

**ILO / WHO/ GTZ / OECD RESEARCH PROJECT ON
SOCIAL HEALTH PROTECTION, POVERTY REDUCTION AND
ACCESS TO CARE**

**The Impact of Social Health protection Mechanisms on Access to Health
Care, Health Expenditure and Impoverishment: A Case Study of Senegal**

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October 2004

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1. Introduction

The main objective of the study is to analyze the impact of health insurance (both mandatory and social) on health status and health care seeking behavior and to examine their role in protecting households from catastrophic health expenditure. The study will also investigate the distribution of utilization of health services and determinants, determinants of health insurance membership, distribution, and determinants of catastrophic health spending, and other related issues. The fairness of the financial contribution of households to the health system will also be evaluated. The analysis is based on a survey conducted by WHO in Senegal in 2002. More than 3600 households with a total family member of nearly 28,000 were interviewed. Two kinds of questionnaire were used in the survey: household and individual. The first one called 'Households Questionnaire' emphasized on the household level information. Data related to expenditure, asset, insurance status, etc. were collected using this questionnaire. From every household one respondent was selected randomly (more than 3200 respondents were selected) and the individual questionnaire was used to collect very detailed information.

2. An Overview of the Health Situation in Senegal

2.1. The Country

Senegal is one of the Sub-Saharan Africa countries located on the coast of West Africa. It has a total population of 10.6 million (in 2003) of whom 48.1 percent live in urban areas and has a total area of 196,190 sq km. Nearly 58% of the population is under the age of twenty and over 92 percent of the population is Muslim. Early marriage and polygamy are widespread practices and more than half of the women give birth before the age of twenty (U.S. Embassy Dakar). Wolof (36%), Fulani, and Serer (each 17%) are the dominant ethnic groups in the country followed by Toucouleur, Diola, and Mandingo (each 9%).

With a per capita income of US\$ 470 (2002), the country is grouped in low-income and moderately indebted countries and its economy is highly tied to former colonial power, France. It has limited natural resources and fishing, mining, agriculture, tourism, and services are the major sources of foreign exchange earnings. Since January 1994, the country has undertaken various economic reforms including devaluation of its currency by half and reducing price controls and subsidies. As a result (coupled with good weather conditions), the country has shown considerable economic growth with relatively low inflation rate and fiscal deficit. However, the country is still poor in many indicators and suffers from high level of poverty, very high rural-urban migration, unemployment (as high

as 45 percent), illiteracy (nearly two thirds of the adult population is illiterate) and poor access to primary health care services.

2.2. Health Indicators for Senegal

As in the case of other SSA countries, income and geographical inequalities in access to health care facilities, shortage and irregular supply of drugs and other basic materials, inefficient allocation of resources, etc. hampers the performance of the health sector in Senegal. The small tax base of the government and the failure of the market in the health insurance sector also aggravate the problem. The combined effect of these problems is reflected in high morbidity, infant and maternal mortality rates, low life expectancy, exclusion of the vast majority of the population from access to basic health care services, catastrophic health expenditure, etc. Appendix 1 gives some basic health indicators for Senegal.

Life expectancy at birth in Senegal is higher than the African average of 49 years but still lower than the 64.6 years of the developing countries. The infant and under five mortality rates are also high in Senegal even compared to the developing countries' average rates. Except in improved water sources, the performance of the country in other indicators is very low as can be seen from Appendix 1.

With relatively low prevalence of HIV/AIDS (1.0% in 2001), malaria is the principal cause of morbidity and death in the country. It is prevalent throughout the country and accounts for 30% of all outpatient attendance (AED, n.d). The government has initiated a countrywide malaria-controlling program and treated bed nets have been taken as a key prevention strategy.

3. Organization and Financing of the Health Care System

The Ministry of Health is responsible for preparing and implementing policies associated with health, hygiene, and health education in Senegal, and health care services are provided by the government, the private sector, and non-governmental organizations. A national health development plan (PNDS) was drafted for the period 1998-2007. Some of the goals of the PNDS included improving the financial viability of public services and improving the health access of the vulnerable groups.

Most researchers argue that the health care sector of African countries face an array of health care problems that basically emanate from inadequate sources of finance. For instance, Dror and Jacquier (2001) indicate that additional resources to the health sector can play a significant role in changing the current dismal picture of the health sector outcomes in most low-and middle-income countries. Similar conclusions are made by Kutzin (1998), Damen (2000), Valdelin et al. (2000).

As in the case of other SSA countries, health care finance is a serious problem in Senegal. The average percentage share of health expenditure from the GDP is only 4.8 percent, which is half of the 9% level recommended by WHO. In addition to its low absolute magnitude, its trend is not also encouraging. Though the government planned to increase the health sector's share from the overall government recurrent budget by 0.5 points per year (IMF 1997), as can be seen from Table 1 the total expenditure on health as a percentage of GDP has declined from 5.1 percent in 1997 to 4.8 percent in 2001. The last column of the table also reveals a negative 1.82 percent average growth rate of total expenditure on health as a percentage of GDP between 1997 and 2001. Similar negative trends are observed in the share of the health sector from the total government expenditure and private expenditure on health as a percentage of total expenditure on health.

Table 1: Trend of Sources of Finance in Senegal between 1997 and 2001

	1997	1998	1999	2000	2001	Average growth rate*
Total expenditure on health as % of GDP	5.1	4.9	4.7	4.6	4.8	-0.0182
Government expenditure on health as % of total government expenditure	14.4	15.0	13.0	13.6	12.9	-0.0313
External resources for health as % of total expenditure on health	11.7	11.1	12.4	14.1	20.2	0.1939
Private expenditure on health as % of total expenditure on health	45.2	42.5	43.9	43.4	41.2	-0.0163
Out-of-pocket expenditure on health as % of private expenditure	91.3	90.6	91.2	91.3	91.6	0.0014
Per capita total expenditure on health at average exchange rate (US\$)	25	24		22	22	-0.0336
Prepaid plans as % of private health expenditure					8.4	

Sources: Population Reference Bureau Data Finder, Demographic and Health Survey STAT compiler, The World Bank and WHO: Maternal and newborn health

*We use the least squares method to compute the growth rates. First, we estimate $\hat{\beta}$ from $\ln X_t = \alpha + \beta t + \varepsilon_t$, and then the average annual growth rate is computed as $\hat{\beta} - 1$.

About 41 percent of the health expenditure in the country is financed by the private sector. As it is the case in most of the African countries, the share of insurance is very low. For instance, the share of prepaid plans from the total private expenditure on health was only 8.4 in 2001, and cover mainly civil servants and a few formal sector employees. As a result, most of the private health expenditure in the country is financed from out-of-pocket payments. As shown in Table 1, the share of the out-of-pocket expenditure on health from the total private expenditure has increased from 91.3 in 1997 to 91.6 in 2001. The share of

external resources from the total health expenditure has shown a 19.3 average annual growth rate under the same period.

These trends indicate that the role of the government in health care financing has declined and the country has greatly depended on foreign sources and out-of-pocket payments. As a result, the real per capita health expenditure in the country is very low (US\$ 22 in 2001) and has shown a declining trend. As shown in last column of Table 1, the per capita total expenditure on health at average exchange rate has declined by an average of 3.3 percent between 1997 and 2001. The increasing trend of the out-pocket-payment also indicates that the health care financing system may not be equitable and may expose people to catastrophic health expenditure.

Community health insurance schemes have emerged as a response to the market and government failure in the provision of health care services in most developing countries (Jütting 2000, ILO 2001, Huber, n.d). In Senegal for instance, 'les mutuelles de santés' (mutual health organizations) have emerged as an alternative health insurance institutions since early 80s in the areas of the Thiés region (Tine 2000 and Jütting 2000, 2001). The oldest 'mutuals' include Fandéne and Ngaye Ngaye and the youngest Sanghé and Mont Rolland. A relatively detailed description of these schemes including their service coverage, size, etc., is well documented elsewhere (For instance see GTZ 2002 and Jütting 2001). Studies made in this area showed that 'mutuals' could be one possible sources of finance to improve access to health care and to protect the poor from catastrophic health expenses.

4. Research Methodology and Empirical Results

4.1. Health Service Need and Utilization

In this section, we analyse the relationship between some socio-economic variables and the incidence of health problem and the decision to seek outside medical help by those individuals with a perceived health problem.

