. The results of this study show that the use of health services rises in step with household income. In theory, the devaluation ought to be reflected in an increase in the income of farmers, driven by stronger demand for local food production and by higher producer prices for such cash crops as peanuts and cotton. Since income has a positive impact on resort to the modern health sector and the use of modern services, the logical expectation in rural areas, other things being equal, would be an increase in the use of health services following devaluation. Devaluation could provide an opportunity to strengthen the capacities of the rural health centers as implementation of the Bamako Initiative becomes more widespread. But a relatively large increase in income would be needed to offset the effects of the resulting increase in the cost of drugs and the upward adjustments of fees: a helpful move in this respect would be to safeguard access to health care for the poorest by pursuing policies aimed at lowering the present financial barriers.

Reforms in hospital financing are even more important from the equity standpoint because the rationing of care due to the effect of access time is particularly pronounced in rural areas. In other words, the best strategy for improving the equity of the health system would be to expand the geographical coverage of the basic public health system in rural areas. In Senegal's current fiscal context, however, significant gains in this respect are unlikely to be forthcoming unless government resources at the hospital level are first freed up so as to ease the fiscal constraints on broadening the basic health system.

In investigative terms, it should be remembered that the present analysis is one component in a series of studies designed to diagnose the health sector as a whole, from the standpoint of both the supply of and demand for health care, in order to identify the problems inhibiting the performance of the health system and to propose solutions to the authorities. Several studies have been carried out in this area, but there are additional issues that still require in-depth study both as a foundation for health strategies and policies and to provide additional insights for decision-making:

- What impact have the improvements in health had on the epidemiological profile of urban areas? What trends are being observed in infectious and parasitic diseases, cardiovascular diseases, and chronic diseases in general?
- What impact is the CFAF devaluation having on supply and demand for health services?
- What are the relationships between the quality and pricing of services and the demand for health care?
- What impact is implementation of the Bamako Initiative having on the demand for health care?
- How good is the financial performance of the third-party institutions that underwrite health care?

ANNEXES

ANNEX A
INFORMATION ON SENEGAL'S HEALTH CARE DELIVERY SYSTEM

EXHIBITS

EXHIBIT A-1
Breakdown of Health Personnel by Category and Sector (1992)

Category	Public sector	Private sector	Total
Doctors	241	269	510
Pharmacists	35	210	245
Surgeons, dentists	63	52	115
Midwives	597	22	734
Nurses/Health employees	2,014	78	2,092
Others	2,445		2,045
TOTAL	5,385	631	6,016

EXHIBIT A-2
Regional Distribution of Health Infrastructure Facilities

Regions	District	Hospitals	Health centers	Health posts	Clinics	CPRS[a]	Consulting rooms	Institutes	Health booths
Dakar	08	07	10	74	18	12	281	04	11
Diourbel	04	01	04	57	01	3	08	0	46
Fatick	05	00	05	58	00	4	05	0	272
Kaolack	04	01	04	64	02	3	22	0	364
Kolda	03	01	03	55	00	0	06	0	83
Louga	03	01	05	53	00	2	08	0	51
St-Louis	05	03	04	133	03	2	11	0	70
Tamba	03	01	04	70	00	1	14	0	208
Thiès	07	02[b]	09	81	01	4	43	0	87
Ziguinchor	03	01	03	66	00	2	17	0	109
TOTALS	5	17	5'	711	25	33	415	4	1,301

Source: Status Report, UNICEF, 1993
[a] Centre de promotion et de réinsertion sociale (Center for Social Advancement and Rehabilitation)
[b] One private Catholic hospital

ANNEX B
DRAWING OF THE SAMPLE

The national territory was divided into 12 agro-ecological strata (see the PS report for the list of strata). The SD sample was drawn from within each stratum with a probability proportional to its size, that is, to the number of households surveyed within each SD. Let M_i be this number for SD i and M'_i the number of households recorded at the time of the census in the same SD. These two quantities will often be different owing to physical movements of the population or errors in one or the other operation. It can readily be shown that the probability of SD i being included in the sample is given by the formula:

$$p_{1i} = a\, M_i/\Sigma M_i$$

in a given stratum, where a = the actual number of SDs drawn within the stratum and the sum ΣM_i covers all the Sds in the stratum. The expression p_{1i} represents the probability with respect to the 1st sampling level and to unit i.

In each of the SDs drawn, the households would be enumerated. At the second sampling level, 20 households were to be selected in each SD by systematic drawings of equal probability. The sampling rate here would be obtained by dividing the actual number of households enumerated ($=M'_i$) by 20. The (conditional) probability of a household being drawn in an SD is thus:

$$p_{2i} = 20 / M'_i$$

The overall probability of a household appearing in the sample is the product of these two probabilities. Using the symbols:

$$F_i = p_{1i}p_{2i} = (a/\Sigma M_i)\,(20\, M_i/M'_i)$$

It should be noted that, where $M_i = M'_i$, this probability is constant for all the households in the stratum. A sample of this type is termed "self-weighted" within the strata. But since in fact M_i et M'_i are different, the data need to be weighted during analysis by the following coefficients:

$$W_i = 1 / F_i = (\Sigma M_i/a)\,(M'_i / 20M_i)$$

These weights need to be calculated for each SD in the sample and recorded in the survey data sheets.

ANNEX C
DETERMINATION OF PRICES

This annex documents the way in which the prices used in the analysis were determined. Given the absence of collective information on the fees charged by the various care providers at the cluster level in the Priorities Survey, this study took advantage of the data structure and information available on patients' payments for medical visits. Several of the patients who visited different care providers paid only one visit: payments made by patients who paid only one visit to a given type of provider provide a good approximation of the fees or prices charged by that provider. In the sample as a whole, 473 of the patients making their first visit to a private provider paid only one visit; 813 patients visited a public hospital or public health center; and 1,410 patients visited a health post or public dispensary.

The information gathered on payments made for their visit by patients who paid only one visit to a given care provider were used to arrive at an approximation of the average fees charged in the modern private sector (PRIVP), in the public sector at the level of the health centers and hospitals (PUBLP1), and finally in the public sector at the level of the health posts and dispensaries (PUBLP2). Typically, the fees charged by different providers vary depending on the place of residence (urban or rural) and the region of residence; moreover, the fees vary according to patients' demographic characteristics, namely sex and age.

The information on the variability of fees among the different care providers according to these geographical characteristics of the survey clusters and to the demographic characteristics of individuals was used to construct a hedonic price model for each type of provider. The resulting equations were subsequently used to determine the average fees per visit to each type of provider for the 498 survey clusters (the equations are presented in ***Exhibits C-1, C-2*** and ***C-3***.

EXHIBIT C-1
Determination of Prices in the Private Modern Sector: Ln(PRIX) = a + bX

Variables in the Equations

Variable	Coefficient B	SE B	Beta	T	Sig T
Fatick	1.366700	.772977	.125489	1.768	.0777
Tambacounda	-.473347	1.564081	-.013245	-.303	.7623
Saint-Louis	1.295045	.866395	.088295	1.495	.1357
Louga	1.116908	.814755	.087741	1.371	.1711
Ziguinchor	1.094100	.740446	.116802	1.478	.1402
Below age 5	-.527893	.223498	-.141810	-2.362	.0186
Thiès	1.826262	.668346	.367625	2.733	.0065
Male	-.020679	.134712	-.006290	-.154	.8781
Dioubel	.992525	.677422	.171997	1.465	.1436
Kaolack	1.049209	.671529	.214235	1.562	.1189
5-14 years	-.680075	.234477	-.168549	-2.900	.0039
Rural residents	-1.034284	.208182	-.245204	-4.968	.0000
15-49 years	-.062282	.213798	-.018552	-.291	.7709
Dakar	2.131906	.655453	.644671	3.253	.0012
(Constant)	5.501738	.687973		7.997	.0000

Multiple R .52346

EXHIBIT C-2
Determination of Prices in the Hospital and
Public Health Center Sector: Ln(PRICE) = a + bX

Variables in the Equations

Variable	Coefficient B	SE B	Beta	T	Sig T
Fatick	.403404	.288106	.048783	1.400	.1618
Below age 5	-.873747	.138234	-.285428	-6.321	.0000
Saint-Louis	.845774	.203195	.169949	4.162	.0000
Diourbel	1.795224	.253821	.255570	7.073	.0000
Tambacounda	.534068	.228068	.089100	2.342	.0194
Louga	.822993	.261562	.113044	3.146	.0017
Male	-.034056	.080604	-.013130	-.423	.6728
Ziguinchor	.393143	.206049	.082653	1.908	.0567
Thiès	1.179240	.186035	.294380	6.339	.0000
5-14 years	-.865817	.140548	-.277222	-6.160	.0000
Kaolack	.886456	.183803	.232084	4.823	.0000
Rural residents	-.408395	.118121	-.130488	-3.457	.0006
15-49 years	-.072990	.126837	-.028243	-.575	.5651
Dakar	1.223537	.167212	.464604	7.317	.0000
(Constant)	5.103347	.195131		26.153	.0000

Multiple R .50711

EXHIBIT C-3
DETERMINATION OF PRICES IN THE HEALTH POST AND PUBLIC DISPENSARY SECTOR
Ln(PRICE) = a + bX

Variables in the Equations

Variable	Coefficient B	SE B	Beta	T	Sig T
Fatick	.261879	.085482	.109059	3.064	.0022
15-49 years	-.041499	.061247	-.028149	-.678	.4982
Ziguinchor	.141046	.102884	.042769	1.371	.1706
Louga	.216594	.100319	.066586	2.159	.0310
Tambacounda	.054349	.096808	.017584	.561	.5746
Thiès	.555777	.092146	.204689	6.031	.0000
Male	-.066738	.034015	-.047033	-1.962	.0500
Saint-Louis	.118971	.087269	.048545	1.363	.1730
Rural residents	-.161599	.042769	-.113915	-3.778	.0002
Kaolack	.225696	.080553	.113727	2.802	.0052
5-14 years	-.522565	.063150	-.327616	-8.275	.0000
Dioubel	.077350	.081022	.037547	.955	.3399
Below age 5	-.577618	.062545	-.367406	-9.235	.0000
Dakar	.500588	.084753	.302465	5.906	.0000
(Constant)	4.848575	.098466		49.241	.0000

Multiple R .49047

ANNEX D
RESULTS

EXHIBIT D-1
Distribution of Selected Variables Over the Entire Sample

Total	Rural areas Numbers as %		Urban areas Numbers as %		Combined Numbers as %	
	36,035	100.0%	45,901	100.0%	81,936	100.0%
REGION						
Dakar	479	1.3	27,649	60.2	28,128	34.3
Ziguinchor	1,597	4.4	2,383	5.2	3,980	4.9
Diourbel	4,345	12.1	2,018	4.4	6,363	7.8
Saint-Louis	5,022	13.9	3,078	6.7	8,100	9.9
Tambacounda	2,855	7.9	686	1.5	3,541	4.3
Kaolack	6,027	16.7	2,744	6.0	8,771	10.7
Thiès	4,109	11.4	4,959	10.8	9,068	11.1
Louga	4,013	11.1	971	2.1	4,984	6.1
Fatick	3,939	10.9	636	1.4	4,575	5.6
Kolda	3,649	10.1	777	1.7	4,426	5.4
ETHNIC GROUP OF THE HEAD OF HOUSEHOLD						
Wolof	15,783	43.8	23,079	50.3	38,862	47.4
Pular	9,355	26.0	8,555	18.6	17,910	21.9
Serer	5,408	15.0	4,697	10.2	10,105	12.3
Diola	1,322	3.7	2,379	5.2	3,701	4.5
Mandingue	1,594	4.4	1,891	4.1	3,485	4.3
Soninké	624	1.7	1,237	2.7	1,861	2.3
Others	1,849	5.1	4,063	8.9	5,912	7.2
PROFESSIONAL STANDING OF THE HEAD OF HOUSEHOLD						
Independent	30,558	84.4	16,293	35.5	46,851	57.2
Civil servant	372	1.0	5,842	12.7	6,214	7.6
Priv.sector wage earner	1,039	2.9	8,361	18.2	9,400	11.5
Employer	913	2.5	722	1.6	1,635	2.0
Domestic servant	92	0.3	87	0.2	179	0.2
Unemployed	2,961	8.2	14,596	31.8	17,557	21.4
EDUCATIONAL LEVEL OF THE HEAD OF HOUSEHOLD						
No schooling	33,818	93.8	28,886	62.9	62,704	76.5
Primary schooling	1,539	4.3	7,305	15.9	8,844	10.8
1st cycle secondary	293	0.8	4,196	9.1	4,489	5.5
2nd cycle secondary	158	0.4	2,405	5.2	2,563	3.1
Higher	127	0.4	3,109	6.8	3,236	4.0
SEX OF RESPONDENT						
Male	17,133	47.5	22,373	48.7	39,506	48.2
Female	18,802	52.2	23,528	51.3	42,330	51.7

EXHIBIT D-2a
Statistics Used in Defining the Variables Included in the Model for Resort to the Modern Sector and the Choice of Provider Model
RURAL AREAS