4.1.1. Health Status and its Distribution

Various indicators ranging from self evaluation of the respondents to body mass index are used to assess the health status of individuals. Appendix 2 presents the detail. Appendix 3, 4, and 5 portray the relationship between various demographic and economic factors on the one hand and the distribution of various indicators of health status. Out of more than 2700 respondents with valid responses, 8.02 percent rated their health status as bad or very bad and more than 30 percent of the respondents reported pain or discomfort in the last 30 days before the survey. Forty eight percent of the respondents were not also satisfied with their health status and enumerators observed that 11.73 percent of the respondents had some health problem. In addition to the self evaluation of health status, we use Body Mass Index (BMI) as an indicator of health status. It is argued that anthropometrics indices such as BMI are reliable measures of the current nutritional and health status of adults (Dercon and Krishnan 1997: 4)¹. Out of the 1618 respondents with valid information on weight and height, 61.87 percent had healthy BMI (between 18.5 & 25).

When we see the distribution of health status by gender and location, women and respondents from the rural areas tended to have poor health status almost in all of the above indicators. The proportion of women who suffer from under-and over-nutrition was also higher than the proportion of men and the difference is statistically significant. Specially, women tended to be more obese than men did (see Appendix 5). Surprisingly, there was no statistically significant difference in most of the self evaluated health status indicators across different income quintiles (see Table 4).

Education is an important variable in explaining the health status of respondents. The tendency of reporting pain or discomfort and rating ones own health as bad or very bad decreases as one moves from illiterate to college graduate respondents.

These two results show that the hypotheses that rich and educated individuals perceive health problems more often than poor and illiterate individuals may not hold in this data set. However, the BMI indicators show that the lower quintiles tend to suffer from under nutrition while the upper quintiles from overweight problems. More than 31 percent of the upper income quintiles found to be overweight compared to only 18 percent of the lowest

¹ Information on weight and height is available only for respondents older than 18 years. Therefore, this indicator may not be representative for the whole age group.

quintile. The problems of severe underweight and obesity declines as the education level of respondents increases though the differences are not statistically significant.

An attempt is also made to see if there is any statistically significant difference in self-reported illness and BMI between insured and non-insured respondents. The results reveal that there was no any statistically significant difference between these groups in most of the indicators though insured respondents tended to report more satisfaction with their health status (47.06 percent) compared to their non-insured counterparts (42.07) and less of them rate their health status as bad or very bad (5 percent compared to 8 percent).

To add an additional empirical depth to the descriptive analysis and to infer about how each variable affects the health status of respondents we estimate a logit model using income, education, sex, age, location, insurance and family size variables as explanatory variables. The results are presented in Appendix 6. Consistent with the descriptive analysis, sex, location, and education are important variables in explaining the health status of respondents. Other variables such as income, health insurance membership, and family size, however, do not explain most of the variations in health status indicators.

4.1.2. Utilization of Health Services and Choice of Providers

As it is the case in most developing countries, illness may not necessarily lead to demand for medical care in Senegal owing to various reasons. First, some individuals who reported illness might not think that they need medical help. Second, even those individuals who perceived health problem and the need for medical help might not be able to translate their need into effective demand. As a result, one may expect a wide variation between the perceived illness and the actual utilization of health care services. The survey has separate information on the utilization of maternal, child, and in-and out-patient services.

4.1.2.1. Maternal Health Care Utilization

We use various indicators presented in Appendix 7 to assess the level and determinants of maternal health care utilization. Out of 648 women of reproductive age (18-49 years) with a live birth in last 5 years, 81 percent visited a health care professional to have a pregnancy check and the average number of visit was four. Out of the total pregnant women who visited health care providers, 93.77 had blood pressure test and 56.32 gave a blood sample for a laboratory analysis at least once. The proportion of deliveries attended by skilled personnel (doctors, nurses, or midwives) was 61.69 percent a bit higher than the national average of 50 percent.

Figures 1, 2, 3, and 4 portray the distribution of maternal health care utilization by location, education, income, and health insurance statuses of respondents. In almost all indicators, the utilization level of urban women is much higher than the utilization level

of their rural counterparts and the difference is statistically significant. The level of education is another important variable that affects the utilization of health care services by pregnant women in Senegal. Ninety three percent of college graduates visited health care professionals to have their pregnancy checked and had an average of 5.3 number visits. The corresponding figures for illiterate women were 79.8 percent and 3.9. Nearly eighty seven percent of college graduates got a professional assistance during delivery compared to only 58 percent illiterate women. Similar statistically significant differences are observed in other indicators. Income and health insurance status were important only in explaining the differences in blood test and delivery assistance. See Appendix 8 for the details.

Fig. 1. Maternal Care Utilization by Education

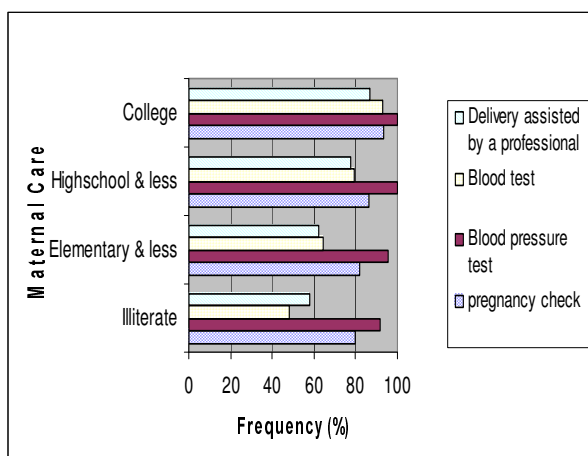


Fig. 2. Maternal Care Utilization by Expenditure Quintile

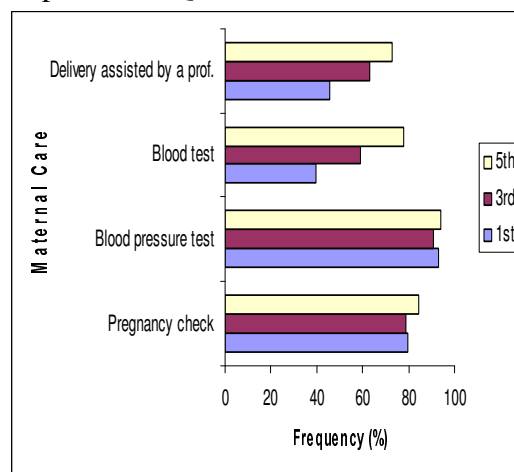


Fig. 3. Maternal Care Utilization by Location

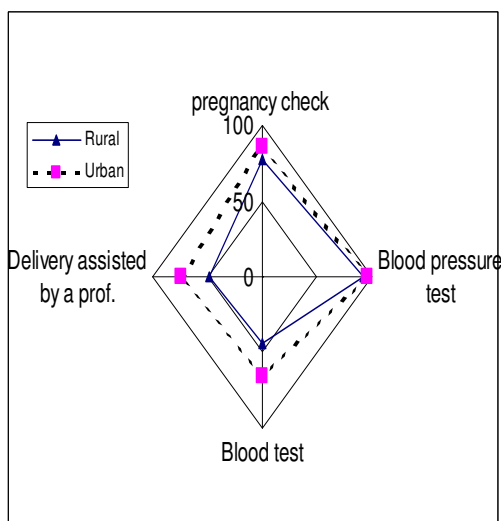
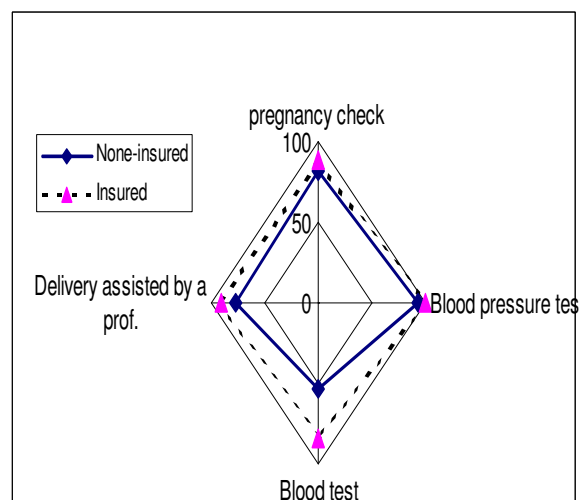


Fig. 4. Maternal Care Utilization by Health Insurance Status



A logit model was also estimated by including all individual and household variables as explanatory variables. The results (not presented) showed similar results. Urban respondents were most likely to use all maternity related health services and educated and health insurance holder respondents were most likely to have a blood test. Wealthy respondents were more likely to get a professional assistance when they gave birth.

4.1.2.2. Child Health Care Utilization

We use vaccination card availability, number of DPT vaccinations, vaccination against measles, vitamin A supplements, getting care or treatment given illness, and how soon after the illness was noticed the child received care as variables to analyse the health care utilization patterns in Senegal. Out of 1264 children (under 5 years only), 87.66 had a vaccination card and children in urban areas and from wealthy, insured and educated households were more likely to have vaccination card. However, no other significant differences were observed in the remaining indicators except in geographical locations (See Appendix 9 and 10). Given that most of the immunization and supplementation services are given through campaigns, the results seem reasonable. Even in the case of receiving care or treatment and in pace of getting help given illness, no statistically significant variation was observed across income groups and between insured and non-insured respondents, though children from educated parents were more likely to get health care than children from less educated ones. More importantly, we could not find any significant gender discrimination in the utilization of child health care services (see Appendix 9 & 10).