Variable	Average	Standard error	Cases	Tag
DEPENDENT VARIABLES				
USEDM	.50	.50	6,331	Used modern services
CHOICE10	.50	.50	6,331	Did not use modern services
CHOICE11	.05	.22	6,331	Choice: Modern private service
CHOICE12	.07	.26	6,331	Choice: Hospitals or public HCs
CHOICE13	.37	.48	6,331	Choice: HPs or public dispensaries
INDEPENDENT VARIABLES				
Economic determinants				
PRIVP	339.77	334.16	6,331	Price: Private visit
PUBLP1	244.00	183.01	6,331	Price: Visit to hospitals and public HCs
PUBLP2	97.73	20.83	6,331	Price: Visit to HPs or public dispensaries
TIME	48.14	41.30	6,331	Access time (min) to nearest PHF
LNINC	8.08	.81	6,331	Per capita household expenditures (ln)
Demographic determinants				
MCHILD	.12	.33	6,331	Boys 0-4 years
M5-14	.13	.34	6,331	Boys 5-14 years
M5-49	.13	.34	6,331	Men 15-49 years
FCHILD	.11	.31	6,331	Girls 0-4 years
F5-14	.11	.32	6,331	Girls 5-14 years
F15-49	.23	.42	6,331	Women 15-49 years
MF50	.17	.37	6,331	Individuals 50 years+: reference
Knowledge and schooling				
PRIMARY	.06	.23	6,331	HH Primary education
SECONDARY	.02	.15	6,331	HH Secondary education
NONE	.92	.27	6,331	HH No schooling: reference
Institutional determinants				
SAL1	.86	.35	6,331	HH Self-employed
SAL2	.01	.10	6,331	HH Public sector wage earner
SAL3	.03	.17	6,331	HH Private sector wage earner
SAL0	.10	.30	6,331	HH Other statuses: reference

(continued on next page)

EXHIBIT D-2a
Statistics Used in Defining the Variables Included in the Model for Resort to the Modern Sector and the Choice of Provider Model
RURAL AREAS

Variable	Average	Standard error	Cases	Tag
Other determinants				
ETH1	.41	.49	6,331	HH Wolof
ETH2	.25	.44	6,331	HH Pular
ETH3	.17	.38	6,331	HH Serer
ETH4	.04	.20	6,331	HH Dioia
ETH5	.05	.22	6,331	HH Mandingue
ETH6	.07	.25	6,331	HH Other ethnic groups: reference
GREG1	.01	.08	6,331	Dakar
GREG2	.30	.46	6,331	West Central
GREG3	.31	.46	6,331	East Central
GREG5	.20	.40	6,331	South (Casamance)
GREG4	.18	.39	6,331	Northeast: reference

EXHIBIT D-2b

Entry into the Modern Sector: Urban Areas—Results of the Logistical Regression Model (Individual Patients)

$\ln\{Prob[Y_i = 1] / Prob[Y_i = 0]\} = \alpha + \beta X_i$

where $Y_i = 0$, if the individual did not resort to the modern health sector; and
$= 1$, if the individual sought care from a modern provider

Variable	Average	Standard error	N	Tag
USEDM	.67	.47	8,191	Used modern services
CHOICE10	.33	.47	8,191	Did not use modern services
CHOICE11	.18	.39	8,191	Choice: Modern private service
CHOICE12	.26	.44	8,191	Choice: Hospitals or public HCs
CHOICE13	.23	.42	8,191	Choice: HPs or public dispensaries
PRIVP	1,159.03	609.48	8,191	Price: Private visit
PUBLP1	369.98	158.63	8,191	Price: Visit to hospitals and public HCs
PUBLP2	138.10	36.52	8,191	Price: Visit to HPs or public dispensaries
TIME	14.46	6.60	8,191	Access time (min) to nearest PHF
LNINC	9.41	.80	8,191	Per capita household expenditure (ln)
MCHILD	.11	.31	8,191	Boys 0-4 years
M5-14	.11	.32	8,191	Boys 5-14 years
M15-49	.18	.38	8,191	Men 15-49 years
FCHILD	.10	.30	8,191	Girls 0-4 years
F5-14	.11	.31	8,191	Girls 5-14 years
F15-49	.26	.44	8,191	Women 15-49 years
MF50	.14	.35	8,191	Individuals 50+ years: reference
EDU1	.15	.36	8,191	HH Primary education
EDU2	.10	.29	8,191	HH First cycle secondary education
EDU3	.06	.24	8,191	HH Second cycle secondary education
EDU4	.08	.27	8,191	HH Higher education
EDU0	.62	.49	8,191	HH No schooling: reference
SAL1	.35	.48	8,191	HH Self-employed
SAL2	.15	.35	8,191	HH Public sector wage earner
SAL3	.18	.39	8,191	HH Private sector wage earner
SAL0	.32	.47	8,191	HH Other statuses: reference
ETH1	.48	.50	8,191	HH Wolof
ETH2	.20	.40	8,191	HH Pular
ETH3	.11	.31	8,191	HH Serer
ETH4	.06	.23	8,191	HH Diola
ETH5	.04	.20	8,191	HH Mandingue
ETH6	.12	.32	8,191	HH Other ethnic groups: reference

EXHIBIT D-3

Entry into the Modern Sector: Rural Areas—Results of the Logistical Regression Model (Individual Patients)

$\ln\{Prob[Y_i = 1] / Prob[Y_i = 0]\} = \alpha + \beta X_i$

where $Y_i = 0$, if the individual did not resort to the modern health sector; and
$= 1$, if the individual sought care from a modern provider

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P value
Constant	-4.59630	0.89020	-5.163	0.010	0.000***
Private fees	-0.00020	0.00015	-1.312	1.000	0.190
Fees at hospitals and public HCs	0.00154	0.00068	2.255	1.002	0.024**
Fees at HPs and pub. dispensaries	-0.00114	0.00348	-0.329	0.999	0.742
Access time	-0.01055	0.00226	-4.666	0.990	0.000***
Household income (log)	0.52788	0.08072	6.540	1.695	0.000***
Boys 0-4 years	0.97358	0.18120	5.373	2.647	0.000***
Boys 5-14 years	0.26011	0.17200	1.512	1.297	0.131
Men 15-49 years	0.33893	0.17890	1.894	1.403	0.058*
Girls 0-4 years	0.77733	0.19090	4.072	2.176	0.000***
Girls 5-14 years	0.31146	0.18160	1.715	1.365	0.086*
Women 15-49 years	0.71946	0.14910	4.826	2.053	0.000***
HH primary education	-0.03775	0.18540	-0.204	0.963	0.839
HH secondary-and-above education	-0.39001	0.42740	-0.912	0.677	0.362
HH Self-employed	-0.08723	0.16010	-0.545	0.916	0.586
HH Public sector wage earner	0.16614	0.76120	0.218	1.181	0.827
HH Private sector wage earner	0.04252	0.29630	0.143	1.043	0.886
HH Wolof	0.23843	0.26370	0.904	1.269	0.366
HH Pular	0.20384	0.25690	0.793	1.226	0.428
HH Serer	0.23856	0.29130	0.819	1.269	0.413
HH Diola	-0.08532	0.33740	-0.253	0.918	0.800
HH Mandingue	0.90423	0.45890	1.971	2.470	0.049**
Dakar	0.45501	0.41040	1.109	1.576	0.268
West Central	-5.18310	1.76900	-2.930	0.006	0.003***
East Central	-1.14700	0.33790	-3.394	0.318	0.001***
South	0.79702	0.29750	2.679	2.219	0.007***