We also use OLS (in the case of number of DPT vaccinations) and logit models to estimate the simultaneous impact of various demographic and economic indicators. The results (not presented) strengthened the descriptive analysis results. Generally, we can say that despite the overall access of children to health care services (given illness) was very low (only 56.34 percent got care within the same day they needed), there was no statistically significant difference between boys and girls, and between rich and poor and member of health insurance and non-members. Probably, instead of income, insurance, education, etc., factors such as user fees, distance to facility, etc. may affect the probability of children to get medical care given illness.

4.1.2.3. Out-and In-patient Services

The survey provided detailed information on the utilization of out-and in-patient services by the respondent or his/her child. As shown in Appendix 3, we want to see the distribution and determinants of getting health care at a time of need, in-patient stay in a hospital in the last five years, and getting out-patient medical care in the last 12 months before the survey.

Respondents were asked the last time that either they or their child aged 12 years or less needed health care. Out of the total respondents with a valid answer, 75.64 % reported that they needed health care at least once (51.25 percent in the last one year, 11 percent between 1 and 2 years, 8 percent in the last 5 years, and 5.7 percent more than 5 years ago). Out of those respondents who reported health needs, 95 percent got health care. This is a very high utilization rate in a country where the health service coverage is not more than 50 percent. We have tried to see the distribution of health care service need and utilization by expenditure quintile and health insurance status. As can be seen from Fig. 5 income did not make any significant difference in reporting need and in not seeking medical care. However, insured respondents were less likely not to get health care given need (2.56 percent) compared to non-insured respondents (5.05).

Fig. 5. Health Care Utilization by Expenditure Quintile

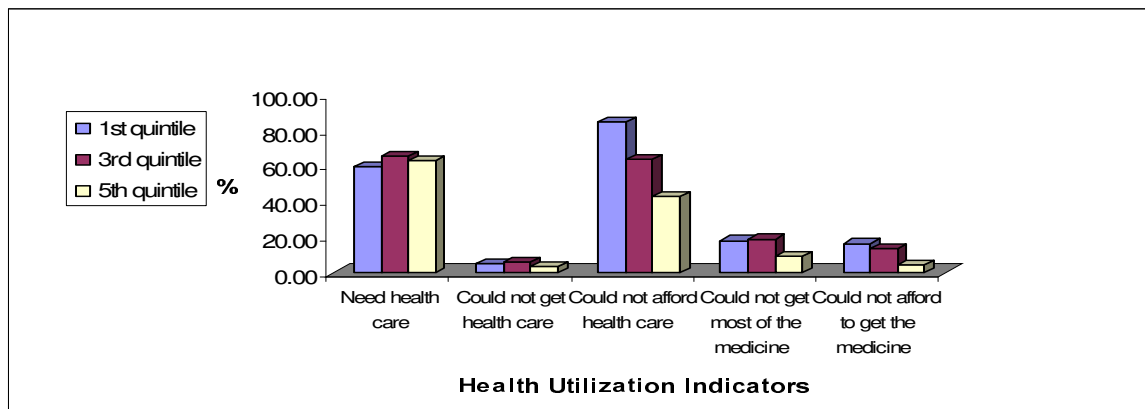


Fig. 6. Health Care Utilization by Insurance Status

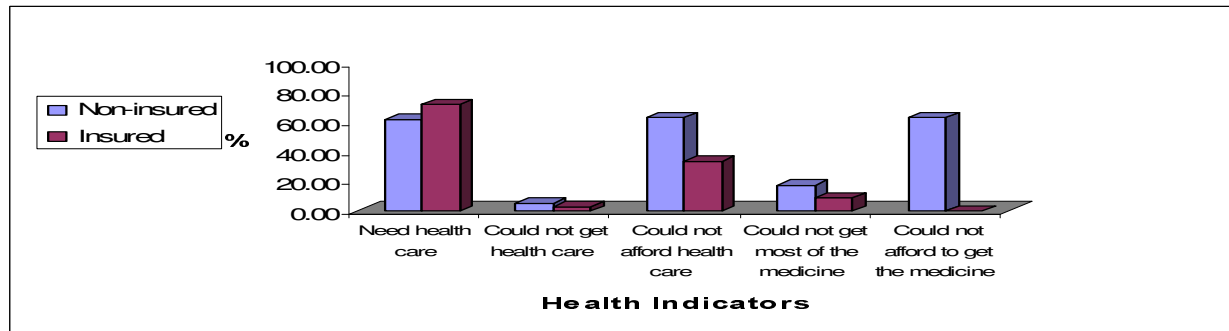
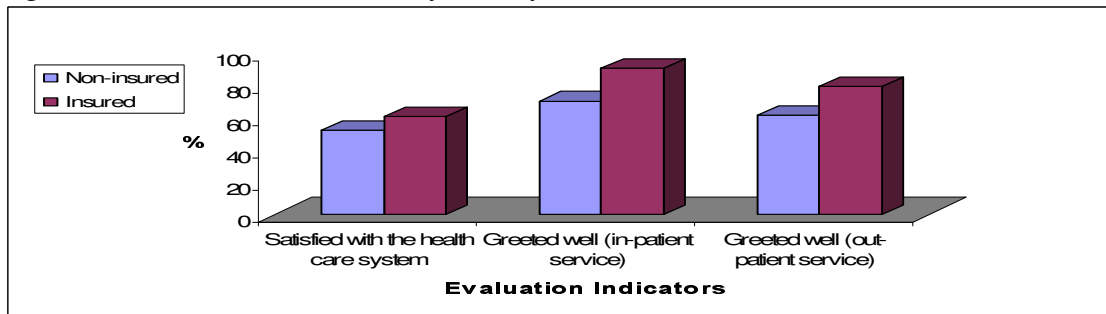


Fig. 7. Evaluation of the Health System by Insurance Status



There was also no significant difference across these groups in the place where health care was sought. This unusual result can be due to the very long recall period used in the survey. It is argued that respondents usually remember illness symptoms for which they sought medical help. However, very significant differences were observed in the reasons for not seeking care given need and not getting all the medicines prescribed given medicine was prescribed. In the highest income quintile, only 43 percent of the respondents sighted 'could not afford' as the best reason for not getting health care compared to 85 percent in the poorest quintile. At the same time, though there was no significant difference in the prescription of medicine among different income groups, 18 percent of respondents from the poorest quintile could not get all of the medicine prescribed compared to only 9 percent in the richest quintile. More importantly, 74 percent of the respondents in the poorest quintile could not get all of the medicine prescribed due to affordability problem while only 62 percent in the third and 43 percent in the fifth quintile. For the relatively rich respondents the problem of availability was more important (see Appendix 11 for the details).

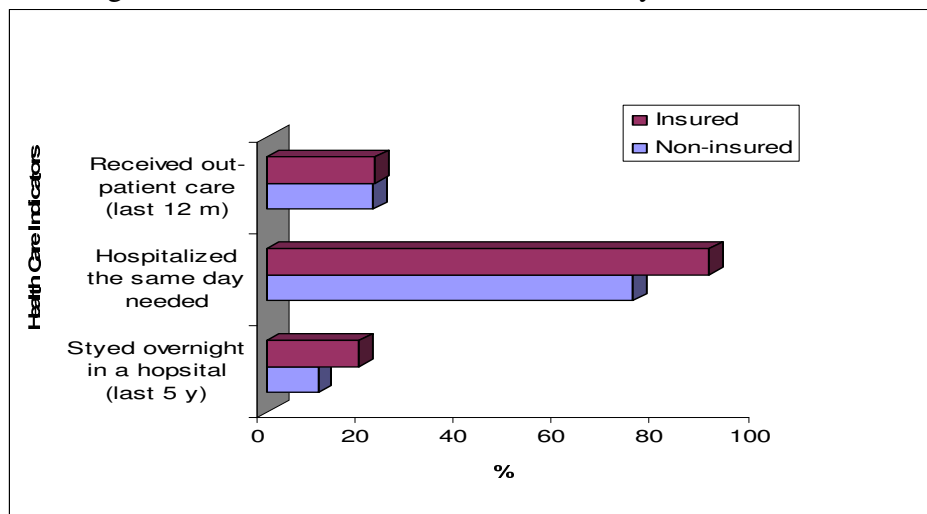
Similar interesting differences were also observed between insured and non-insured respondents. Out of the total respondents who could not get health care, only one third of respondent with health insurance raised the issue of affordability as a reason for not getting care compared to two third of respondents without health insurance. Moreover, the percentage of respondents who could not get all of the medicine prescribed were only 8.79 percent in the case of insured respondents while it was double of this figure in the case of non-insured respondents. More importantly, while no insured respondent raised the question of affordability, more than 63 percent of non-insured respondents mentioned it as the best reason why they did not get all the medicines prescribed to them.

Respondents were also asked about their expenses on health care services in the last four weeks before the survey and their in-patient (overnight stay in a health facility) and out-patient health care utilization in the last 5 years and 12 months before the survey, respectively. They were also asked how long it took them to be admitted after the need for hospitalization was realized, and about the way they were greeted and respected at the facilities. The descriptive analysis result showed that there was no significant differences in receiving out-patient care and in the time needed to be admitted to a hospital between rich and poor respondents (see Appendix 12). However, rich respondents were more likely to spent money on health services (with a recall period of 4 weeks) and seeking in-patient care. Seventy four percent of the richest quintile had positive expenses on health services during the last 4 weeks before the survey compared to only 36 percent in the poorest quintile. Thirteen percent of the richest quintile compared to nine percent of the poorest quintile also stayed overnight in a hospital over the last 5 years before the survey.

Statistically significant differences were also observed between member and non-member respondents both in hospitalization and in the time needed to be hospitalized. Nineteen percent of insured respondents stayed overnight in a hospital compared to only ten percent of non-insured respondents. More importantly, despite income did not have any significant effect on the waiting

time to be admitted to a hospital membership in health insurance did. Ninety percent of insured respondents admitted to a hospital the same day they needed hospitalization compared to 74 percent in the case of non-insured respondents and no insured respondent waited more than a week to be admitted while more than 8 percent of non-insured respondents stayed between one and more than three months (see Fig. 8).

Fig. 8. In and out-Patient Care Utilization by Insurance Status



Significant differences were also observed in evaluation of the in-and-out patient health care services. As shown in Fig. 7, sixty one percent of insured respondents were satisfied with the health care system and ninety and eighty percent of patients were greeted and talked with respect during their in-patient and out-patient stay in health care facilities, respectively. The corresponding figures for non-insured respondents were 52, 70, and 62 percent, respectively.

All these results reveal that insured respondents were more likely to get health care given need, to use in-patient services more frequently and to be admitted to a hospital sooner, less likely to raise the affordability issue as a reason for not seeking health care and not getting the full medicine prescribed to them, and so on. To verify whether these results were simply because insured respondents were also rich individuals, we estimate a logit regression model with all potential variables included as explanatory variables. The results are presented in Appendix 13. For the sake of simplicity, only the sign and the significance level of the coefficients are shown.

Most of the results are consistent with the descriptive analysis. Women, rich and insured respondents needed more health care than their counter parts. Poor respondents are also more likely not to get health care and all prescribed medicine due to lack of money. Controlling other variables, insurance status explains perfectly the probability of getting health care given need, the probability of not mentioning the issue of affordability as a reason for not seeking care and buying all the medicine prescribed. *Ceteris paribus*, insured

respondents are more satisfied with the health care system and more likely to be respected and greeted well when seeking both in-and out-patient health care than non-insured respondents, which implies that the health care system in Senegal is responsive to the demands of insured individuals. Similar findings were reported by Jütting (2004) for Senegal and by Msuya, et al. (2004) for Tanzania. However, the results should be taken in caution since the health insurance membership variable can be endogenous in the system (see Jütting 2004 for the details).

4.2. Distribution and Structure of Health Expenditure

In this section, we used some parts of the household level questionnaire to compute the level of out-of-pocket payments for health and its share from total consumption and capacity of households to pay. We also investigate the distribution of impoverished households across expenditure quintile.

As shown in Appendix 14, the mean monthly expenditure ranged from 26,300 in the poorest quintile to 330,000 F CFA in the richest quintile and the average was F CFA 128,000. This was equivalent to a per capita income of US\$ 670, which was as expected higher than the US\$470 reported by the World Bank using Atlas method. The average household size equivalised per capita monthly expenditure was 41, 500 F CFA. This was also higher than the minimum monthly salary of 37, 000 F CFA per person (Jütting 2004) in the country. The per capita income of the poorest quintile of F CFA 330/day was not more than the adult equivalent adjusted poverty threshold of F CFA 328/day estimated by IMF (IMF 2002).

The per capita health expenditure per month was F CFA 2,230 (US\$34 per annum) which was higher than the per capita total expenditure on health of US\$ 22 reported by WHO in 2001 (WHO n.d). The absolute magnitude of the per capita health expenditure showed significant difference across expenditure quintiles. If we use households with positive health expenditure, the per capita health expenditure of the richest quintile would be 12 times more than the poorest quintile and the difference would increase significantly if the total sample was used.

Given the considerable difference in the total expenditure among different income groups, we would not expect significant difference in the share of out-of-pocket health expenditure from the total expenditure as shown Appendix 14. The average share of health expenditure from the total expenditure was 10.56 percent and it was 10.01 percent for the poor. This supports the findings of some researchers, which said that even poor households in developing countries spend between 5 and 10 percent of their income on health care (van Ginneken1 996). There was also no big difference in the share of out-of-pocket health expenditure from the capacity to pay of households if all households are included in the analysis since as we have seen before, poor households are less likely to spent on health services. However, large difference was observed in the share of out-of-pocket health

expenditure from the capacity of households to pay. The out-of-pocket health expenditure constituted nearly sixty percent of the non-subsistence effective income of the poorest quintile compare to only 21 percent of the richest quintile.

Similar interesting differences were observed between insured and non-insured households. Despite the mean total expenditure and the mean total health expenditure of insured households was higher than their non-insured counterparts, the shares out-of-pocket expenditure from the total expenditure and from the non-subsistence effective income were very low for insured households (see Fig.9 and 10).

Fig. 9. monthly Per Capita Total and Health Expenditure

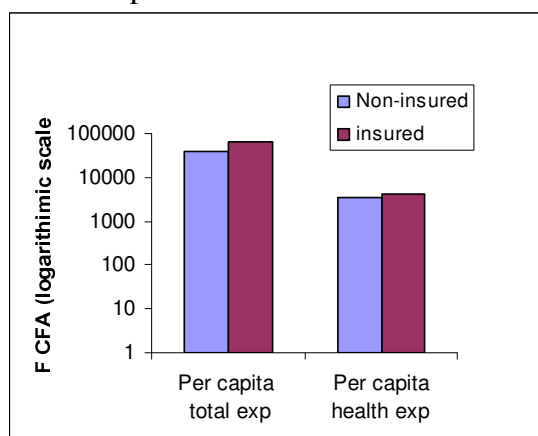
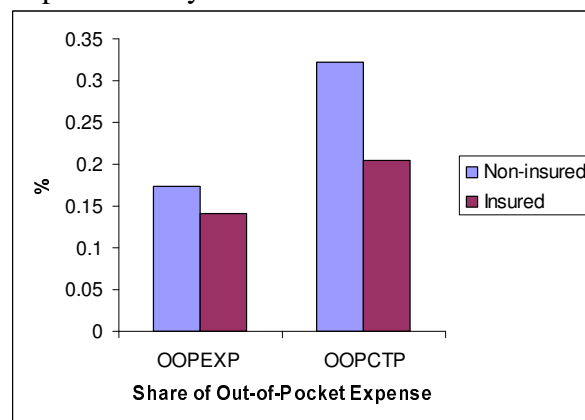


Fig. 10. Share of Out-of-Pocket Health Expenditure by Insurance Status



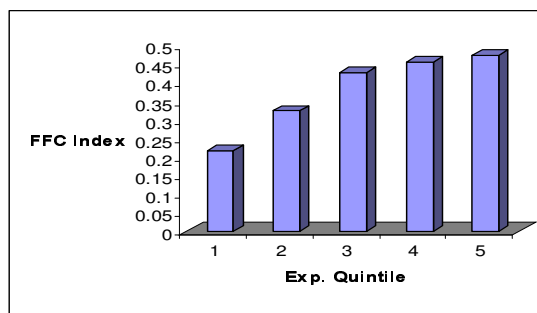
4.3. Fairness in Financial Contribution and Catastrophic Health Spending

Depending on their economic and social development, different countries have been adopting different health care financing strategies. Generally, a health care financing system is considered as fair if the share of households' health expenditure from the non-subsistence effective income is the same across different income groups (WHO 2004). To examine the fairness of financial contribution in Senegal, we computed a Fairness in Financial Contribution (FFC) index (See WHO 2004), which measures the level of inequality in households' contribution to the health care system. The index also measures the depth of inequality by giving more weight for those households with high proportion of their non-subsistence income spent on health. The index is expected to lie between zero and one and the unjust the health care financing system the closer the value FFC to zero.