Log-Likelihood..... -1,282.846
Chi-Squared (25)..... 2,941.464
Significance Level..... 000.000
No. of observations..... 6,331.000

*** Statistically significant at a level of 0.01 = 1%
** Statistically significant at a level of 0.05 = 5%
* Statistically significant at a level of 0.10 = 10%

EXHIBIT D-4

Entry into the Modern Sector: Urban Areas—Results of the Logistical Regression Model
(Individual Patients)

$\ln\{Prob[Y_i = 1] / Prob[Y_i = 0]\} = \alpha + \beta X_i$

where $Y_i = 0$, if the individual did not enter the modern health sector; and
$= 1$, if the individual sought care from a modern provider

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P value
Constant	-2.23540	0.79490	-2.812	0.107	0.005c
Private fees	0.00025	0.00010	2.483	1.000	0.013b
Fees at hospitals and public HCs	-0.00067	0.00050	-1.335	0.999	0.182
Fees at HPs and pub. dispensaries	-0.00148	0.00166	-0.892	0.999	0.372
Access time	-0.00988	0.01046	-0.944	0.990	0.345
Household income (log)	0.29127	0.07504	3.881	1.338	0.000c
Boys 0-4 years	0.99317	0.21350	4.651	2.700	0.000c
Boys 5-14 years	0.52399	0.21060	2.489	1.689	0.013b
Men 15-49 years	-0.02196	0.17130	-0.128	0.978	0.898
Girls 0-4 years	0.55516	0.20510	2.706	1.742	0.007c
Girls 5-14 years	0.23817	0.19700	1.209	1.269	0.227
Women 15-49 years	0.35893	0.15900	2.258	1.432	0.024b
HH Primary education	0.27177	0.14480	1.877	1.312	0.061a
HH 1st cycle secondary education	-0.16253	0.17610	-0.923	0.850	0.356
HH 2nd cycle secondary education	-0.09184	0.18990	-0.484	0.912	0.629
HH Higher education	-0.48751	0.18790	-2.595	0.614	0.009c
HH Self-employed	-0.12152	0.13060	-0.930	0.886	0.352
HH Public sector wage earner	0.48669	1.17180	2.833	1.627	0.005c
HH Private sector wage earner	0.29133	1.13650	2.135	1.338	0.033b
HH Wolof	-0.00314	0.15370	-0.020	0.997	0.984
HH Pular	0.07204	0.17630	0.409	1.075	0.683
HH Serer	-0.02745	0.20340	-0.135	0.973	0.893
HH Diola	-0.32216	0.24070	-1.338	0.725	0.181
HH Mandingue	-0.43338	0.27520	-1.575	0.648	0.115

Log-Likelihood..... -1,232.932
Chi-Squared (23)..... 4,791.086
Significance Level..... 000.000
No. of observations..... 8,191.000

c Statistically significant at a level of 0.01 = 1%
b Statistically significant at a level of 0.05 = 5%
a Statistically significant at a level of 0.10 = 10%

EXHIBIT D-5

Choice of Provider: Rural Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P value
MODERN PRIVATE PROVIDERS					
Constant	-0.11821	2.53500	-0.047	0.889	0.963
Private fees	-0.00439	0.00141	-3.106	0.996	0.002***
Fees at hospitals and public HCs	0.00276	0.00231	1.192	1.003	0.233
Fees at HPs and pub. dispensaries	-0.03159	0.00970	-3.257	0.969	0.001***
Access time	-0.01411	0.00884	-1.596	0.986	0.110
Household income (log)	0.31029	0.20950	1.481	1.364	0.139
Boys 0-4 years	1.38980	0.47370	2.934	4.014	0.003***
Boys 5-14 years	0.10478	0.53020	0.198	1.110	0.843
Men 15-49 years	0.68247	0.49460	1.380	1.979	0.168
Girls 0-4 years	1.55150	0.46630	3.327	4.719	0.001***
Girls 5-14 years	-0.23622	0.61220	-0.386	0.790	0.700
Women 15-49 years	0.60992	0.45630	1.337	1.840	0.181
HH Primary education	-0.12539	0.44100	-0.284	0.882	0.776
HH Secondary-and-above education	0.26839	0.95900	0.280	1.308	0.780
HH Self-employed	-0.55151	0.42170	-1.308	0.576	0.191
HH Public sector wage earner	1.75340	1.38300	1.268	5.774	0.205
HH Private sector wage earner	1.39750	0.52330	2.671	4.045	0.008***
HH Wolof	-0.13926	0.66400	-0.210	0.870	0.834
HH Pular	0.20471	0.65530	0.312	1.227	0.755
HH Serer	0.77380	0.69890	1.107	2.168	0.268
HH Diola	-2.41570	0.82410	-2.931	0.089	0.003***
HH Mandingue	0.45672	0.84530	0.540	1.579	0.589
Dakar	2.17160	0.80240	2.706	8.772	0.007***
West Central	-5.89520	4.99800	-1.179	0.003	0.238
East Central	-3.16560	1.42600	-2.220	0.042	0.026**
South	0.92135	0.91940	1.002	2.513	0.316

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EXHIBIT D-5

Choice of Provider: Rural Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P value
HOSPITALS AND PUBLIC HEALTH CENTERS					
Constant	-9.16400	1.81000	-5.063	0.000	0.000***
Private fees	0.00024	0.00031	0.778	1.000	0.436
Fees at hospitals and public HCs	-0.00253	0.00129	-1.963	0.997	0.050*
Fees at HPs and pub. dispensaries	-0.00353	0.00699	-0.504	0.996	0.614
Access time	-0.00490	0.00428	-1.145	0.995	0.252
Household income (log)	0.87674	0.16250	5.394	2.403	0.000***
Boys 0-4 years	0.58641	0.36010	1.628	1.798	0.103
Boys 5-14 years	-0.05141	0.35880	-0.143	0.950	0.886
Men 15-49 years	0.02672	0.36970	0.072	1.027	0.942
Girls 0-4 years	0.07274	0.44150	0.165	1.075	0.869
Girls 5-14 years	-0.31677	0.42290	-0.749	0.728	0.454
Women 15-49 years	0.78519	0.27820	2.823	2.193	0.005***
HH Primary education	0.72159	0.32630	2.211	2.058	0.027**
HH Secondary-and-above education	0.86625	0.55330	1.566	2.378	0.117
HH Self-employed	-0.21075	0.28830	-0.731	0.810	0.465
HH Public sector wage earner	-0.25447	1.11900	-0.227	0.775	0.820
HH Private sector wage earner	-0.59843	0.57830	-1.035	1.550	0.301
HH Wolof	0.61734	0.51600	1.196	1.854	0.232
HH Pular	0.81864	0.49030	1.670	2.267	0.095*
HH Serer	0.58372	0.61870	0.944	1.793	0.345
HH Diola	-0.69985	0.66890	-1.046	0.497	0.295
HH Mandingue	1.05390	0.78330	1.345	2.869	0.179
Dakar	1.25270	0.65380	1.916	3.500	0.055*
West Central	-7.30420	3.30500	-2.210	0.001	0.027**
East Central	0.22338	0.63250	0.353	1.250	0.724
South	0.97228	0.47820	2.033	2.644	0.042**

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EXHIBIT D-5

Choice of Provider: Rural Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P value
PUBLIC HEALTH POSTS					
Constant	-5.08630	0.94290	-5.394	0.006	0.000***
Private fees	-0.00017	0.00016	-1.059	1.000	0.289
Fees at hospitals and public HCs	0.00242	0.00074	3.248	1.002	0.001***
Fees at HPs and pub. dispensaries	0.00207	0.00368	0.562	1.002	0.574
Access time	-0.01133	0.00243	-4.656	0.989	0.000***
Household income (log)	0.50125	0.08539	5.870	1.651	0.000***
Boys 0-4 years	1.00470	0.19250	5.219	2.731	0.000***
Boys 5-14 years	0.33445	0.18410	1.817	1.397	0.069*
Men 15-49 years	0.35526	0.19230	1.847	1.427	0.065*
Girls 0-4 years	0.75576	0.20460	3.695	2.129	0.000***
Girls 5-14 years	0.45406	0.19130	2.374	1.575	0.018**
Women 15-49 years	0.72324	0.15980	4.526	2.061	0.000***
HH Primary education	-0.15844	0.02440	-0.775	0.853	0.438
HH Secondary-and-above education	-0.86984	0.51770	-1.680	0.419	0.093*
HH Self-employed	-0.02833	0.17120	-0.165	0.972	0.869
HH Public sector wage earner	0.19210	0.82100	0.234	1.212	0.815
HH Private sector wage earner	-0.50225	0.34510	-1.456	0.605	0.145
HH Wolof	0.22210	0.28090	0.791	1.249	0.429
HH Pular	0.11646	0.27440	0.424	1.124	0.671
HH Serer	0.04333	0.31190	0.139	1.044	0.890
HH Diola	0.18837	0.36080	0.522	1.207	0.602
HH Mandingue	0.99471	0.48130	2.067	2.704	0.039**
Dakar	-0.13584	0.46940	-0.289	0.873	0.772
West Central	-3.38430	1.92400	-1.759	0.034	0.079*
East Central	-1.43960	0.36680	-3.924	0.237	0.000***
South	0.65506	0.32050	2.044	1.925	0.041**

Log-Likelihood	-1,855.448
Chi-Squared (25)	3,167.166
Significance Level	000.000
No. of observations	6,331.000

*** Statistically significant at a level of 0.01 = 1%
** Statistically significant at a level of 0.05 = 5%
* Statistically significant at a level of 0.10 = 10%

EXHIBIT D-6

Choice of Provider: Urban Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P Value
MODERN PRIVATE PROVIDERS					
Constant	-6.48800	1.04000	-6.241	0.001521	0.000***
Private fees	0.00026	0.00014	1.861	1.000261	0.063*
Fees at hospitals and public HCs	0.00058	0.00067	0.877	1.000584	0.380
Fees at HPs and pub. dispensaries	-0.00145	0.00208	-0.695	0.998552	0.487
Access time	0.00079	0.01325	0.060	1.000788	0.953
Household income (log)	0.55250	0.09610	5.749	1.737591	0.000***
Boys 0-4 years	0.96789	0.26220	3.692	2.632384	0.000***
Boys 5-14 years	0.34749	0.27350	1.271	1.415510	0.204
Men 15-49 years	-0.10244	0.22460	-0.456	0.902632	0.648
Girls 0-4 years	0.33083	0.26580	1.245	1.392123	0.213
Girls 5-14 years	0.25823	0.25320	1.020	1.294636	0.308
Women 15-49 years	0.25443	0.20810	1.223	1.289726	0.221
HH Primary education	0.16612	0.19160	0.867	1.180714	0.386
HH 1st cycle secondary education	-0.02344	0.21920	-0.107	0.976830	0.915
HH 2nd cycle secondary education	0.11618	0.22860	0.508	1.123198	0.611
HH Higher education	-0.26415	0.22480	-1.175	0.767858	0.240
HH Self-employed	-0.02739	0.17800	-0.154	0.972986	0.878
HH Public sector wage earner	0.75553	0.20910	3.614	2.128739	0.000***
HH Private sector wage earner	0.66260	0.17180	3.856	1.939829	0.000***
HH Wolof	-0.36550	0.18170	-2.012	0.693849	0.044**
HH Pular	-0.01870	0.20750	-0.090	0.981470	0.928
HH Serer	-0.25934	0.24790	-1.046	0.771560	0.296
HH Diola	-0.58601	0.30320	-1.933	0.556543	0.053*
HH Mandingue	-0.49773	0.34660	-1.436	0.607909	0.151

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EXHIBIT D-6

Choice of Provider: Urban Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{Prob[Y_i = j] / Prob[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P Value
HOSPITALS AND PUBLIC HEALTH CENTERS					
Constant	-3.73280	1.02800	-3.632	0.023925	0.000***
Private fees	0.00062	0.00017	3.749	1.000622	0.000***
Fees at hospitals and public HCs	-0.00158	0.00063	-2.494	0.998424	0.013**
Fees at HPs and pub. dispensaries	-0.00289	0.00212	-1.360	0.997118	0.174
Access time	-0.00062	0.01354	-0.046	0.999377	0.963
Household income (log)	0.34981	0.09804	3.568	1.418797	0.000***
Boys 0-4 years	0.52089	0.24750	2.105	1.683525	0.035**
Boys 5-14 years	0.25921	0.24470	1.059	1.295905	0.290
Men 15-49 years	0.08413	0.19170	0.439	1.087772	0.661
Girls 0-4 years	0.29922	0.23370	1.280	1.348806	0.200
Girls 5-14 years	-0.22428	0.24270	-0.924	0.799091	0.355
Women 15-49 years	0.26595	0.17430	1.526	1.304669	0.127
HH Primary education	0.53417	0.17110	3.123	1.706131	0.002***
HH 1st cycle secondary education	0.00291	0.2192[illegible]	0.013	1.002915	0.989
HH 2nd cycle secondary education	-0.17487	0.23590	-0.741	0.839566	0.459
HH Higher education	-0.52917	0.23520	-2.250	0.589093	0.024**
HH Self-employed	-0.40012	0.16540	-2.419	0.670239	0.016**
HH Public sector wage earner	0.27242	0.21080	1.292	1.313138	0.196
HH Private sector wage earner	-0.47232	0.18550	-2.547	0.623553	0.011**
HH Wolof	0.14568	0.16470	0.885	1.156825	0.376
HH Pular	0.25279	0.19340	1.307	1.287612	0.191
HH Serer	-0.16174	0.24170	-0.669	0.850662	0.503
HH Diola	-0.23439	0.29000	-0.808	0.791053	0.419
HH Mandingue	-0.77282	0.36020	-2.145	0.461709	0.032**