Based on the households with positive health expenditure, the FFC index in Senegal ranges from 0 to 0.682 and the mean value was 0.395. As depicted in Fig. 11, striking difference was observed in the distribution of the FFC index across income groups. The share in the financial contribution of the poorest quintile into the health system was much higher

than the share of other quintiles. In other words, the relatively rich households did not pay a fair share of their disposable income to the health system.

Figure 11. Distribution of FFC



This leads us to what is known as catastrophic health expenditure. Catastrophic health expenditure is defined as a situation where a household's out-of-pocket health payment consumes more than 40 percent of its non-subsistence expenditure or 20 percent of its total expenditure (Xu, et, al. 2003). The analysis can also be made conditionally and unconditionally. The unconditional analysis is based on all respondents irrespective of their level of spending on health. The conditional analysis on the other hand is based on households with positive health expenditure. If we start with the unconditional analysis, nearly 15.63 percent of the sampled households in Senegal faced catastrophic health payments. This figure is much higher than the 0.55 percent found in Senegal in 1994 by Xu, et al. (2003)² and even higher than the highest figure reported in the study (10.5% in Vietnam). If we take only households with positive health expenditure (conditional analysis), the proportion of households with catastrophic health expenditures increased dramatically to 28.78 percent. This is not surprising since as we have seen before the poor is less likely to spend on health compared to the non-poor. These results remain the same if the threshold of catastrophic health expenditure is changed from 40 percent of non-subsistence expenditure to 20 of total household's expenditure.

Theoretically, various factors may affect the incidence of catastrophic health expenditure. Fig. 12 portrays the proportion of households facing catastrophic health expenditure across expenditure quintile. If we take the overall sample, 22 percent of the poorest quintile faced catastrophic payment from out-of-pocket health expenses and the proportion declined as we move towards the richest quintile. The difference would be very high if we took households with positive health expenditure. More than 60 percent of households in the poorest quintile faced catastrophic health expenditure compared to only 17 percent in the richest quintile. In addition to income, location also affects the incidence of catastrophic health expenditure. Households in the rural areas had high rates of catastrophic spending (22 percent) than households in urban areas (11.4 percent).

² In Xu, et. al, study the highest proportion of households with catastrophic spending was 10.5% in Vietnam.

Consistent with theory and expectations households covered by any type of health insurance were less likely to face catastrophic expenditure from out-of-pocket health payments. The proportion of non-insured households who faced catastrophic health expenditure was more than double of insured households. More interestingly, insured households were less likely to experience catastrophic expenditure from out-of-pocket health payments despite their level of income and the place they live. Fig. 14 and 15 demonstrated that despite proportion of households with catastrophic health expenditure was relatively low in urban areas and for rich households, insured households were better off in all cases. Especially, the proportion of households faced catastrophic health expenditure was lower for the poor but insured households than for the rich but non-insured households. This also implies that the incidence of catastrophic health expenditure was very high for non-insured poor and rural households.

Fig. 12. Catastrophic Health Expenditure by Expenditure Quintile

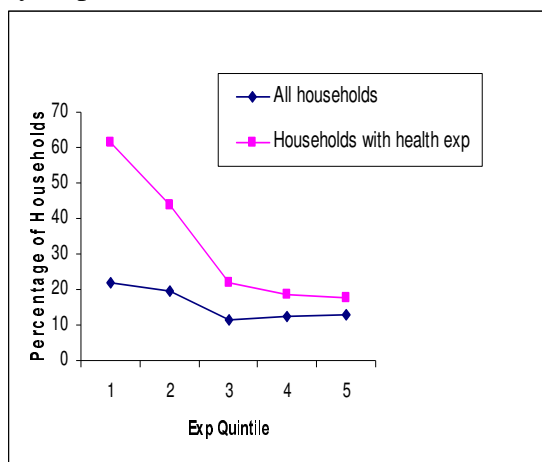


Fig. 13. Catastrophic Health Expenditure by Location

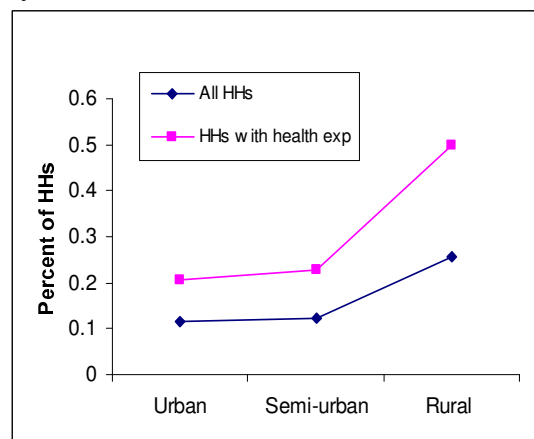


Fig. 14. Catastrophic Health Expenditure by Exp. Quintile and Insurance Status

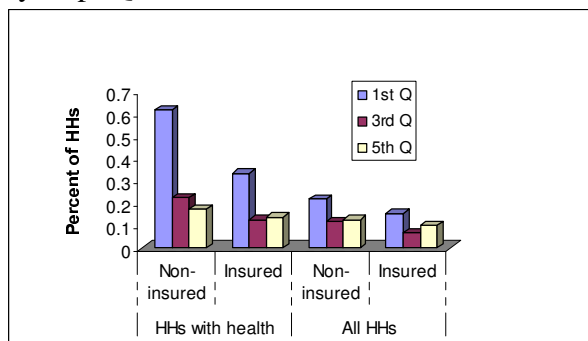
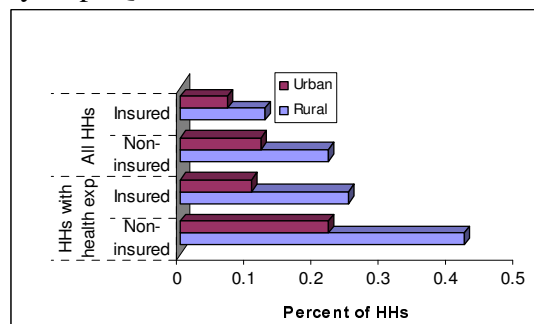


Fig. 15. Catastrophic Health Expenditure by Exp. Quintile and Location



A regression analysis was also conducted to analyze the determinants of the incidence of catastrophic out-of-pocket health expenditure. Household level indicators such as income, location, health insurance status, family size, and the level of out-of-pocket health expenditure

were used as explanatory variables. It is hypothesized that rich, insured, and urban households will be less likely to face catastrophic health expenditure. It is also assumed that the magnitude of the out-of-pocket health expenditure increases the incidence of catastrophic health spending. The dependent variable was the incidence of catastrophic health payments and we estimated both the conditional and the unconditional specifications. As shown in Table 2, the signs of the coefficient of the explanatory variables in both the unconditional and the conditional specifications were quite similar. However, as expected, the marginal effects in the conditional model are higher than that of in the unconditional model.

Most of the results are consistent with the descriptive analysis. Rural and poor households were more likely to face catastrophic expenditure than urban and rich households, all other things remaining constant. As depicted by the magnitude of the coefficients, the probability of the occurrence of catastrophic health payment also declined as we move from the second to the fifth quintile. Taking households with positive health expenditure, a movement of a household from the poorest quintile to the fifth quintile, for instance, reduces the probability of the incidence of catastrophic health expenditure by 57.6 percent compared to by 17.6 percent for a movement from the poorest to second quintile. As expected, an increase in the magnitude of the out-of-pocket payments increases the probability of the incidence of catastrophic payment, *ceteris paribus*. A ten percent increase in the out-of-pocket expenditure of households increased the probability of the incidence of catastrophic expenditure by around 2.35 percent.

Table 2. Determinants of Catastrophic Health Expenditure

Variable	Unconditional		Conditional	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Setting	-0.544***	-0.00005	-0.569***	-0.0701
First quintile (reference)				
Second quintile	-2.403***	-0.00014	-2.442***	-0.1764
Third quintile	-4.780***	-0.00026	-4.854***	-0.3059
Fourth quintile	-6.122***	-0.00028	-6.221***	-0.3918
Fifth quintile	-8.111***	-0.00044	-8.216	-0.5768
Insured	-0.724*	-0.00005	-0.736*	-0.0698
Ln out-of-pocket health expenditure	1.927***	0.00018	1.968***	0.2356
Ln family size	0.925***	0.00008	0.940***	0.1125
Constant	-16.155***		-16.502***	
No of observations	2544		1370.000	
Log likelihood	-472.529		-467.464	
LR chi2(8)	1308.360		740.530	
Prob > chi2	0.000		0.000	
Pseudo R2	0.581		0.442	

***, **, * significant at one, five and ten percent level, respectively

The coefficient of the family size variable was positive and significant indicating that other things remaining constant big family size households were exposed to catastrophic health

expenditure than small sized households. Interestingly, the insurance status variable picked a negative sign and was statistically significant at less than 10 percent significance level indicating that the incidence of catastrophic health payments were less in insured households. Specifically the results showed that, given positive health expenditure, the probability of facing catastrophic health payment decreased by 7 percent if a household covered by any type of health insurance, *ceteris paribus*.