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EXHIBIT D-6

Choice of Provider: Urban Areas—Results of the Polynomial Regression Model
(Individual Patients)

$$\ln\{\text{Prob}[Y_i = j] / \text{Prob}[Y_i = 0]\} = \alpha_j + \beta_j X_i$$

where j = 0, if the individual i did not seek care in the modern sector;
= 1, if the individual i sought care from a modern private provider;
= 2, if the individual i sought care from a hospital or public health center;
= 3, if the individual i sought care from a health post or public dispensary

Variable	Coefficient	Standard error	Ratio t	Odd ratio	P Value
HEALTH POSTS AND PUBLIC DISPENSARIES					
Constant	0.12551	1.11900	0.112	1.133726	0.911
Private fees	0.00002	0.00012	0.183	1.000022	0.855
Fees at hospitals and public HCs	-0.00070	0.00066	-1.070	0.999297	0.285
Fees at HPs and pub. dispensaries	0.00082	0.00236	0.346	1.000817	0.729
Access time	-0.03444	0.01465	-2.350	0.966147	0.019**
Household income (log)	-0.14158	0.10750	-1.316	0.867985	0.188
Boys 0-4 years	1.63390	0.28720	5.690	5.123818	0.000***
Boys 5-14 years	1.16810	0.29140	4.008	3.215876	0.000***
Men 15-49 years	0.03929	0.28090	0.140	1.040072	0.889
Girls 0-4 years	1.27780	0.28410	4.498	3.588735	0.000***
Girls 5-14 years	0.85722	0.28320	3.027	2.356600	0.002***
Women 15-49 years	0.79428	0.24510	3.240	2.212847	0.001***
HH Primary education	0.08188	0.18860	0.434	1.085320	0.664
HH 1st cycle secondary education	-0.43023	0.24940	-1.725	0.650359	0.085*
HH 2nd cycle secondary education	-0.05791	0.26170	-0.221	0.943735	0.825
HH Higher education	-1.05120	0.31740	-3.312	0.349518	0.001***
HH Self-employed	0.19126	0.17770	1.076	1.210774	0.282
HH Public sector wage earner	0.42206	0.24660	1.712	1.525100	0.087*
HH Private sector wage earner	0.57688	0.18340	3.145	1.780474	0.002***
HH Wolof	0.46033	0.22270	2.067	1.584596	0.039**
HH Pular	0.15859	0.25660	0.618	1.171857	0.537
HH Serer	0.59939	0.27210	2.203	1.821007	0.028*
HH Diola	0.25676	0.31910	0.805	1.292734	0.421
HH Mandingue	0.25334	0.37050	0.684	1.288321	0.494

Log-Likelihood	-2,529.933
Chi-Squared (25)	5,105.593
Significance Level	000.000
No. of observations	8,191.000

*** Statistically significant at a level of 0.01 = 1%
** Statistically significant at a level of 0.05 = 5%
* Statistically significant at a level of 0.10 = 10%

EXHIBIT D-7a
Statistics Used in Defining the Variables Included in the Model on Quantity of Care Sought and Expenditures on Health: (Individuals entering the modern sector)

RURAL AREAS

Variable	Average	Standard error	N	Tag
NVISIT	.52	.52	3,151	Number of visits (ln)
EXPENDITURES	6.32	1.94	3,151	Expenditures on health (ln)
EXP	.96	.20	3,151	Expenditures on health > 0
TIME	40.79	35.84	3,151	Time (min) to PHF
LNINC	8.21	.77	3,151	Per capita household expenditure (ln)
MCHILD	.14	.35	3,151	Boys 0-4 years
M5-14	.13	.34	3,151	Boys 5-14 years
M15-49	.12	.32	3,151	Men 15-49 years
FCHILD	.12	.33	3,151	Girls 0-4 years
F5-14	.11	.31	3,151	Girls 5-14 years
F15-49	.26	.44	3,151	Women 15-49 years
PRIMARY	.06	.24	3,151	HH Primary
SECONDARY	.03	.18	3,151	HH Secondary and above
SAL1	.85	.36	3,151	HH Self-employed
SAL2	.02	.12	3,151	HH Public sector wage earner
SAL3	.04	.19	3,151	HH Private sector wage earner
ETH1	.41	.49	3,151	HH Wolof
ETH2	.26	.44	3,151	HH Pular
ETH3	.18	.38	3,151	HH Serer
EHT4	.04	.19	3,151	HH Diola
ETH5	.05	.21	3,151	HH Mandingue and Soce
GREG1	.01	.09	3,151	Dakar
GREG2	.33	.47	3,151	West Central (Thiès-Louga-Fatick)
GREG3	.30	.46	3,151	East Central (Kaolack-Diourbel)
GREG5	.16	.37	3,151	South (Ziguinchor-Kolda)

EXHIBIT D-7b
Statistics Used in Defining the Variables Included in the Models on Quantity of Care Sought and Expenditures on Health (Individuals entering the modern sector)

URBAN AREAS

Variable	Average	Standard error	N	Tag
NVISIT	.49	.52	5,590	Number of visits (ln)
EXPENDITURES	6.95	2.68	5,586	Expenditures on health (ln)
EXP	.90	.29	5,590	Expenditures on health > 0
TIME	14.26	6.51	5,590	Time (min) to PHF
LNINC	9.46	.80	5,590	Per capita household expenditure (ln)
MCHILD	.12	.33	5,590	Boys 0-4 years
M5-14	.11	.32	5,590	Boys 5-14 years
M15-49	.17	.37	5,590	Men 15-49 years
FCHILD	.11	.31	5,590	Girls 0-4 years
F5-14	.11	.31	5,590	Girls 5-15 years
F15-49	.26	.44	5,590	Women 15-49 years
EDU1	.16	.37	5,590	HH Primary
EDU2	.10	.30	5,590	HH 1st cycle secondary
EDU3	.06	.25	5,590	HH 2nd cycle secondary
EDU4	.08	.27	5,590	HH Higher education
SAL1	.33	.47	5,590	HH Self-employed
SAL2	.15	.36	5,590	HH Public sector wage earner
SAL3	.19	.40	5,590	HH Private sector wage earner
ETH1	.48	.50	5,590	HH Wolof
ETH2	.20	.40	5,590	HH Pular
ETH3	.10	.30	5,590	HH Serer
EHT4	.06	.24	5,590	HH Diola
ETH5	.04	.20	5,590	HH Mandingue and Soce

EXHIBIT D-8

Number of Visits: Rural Areas—Results of the Linear Regression Model

(Individuals entering the modern sector)

$\ln\{ Y_i \} = \alpha + \beta X_i$; where Y_i is the number of visits by the individual i

Equation Variables

Variable	B	SE B	Beta	T	Sig T
TIME	-.000500	.000267	-.034608	-1.873	.0611*
LNINC	.060238	.013261	.090197	4.543	.000***
MCHILD	-.014856	.035453	-.010104	-.419	.6752
M5-14	-.052074	.036357	-.033761	-1.432	.1522
M15-49	.000912	.037262	.000566	.024	.9805
FCHILD	-.029985	.036829	-.019047	-.814	.4156
F5-14	-.055326	.038380	-.032837	-1.442	.1495
F15-49	.049944	.031595	.042176	1.581	.1140
PRIMARY	-.072440	.039583	-.034062	-1.830	.0673*
SECONDARY	-.097495	.054307	.034442	-1.795	.0727*
SAL1	.028489	.031325	.019841	.909	.3632
SAL2	-.109824	.084135	-.026530	-1.305	.1919
SAL3	-.106876	.056607	-.039859	-1.888	.0591*
ETH1	.092896	.044238	.088387	2.100	.0358**
EHT2	.068129	.041691	.058080	1.634	.1023
EHT3	.015048	.048171	.011182	.312	.7548
ETH4	.230476	.063858	.084244	3.609	.0003***
ETH5	.047056	.057160	.019184	.823	.4104
GREG1	-.093080	.099620	-.016886	-.934	.3502
GREG2	.039608	.032168	.036117	1.231	.2183
GREG3	.078523	.030998	.069805	2.533	.0114**
GREG5	.124383	.035995	.088068	3.456	.0006***
(Constant)	-.083403	.124838		-.668	.5041

Multiple R	.19156
R Square	.03669
Adjusted R Square	.02992
Standard Error	.50958
F =	5.41601
Signif F =	0.00000
No. of observations	3,151.00

EXHIBIT D-9

Number of Visits: Urban Areas—Results of the Linear Regression Model

(Individuals entering the modern sector)

$\ln\{ Y_i \} = \alpha + \beta X_i$; where Y_i is the number of visits by individual i

Equation Variables

Variable	B	SE B	Beta	T	Sig T
TIME	-.000570	.001084	-.007092	-.526	.5992
LNINC	-.019340	.010203	-.029770	-1.895	.0581*
MCHILD	-.002223	.028822	-.001394	-.077	.9385
M5-14	-.021829	.029286	-.013283	-.745	.4561
M15-49	-.014204	.026878	-.010151	-.528	.5972
FCHILD F5-14	.000329	.029893	.000194	.011	.9912
F15-49	.008920	.029570	.005342	.302	.7629
EDU1	.005955	.024678	.005000	.241	.8093
EDU2	-.002902	.020283	-.002027	-.143	.8862
EDU3	-.039813	.025711	-.022174	-1.548	.1216
EDU4	-.063414	.031580	-.029846	-2.008	.0447**
SAL1	-.096355	.031325	-.050032	-3.076	.0021***
SAL2	-.006172	.017598	-.005562	-.351	.7258
SAL3	-.085953	.024222	-.059167	-3.549	.0004***
EHT1	-.023436	.020984	-.017739	-1.117	.2641
ETH2	.026217	.022722	.025052	1.154	.2486
ETH3	.010877	.025816	.008284	.421	6735
ETH4	.045709	.030090	.026183	1.519	.1288
ETH5	.117954	.035287	.053392	3.343	.0008***
	.072901	.039933	.027807	1.826	.0680*
(Constant)	.695125	.103324		6.728	.0000***

Multiple R	.12481
R Square	.01558
Adjusted R Square	.01204
F =	4.40645
Signif F =	.0000
No. of observations	5,590.00

EXHIBIT D-10
Average Health-Related Expenditures by Individual and Age Group
During the 30 Days Preceding the Interview:
RURAL AREAS

AGE GROUP	CHARGES FOR VISITS (CFAF)		CHARGES FOR DRUGS (CFAF)		TOTAL CHARGES (CFAF)	
	N	Average	N	Average	N	Average (CFAF)
0-4 years	818,003	20.5	818,003	149.7	818,003	170.2
5-9 years	796,457	9.5	796,457	72.2	796,457	81.7
10-14 years	557,192	9.6	557,192	74.4	557,192	84.0
15-19 years	410,387	19.6	410,387	132.6	410,387	152.2
20-24 years	283,345	28.8	283,345	238.7	283,345	267.5
25-29 years	275,589	27.3	275,589	249.4	275,589	276.7
30-34 years	226,829	32.6	226,829	248.5	226,829	281.1
35-39 years	200,556	28.4	200,556	326.3	200,556	354.8
40-44 years	159,166	44.9	159,166	246.8	159,166	291.7
45-49 years	125,747	36.7	125,747	322.7	125,747	359.4
50-54 years	129,275	31.4	129,275	246.2	129,275	277.6
55-59 years	99,840	34.6	99,840	252.2	99,840	286.8
60-64 years	94,921	57.8	94,921	338.5	94,921	396.3
65-69 years	61,238	45.7	61,238	365.5	61,238	411.2
70-74 years	53,039	54.9	53,039	283.5	53,039	338.3
75-79 years	29,664	57.0	29,664	232.6	29,664	289.5
80 yrs. or +	33,998	21.7	33,998	326.5	33,998	348.3
Total	4,355,248	22.8	4,355,248	174.1	4,355,248	197.0

EXHIBIT D-11
Average Health-Related Expenditures by Individual and Age Group
During the 30 Days Preceding the Interview:
URBAN AREAS