4.4. Health Care Financing Strategy of Households

At a household level, various financing mechanisms can be used to cover out-of-pocket health expenses. The literature show that households, especially poor households try to cover out-of-pocket health expenses through borrowing, selling asset such as livestock, land, etc. since these expenses are usually higher than their cash savings (Sauerborn et al., 1996, Jütting 2004, Msuya, et al. 2004, Asfaw 2003). Unplanned sale assets especially productive assets such as land, oxen, etc., may decrease the productive ability of households and their future income generating capacity. Table 3 portrayed the mechanism of health care financing in the last 12 months before the survey in the sampled areas.

As expected, the poor hardly used savings as a major financing mechanism. Only 4 percent of the first quintile used their savings to cover their health care costs during the year compared to 18 percent of the fifth quintile. On the average only 3 percent of households' health expenditure was covered through payments or reimbursement from a health insurance plan and this varied from 2 percent in the poorest quintile to 7 percent in the richest quintile. Consistent with expectations and other studies (Msuya 2004), the poor were more likely to sell asset and to borrow from someone other than a friend or family than the rich. Nearly 22 percent of households in the poorest quintile sold some items and 11.5 percent borrowed from outside to cover their health expenditure in the last 12 months before the survey compared to only 10.2 and 9.8 percent of households in the richest quintile, respectively.

Table 3. Health Expenses Financing Mechanism by Expenditure Quintile and Insurance

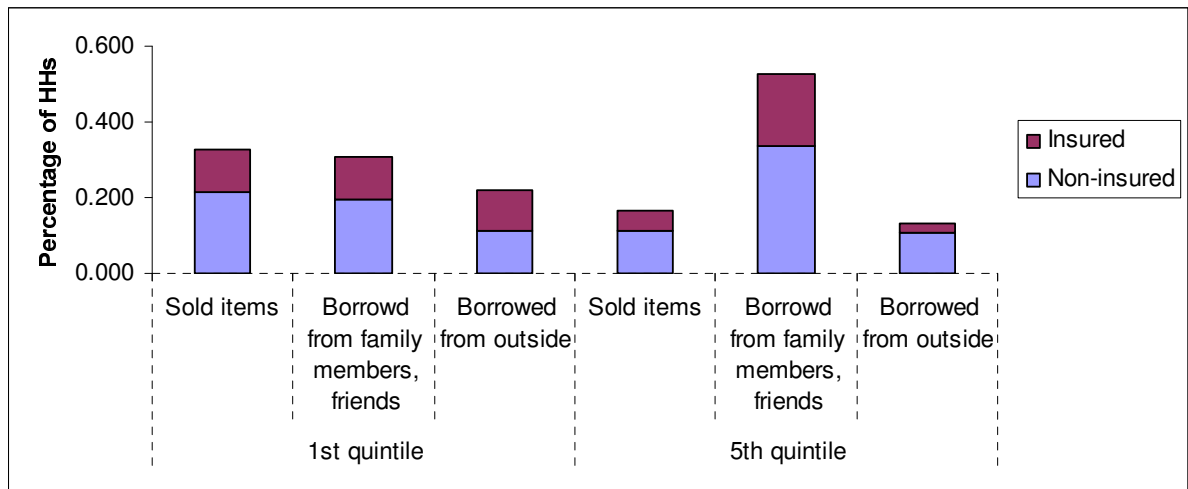
Variable	Overall		Exp. quintile		Insurance Status	
	Obs.	Mean	1 st	5 th	Non-Insured	Insured
Current income	2762	0.723	0.714	0.739	0.719	0.794
Savings	2341	0.093	0.044	0.178	0.083	0.208
Health insurance	2330	0.033	0.019	0.074	0.014	0.312
Sold items	2332	0.148	0.217	0.102	0.154	0.044
Family members, friends	2389	0.276	0.201	0.328	0.279	0.123
Borrowed from outside	2295	0.129	0.115	0.098	0.132	0.061

Health insurance also played a significant role in protecting households from welfare threatening health care financing mechanisms. Insured households tended to depend on their own savings and health insurance compared to non-insured households. Nearly 28 and 13 percent of non-insured households were borrowed money from friends and outside compared

to only 12 and 6 percent of insured households, respectively. The role of insurance in protecting members against welfare threatening health care financing methods was more evident in the case of selling asset. Nearly 15 percent of non-insured households sold some item to finance their health expenses compared to only 4 percent of insured households.

Further analysis was carried out to investigate whether insured households were protected against welfare threatening ways of financing health expenditure merely because members were rich. As Fig. 16 clearly demonstrated, insured households were less likely to sell asset, to borrow from friends, or to borrow from outside so as to cover health expenses irrespective of their income level. In other words, the percentage of insured households who relied on selling assets or borrowing money to cope with health expenses was very low at every expenditure quintile.

Fig. 16. Welfare Threatening Ways of health Care Financing by Expenditure Quintile and Insurance Status



4.5. Health Insurance and Poverty

Recently, researchers and policy makers have given special attention to improve the access of the poor to basic health services. Health care development is increasingly considered not only as one of the ultimate goals of economic and social development but also as an important instrument in fighting poverty [WHO 2000]. In response to this reality, the international community set eight development goals (known as the Millennium Development Goals), of which one-third are directly related to health. Various research findings at both the macro and the micro levels have also shown that poverty and health are highly interrelated [Wagstaff, 2002, WHO 2000]. Poor health triggers poverty by reducing the capacity of households to use their labour and by consuming a significant portion of income that would have been used for other productive purposes. In this section, we investigate the impact of health insurance on poverty. It is hypothesized that health insurance by protecting households from high

unforeseen out-of-pocket expenses reduces the chance of impoverishment. Health insurance is also expected to improve the health status of individuals and consequently to reduce the problem of unemployment associated with ill health. We use the following two indicators to measure the impact of out-of-pocket health payments and consequently health insurance on poverty.

4.5.1. Impact of health insurance on impoverishment and deepening of poverty

Out-of-pocket health expenditure can drive people to poverty or deepen poverty. Impoverishment is defined as the state of being reduced to poverty because of health payments. We use a head count index to measure impoverishment. Deepening of poverty on the other hand is defined as a situation where health payments intensify the problem of poverty within poor households. The poverty gap index is used to measure the effect of out-of-pocket payments on deepening of poverty.

We use adult equivalent subsistent expenditure to compute the poverty line. Households with expenditure below the average of the 45th and 55th percentile range of total expenditure were considered as poor. Out of the 3,352 households with a valid response, 22 percent were below the poverty line. This figure is comparable to the 24 percent figure reported by the World Bank for Senegal (2001) based on the criteria of population below minimum level of dietary energy consumption (World Bank 2004).

First, we examine the impact of out-of-pocket payments on impoverishment. Out of 2651 households above the poverty line, 5 percent were impoverished by health payments. In other words, the head count index showed that the proportion of households for whom consumption was less than the poverty line had increased by 5 percent. Various factors may explain the incidence of impoverishment. Appendix 15 provided the distribution of impoverishment by sex, education level and insurance status of the household head (person that provides the main economic support), and family size and location of the household. As the table showed less educated, rural, and big sized households were more likely to be impoverished than educated, urban, and small sized households. Insurance also played an important role. More than 5 percent of non-insured households were impoverished compared to only 2.91 percent insured households (though the difference was not significant at 10 percent level). Sex and age of the household head were not important variables in explaining the incidence of impoverishment.

Out-of-pocket health payments also affected 41 percent of the 742 households below the poverty line. The poverty gap index was 0.36 before the out-of-pocket payments made and it jumped to 0.42 after the payment. As it is the case in the incidence of impoverishment, rural, illiterate, and big family sized households were more affected. Surprisingly, unlike in the case of non-poor households, membership in a health insurance scheme did not protect poor households from the downside effect of out-of-pocket payments. This was mainly because only

2 percent of poor households (compared to 8 percent of non-poor households) were covered by any type of health insurance plan.