AGE GROUP	CHARGES FOR VISITS (CFAF)		CHARGES FOR DRUGS (CFAF)		TOTAL CHARGES (CFAF)	
	N	Average	N	Average	N	Average (CFAF)
0-4 years	471,150	139.8	471,150	500.1	471,150	639.9
5-9 years	448,404	59.7	448,404	258.4	448,404	318.1
10-14 years	393,891	57.0	393,891	225.9	393,891	282.9
15-19 years	355,784	57.4	355,784	241.2	355,784	298.7
20-24 years	273,935	127.0	273,935	486.8	273,935	613.7
25-29 years	223,566	162.4	223,566	655.8	223,566	818.2
30-34 years	181,240	183.4	181,240	808.2	181,240	991.6
35-39 years	150,446	321.9	150,446	1,075.9	150,446	1,397.9
40-44 years	110,058	270.0	110,058	1,129.3	110,058	1,399.3
45-49 years	81,313	251.4	81,313	857.5	81,313	1,109.0
50-54 years	76,689	227.0	76,689	1,035.2	76,689	1,262.1
55-59 years	54,639	278.0	54,639	1,289.3	54,639	1,567.4
60-64 years	49,366	339.6	49,366	1,261.5	49,366	1,601.1
65-69 years	29,258	233.2	29,258	1,456.4	29,258	1,689.6
70-74 years	22,940	405.2	22,940	1,593.1	22,940	1,998.3
75-79 years	12,531	376.8	12,531	2,500.9	12,531	2,877.7
80 yrs. or +	15,907	511.5	15,907	1,126.0	15,907	1,637.6
Total	2,951,118	141.2	2,951,118	558.8	2,951,118	700.1

EXHIBIT D-12
Average Health-Related Expenditures by Individual and Age Group
During the 30 Days Preceding the Interview:
SENEGAL AS A WHOLE

AGE GROUP	CHARGES FOR VISITS (CFAF)		CHARGES FOR DRUGS (CFAF)		TOTAL CHARGES (CFAF)	
	N	Average	N	Average	N	Average (CFAF)
0-4 years	1,289,154	64.1	1,289,154	277.7	1,289,154	341.9
5-9 years	1,244,861	27.6	1,244,861	139.3	1,244,861	166.8
10-14 years	951,083	29.2	951,083	137.1	951,083	166.4
15-19 years	766,172	37.2	766,172	183.0	766,172	220.2
20-24 years	557,281	77.0	557,281	360.6	557,281	437.7
25-29 years	499,156	87.8	499,156	431.4	499,156	519.2
30-34 years	408,069	99.6	408,069	497.1	408,069	596.7
35-39 years	351,002	154.2	351,002	647.6	351,002	801.9
40-44 years	269,225	137.0	269,225	607.6	269,225	744.5
45-49 years	207,060	121.0	207,060	532.7	207,060	653.8
50-54 years	205,964	104.2	205,964	539.9	205,964	644.2
55-59 years	154,479	120.7	154,479	619.0	154,479	739.7
60-64 years	144,286	154.2	144,286	654.3	144,286	808.5
65-69 years	90,496	106.3	90,496	718.2	90,496	824.5
70-74 years	75,978	160.6	75,978	678.9	75,978	839.5
75-79 years	42,195	151.9	42,195	906.2	42,195	1,058.2
80 yrs. or +	49,906	177.9	49,906	581.4	49,906	759.2
Total	7,306,366	70.6	7,306,366	329.5	7,306,366	400.2

EXHIBIT D-13
Health-Related Expenditures: Results of the Linear Regression
Rural Areas: (Individuals entering the modern sector)

$\ln\{ Y_i + 1 \} = \alpha + \beta X_i$; where Y_i is the sum of charges incurred for visits and drugs

EQUATION VARIABLES

Variable	B	SE B	Beta	T	Sig T
TIME	.005586	.000962	.103006	5.805	.0000***
LNINC	.574736	.047847	.229001	12.012	.0000***
MCHILD	-.499448	.127972	-.090429	-3.903	.0001***
M5-14	-.754588	.131220	-.130245	-5.751	.0000***
M15-49	-.067720	.134582	-.011180	-.503	.6149
FCHILD	-.285343	.132923	-.048254	-2.147	.0319**
F5-14	-.678811	.138521	-.107259	-4.900	.0000***
F15-49	.253875	.114064	.057047	2.226	.0261**
PRIMARY	-.181226	.143176	-.022634	-1.266	.2057
SECONDARY	.210199	.195939	.019770	1.073	.2835
SAL1	-.220688	.112983	-.040882	-1.953	.0509*
SAL2	-.344252	.303535	-.022141	-1.134	.2568
SAL3	-.582022	.204864	-.057562	-2.841	.0045***
ETH1	.215607	.159654	.054593	1.350	.1770
ETH2	.021988	.150380	.004988	.146	.8838
ETH3	-.017333	.173772	-.003429	-.100	.9206
ETH4	-.030021	.230411	-.002922	-.130	.8963
ETH5	.229551	.206491	.024835	1.112	.2664
GREG2	.049655	.359315	.002398	.138	.8901
GREG3	.099266	.116065	.024094	.855	.3925
GREG5	.324855	.111835	.076871	2.905	.0037***
	.231628	.129988	.043590	1.782	.0749*
(Constant)	1.543658	.450455		3.427	.0006***

Multiple R	.33555
R Square	.11259
Adjusted R Square	.10634
Standard Error	1.83790
F =	18.02213
Signif F =	.0000
No. of observations	3,151.00

EXHIBIT D-14
Health-Related Expenditures: Results of the Linear Regression
Urban Areas: (Individuals entering the modern sector)

$\ln\{ Y_i + 1 \} = \alpha + \beta X_i$; where Y_i is the sum of charges incurred for visits and drugs

EQUATION VARIABLES

Variable	B	SE B	Beta	T	Sig T
TIME	-.019558	.005356	-.047401	-3.651	.0003***
LNINC	.821728	.050368	.246601	16.314	.0000***
MCHILD	-.516549	.142252	-.063168	-3.631	.0003***
M5-14	-1.104274	.144537	-.131038	-7.640	.0000***
M15-49	-.747326	.132705	-.104102	-5.631	.0000***
FCHILD	-.530206	.147536	-.061026	-3.594	.0003***
F5-14	-1.033583	.146011	-.120616	-7.079	.0000***
F15-49	-.112676	.121829	-.018441	-.925	.3551
EDU1	.007409	.100109	.001009	.074	.9410
EDU2	-.151359	.127085	-.016813	-1.191	.2337
EDU3	-.190585	.155804	-.017492	-1.223	.2213
EDU4	-.014740	.154558	-.001493	-.095	.9240
SAL1	.003274	.086851	-.057521	.038	.9699
SAL2	-.378691	.119532	-.050833	-3.168	.0015***
SAL3	-.375103	.103593	-.055344	-3.621	.0003***
ETH1	.076422	.112181	.014236	.681	.4958
ETH2	-.107177	.127425	-.015917	-.841	.4003
ETH3	-.181213	.148491	-.020242	-1.220	.2224
ETH4	.144851	.174119	.012786	.832	.4055
ETH5	.154966	.197034	.011527	.786	.4316
(Constant)	.120944	.510094		.237	.8126

Multiple R .29931
R Square .08959
Adjusted R Square .08631
Standard Error 2.56412

F = 27.37998
Signif F = .0000

No. of observations 5,586.00

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