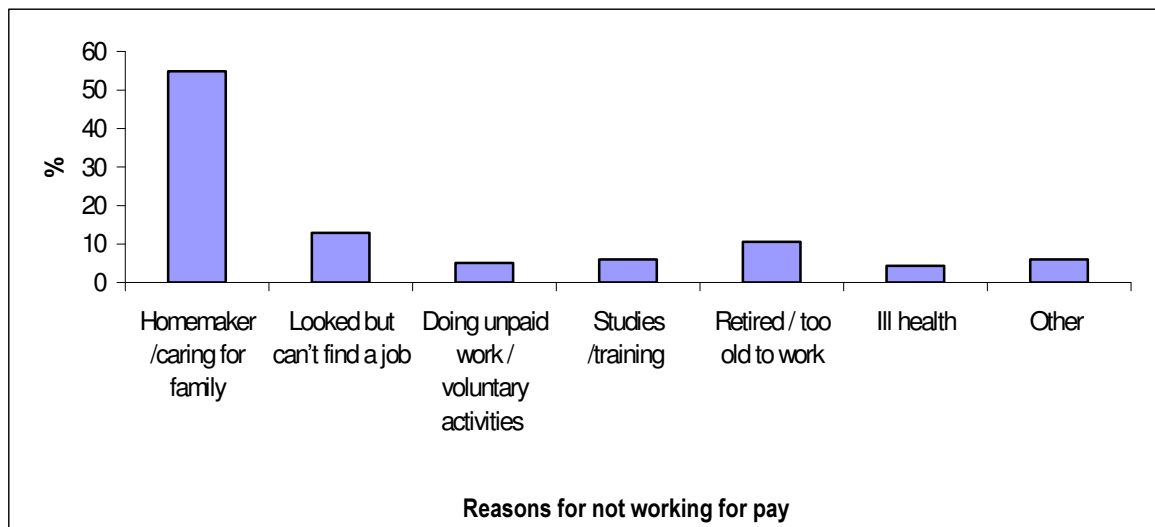
The above results revealed that out-of-pocket health payments impoverished non-poor households and deepened poverty in already poor households. Rural and less educated households were more vulnerable in both cases compared to urban and literate households.

4.5.2. Health Insurance and Illness Inflicted Unemployment

We have also tried to examine the impact health insurance on unemployment especially on the reasons of respondents for not working for pay. We use the individual level survey since it has detailed information on the employment status and reasons for not working for pay. Out of 1888 respondents with valid responses, 4.8, 11.6, 48.3 and 1.22 were government employee, non-government employee, self-employed and employer, respectively, and the remaining 34 percent were not working for pay. This unemployment figure is less than the 48 % unemployment figure given by the UNDP for the year 2001 (UNDP 2002). Fig. 17 presented the reasons for not working for pay.

Out of the total respondents who were not working for pay, 55 percent were caring for family, 13 percent looking but could not find a job, 5 percent doing unpaid voluntary work, and 10 percent were too old to work. We were more interested on the illness variable and its distribution. As Fig. 17 showed, more than 4 percent of the respondents were unemployed due to ill health. The distribution of these respondents across income, sex, education and insurance status gave interesting results.

Fig 17. Reasons for not working for pay



Male respondents were more likely to raise the issue of illness as a reason for not working for pay compared female respondents. This was mainly because most of female respondents were occupied by home care (79%) compared to male respondents (3%). Only 2.6 percent of literate and 3.02 percent of urban respondents were not healthy to work for pay compared to 5.38

percent of illiterate and 5.32 percent rural respondents. While older respondents were more likely to raise the issue of ill health as a reason for not working, family size of the respondent did not have any significant impact. More interestingly, income did not explain the proportion of respondents who were not able to work due to illness. Rather than income, health insurance status of respondents was very important in explaining the distribution of respondents who were not able to work for pay due to illness. While more than 4.7 percent of non-insured respondents were unable to work due to illness none of insured respondents were unemployed due to ill health. This implies that membership in a health insurance was more important than income in reducing the probability of not working for pay due to illness.

4.6. Determinants of Health Insurance Membership

As it is the case in most developing countries, the coverage of health insurance in Senegal is very low. The percentage share of prepaid plans from the total private expenditure was 8.4 in 2001(WHO, n.d). Based on our data set, 5.41 percent of respondents were covered by some kind of health insurance plan. Roughly, two-third of the households were covered by a mandatory and the remaining one-third by a voluntary health insurance plan. The average contribution in the voluntary health insurance plan was around F CFA 195 per person per month, nearly 1 percent of households' average per capita total expenditure. Various individual, household, occupational, and community characteristics are expected to affect the decision of households to join a health insurance plan. In this study we use education, age, income, location, and family size as factors that may affect the enrollment of individuals in a health insurance plan³.

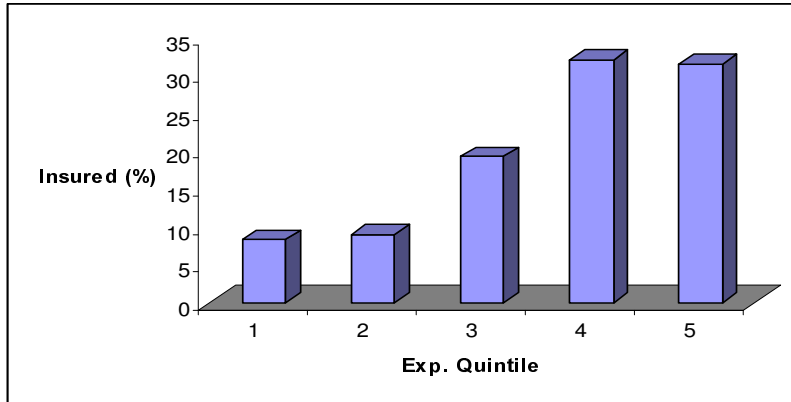
The descriptive analysis shows that more educated and urban households were more likely to join health insurance plan and the differences were statistically significant. However, there was no significant gender difference. As shown in Fig. 18, income was another important variable that affected the enrollment of households with health insurance. Among the 559 respondents in the 5th quintile, more than 31 percent were covered by health insurance compared to only 8 percent in the poorest quintile. Similar findings were reported by Jütting (2004) for Sengal. Households with big family size were also less likely to be enrolled in insurance plans. Out of 740 households with an average family size of 12.5 only 4.27 were covered by a health insurance compared to 7 percent in households with an average family size of 4.6.

The logit regression result (not shown) also supported the descriptive analysis. More educated and richer respondents were more likely to be enrolled than illiterate and poor households. More respondents in the urban areas were also enrolled than in rural areas and big family size negatively affected the probability of a household to be enrolled in a health

³ Other variables such as ethnicity, availability of health care facility, religion, occupation, membership in other organizations, the premium level, risk perception, previous health care financing history, etc. will be included in the analysis based on the availability of reliable information.

insurance plan. In contrast to the descriptive analysis, the sex variable was positive and significant indicating that women respondents were more likely to be insured than men respondents.

Fig. 18. Percentage of Insured Respondents by Exp. Quintile



Members of community health Insurance programs were also asked how high the contribution was compared to the benefits they get from the schemes. Out of 99 households with valid response, 84 percent replied that the premium level was not very high or high compared to the benefits they were getting and 20.6 percent replied that it was not very difficult or difficult for them to pay the monthly contributions. However, these responses could not be representative since only member respondents (who were also relatively rich) were asked. We could not find any systematic difference across income groups in their response to the above questions though the rich tended to complain more than the poor did.

5. Summary and Policy Implications

As it is the case in other Sub-Saharan Africa countries, health care finance is a serious problem in Senegal. The average percentage share of health expenditure from the GDP was not only 4.8 % in 2002, which is half of the 9% recommended by WHO, but has also declined from 5.1 % in 1997 to 4.8 % in 2001. During the same period however, the share of out-of-pocket payments and external sources from the total health expenditure has shown positive trend indicating that the country has greatly depended on foreign sources and out-of-pocket payments. Not only the health expenditure that was financed by the private sector was very high (more than 41 %) but also the share of prepaid plans from the total private expenditure was very low (only 8.4 % in 2001). These imply that the majority of the population was not covered by both formal and social health risk management institutions. In this study, we have tried to analyze the impact of health insurance (both social and formal) on the health status, utilization, and incidence of catastrophic payments, and poverty of households in Senegal. The main findings of the study and their implications are summarized as follows.

Health Status:

- Women and rural respondents tended to have poor health almost in all indicators. There was no statistically significant difference in most of the self-evaluated health status indicators across different income quintiles but the poor tended to suffer from under and the rich and women from over nutrition problem based on BMI indicators. Education is an important variable in explaining the health status of respondents. The policy implication is that more attention should be given to gender specific illness and diet education should be encouraged specially to women and rich households.
- No statistically significant difference between insured and non-insured respondents in most of the indicators though insured respondents were more satisfied with their health status (47%) than non-insured (42%) and few insured respondents (5%) rated their health status as bad or very bad compared to non-insured (8%).

Utilization of Health Services:

- Maternal health care utilization level of urban and educated women was much higher than that of rural and illiterate women in almost all indicators, especially in delivery. Income and insurance status were important only in explaining differences in blood test and professional delivery. In the case of child health care utilization, there was no significant and meaningful difference between different groups. Especially the absence of gender discrimination should be encouraged.
- Significant differences were also observed in the reasons for not seeking care given need and not getting all the medicines prescribed given medicine between insured and non-insured and among different expenditure quintiles. For instance, no insured respondent raised the issue of affordability as a reason for not getting all the medicine prescribed while 63 % of non-insured and 9 % of respondents in the richest quintile did.
- No significant differences observed in getting out-patient care and in waiting time to be hospitalized across expenditure quintile. However, insured respondents were more likely to use in-patient services and to be admitted to a hospital sooner than non-insured respondents. Insured respondents were also more satisfied with the health care system and greeted well when seeking both in-and out-patient care.

- All these results imply that, insured respondents were better off in most of the utilization indicators especially in getting in-patient care. However, the over all health care utilization can be further improved if health insurance plans can cover out-patient services with some co-payments (to discourage moral hazard problem).

Health Expenditure and Catastrophic Health Spending

- The per capita health expenditure of the richest quintile was 12 times higher than the poorest quintile if households with positive health expenditure were taken. The difference would be much higher than this if we took all households since the poor was likely to spend on health. The share of out-of-pocket health expenses from the capacity to pay in the poorest quintile was 60 % compared to 21 % in the richest quintile. This implied that despite the mean total expenditure and total health expenditure of insured households were higher than non-insured households, the shares of out-of-pocket health expenditure from the total expenditure and from the non-subsistence effective income were very low for insured households.
- There was significant difference in the Fairness in Financial Contribution index across expenditure quintile. The index shows that the financial contribution of the poorest quintile was much higher than other quintiles implying that the financial contribution in Senegal was unfair.
- Out of the total households, more than 15 % of faced catastrophic health payments (out-of-pocket health payment was higher than 40 % of the households' non-subsistence expenditure). The proportion of households who faced catastrophic health payments would rise to 28.78% if only households with positive health expenditure were considered.
- The poorest quintile and rural households were more likely to face catastrophic health expenditure while households covered by any type of health insurance were less likely to face catastrophic expenditure from out-of-pocket health payments. Specifically the regression results revealed that the probability of facing catastrophic health payments declined by 7 % if a household was covered by any type of health insurance, ceteris paribus.

Health Care Financing Strategy

- Only 4 % of the poorest quintile used savings to cover out-of-pocket health payments compared to 18 % of the richest quintile. At the same time, only 3 % of households' health expenditure was covered through payments or reimbursement from health insurance plan and it varied from 2 to 7 % between the poorest and the richest quintile.
- Nearly 22 % of households in the poorest quintile sold some items and 11.5 % borrowed from outside to cover health expenses compared to only 10.2 and 9.8 % in the richest quintile, respectively.
- Health insurance played a significant role in protecting households from welfare threatening health care financing mechanisms such as selling asset, borrowing from outside, etc., and this holds true for all income groups. The results showed that insured households at all income levels were less likely to sell asset and to borrow from both friends and outsiders than non-insured households.

Health Insurance and Poverty

- Based on the adult equivalent subsistence expenditure (the average of 45th and 55th percentile), 22 percent of Senegalese were below the poverty line. This figure is

comparable to the 24 percent figure reported by the World Bank for Senegal (2001) based on the criteria of population below minimum level of dietary energy consumption.

- Out of 2651 households above the poverty line, 5 percent were impoverished by health payments and non-insured, less educated, rural, and big sized households were more likely to be impoverished. For instance, more than 5 % of non-insured households were impoverished compared to only 2.9 % of insured households.
- Out-of-pocket health payments also deepened poverty in 41 % of households below the poverty line. More importantly, membership in insurance plans could not prevent deepening of poverty mainly because only 2 percent of the poor households were covered by any type of health insurance plan.
- Out of the total respondents who were not working for pay (34%), more than 4% were unemployed due to ill health. Interestingly income did not explain the proportion of households who were unemployed due to illness but membership in a health insurance did. More than 4.7% of non-insured respondents were unemployed due to illness while no single insured respondent raised the issue of ill health as a reason for not working for pay. This implies that health insurance plans by improving access to health care reduced the probability of not working for pay due to illness for all income groups.

Health Insurance Membership

- 5.5% of respondents were covered by some of type of health insurance of which one-third by voluntary health insurance schemes. The average monthly contribution in the voluntary health insurance plan was around F CFA 195 per person or US\$3/year/person. This is equivalent to 1% of the households' average per capita expenditure.
- Income is the most important variables that affect the decision of respondents to be a member of health insurance plans. Out of 559 respondents in the richest quintile, 8.7% were covered by health insurance compared to only 2.41% in the poorest quintile.
- For members the insurance premium level was not high compared to the benefits and most of them replied that it was not difficult to pay the premium. However, this would not be representative since only member households (who were also rich) were asked.

In Conclusion

Health insurance plays a significant role in enhancing health care utilization and in protecting households from catastrophic out-of-pocket health payments in Senegal. It also helped to reduce illness-inflicted unemployment significantly. However, most of the population especially the poor and rural households were not covered by any health insurance plans. Out-of-pocket health expenditure still consumes a significant share of the total health expenditure. Therefore, attention should be given to expand the coverage of health insurance in the country.

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Appendix 1. Basic health indicators, 2002

	Senegal	Developing countries
GNI per capita Atlas method (current US\$)	470.0	1,170.0
Literacy rate, adult female (% of females ages 15 and above)	29.75	57.51
Literacy rate, adult total (% of people ages 15 and above)	39.25	64.89
Life expectancy at birth, total (years)	52.31	64.6
Mortality rate, under-5 (per 1,000 live births)	138	88.0
Immunization, measles (% of children ages 12-23 months)	54	71.2
Improved water source, rural (% of population with access) (2000)	78	70.0
Adult HIV prevalence (2001)	1.0	
Hospital beds (per 1,000 people) (1991/1998)	2.8	0.4
Physicians (per 1,000 people) (1993/1998)	0.1	1.2
Health expenditure per capita (current US\$) (2001)	22.0	72.4
Health expenditure, total (% of GDP)	4.8	5.8

Source: World Bank, World Development Indicators, Senegal Ministry of Health, USAID

Appendix 2. Health Status Indicator Variables

No.	Variable	Description
I	Self evaluation	
1.1	Self health rating-not healthy	1 if the self health rating is bad or very bad
1.2	Pain /discomfort	1 if the individual has mod./worse pain/discomfort in the last 30 days
1.3	Satisfied with health	1 if the respondent is very/satisfied with his/her health
1.4	Child sick	1 if the youngest child was sick in the last 3 months
II.	Evaluation of the enumerator	
2.1.	Any health problem observed	1 if the enumerator observed any health problem
III	Anthropometrics (BMI)	Weight in k.g. / height in c.m ²
3.1	Severely underweight	1 if BMI is < 16
3.2	Under weight	1 if BMI is < 18.8
3.3	Healthy	1 if BMI is between 18.5 and 25 inclusive
3.4	Overweight	1 if BMI is > 25
3.5	Obesity	1 if BMI is > 30

Appendix 3. Health Status Indicators by Sex and Location

No.	Variable	Valid cases	Total (%)	Sex (%)			Location (%)		
				Male	Female	anova F-stst	Rural	Urban	anova F-stat
I	Self evaluation								
1.1	Self health rating-not healthy	2757	8.02	6.25	9.98	12.9*	9.55	6.11	10.1*
1.2	Pain /discomfort in the last 30 days	2860	30.73	25.93	35.46	30.7*	31.12	29.74	0.56
1.3	Satisfied with ones own health status	2701	42.58	43.46	41.63	0.9	40.69	44.69	3.7 ⁺
II.	Evaluation of the enumerator								
2.1.	Any health problem observed	3222	11.73	10.31	14.07	10.1*	10.30	13.28	5.9*
III	Anthropometrics (BMI)								
3.1	Severely underweight	1618	3.89	3.30	4.65	1.93	5.04	2.50	6.6*
3.2	Under weight	1618	13.49	13.75	12.91	0.24	14.81	11.56	3.3 ⁺
3.3	Healthy	1618	61.87	66.06	56.46	15.4*	62.69	61.90	0.1
3.4	Overweight	1618	24.54	20.00	30.63	24.2*	22.35	26.43	3.1 ⁺
3.5	Obesity	1618	6.30	3.40	10.36	32.6*	6.05	6.31	0.4

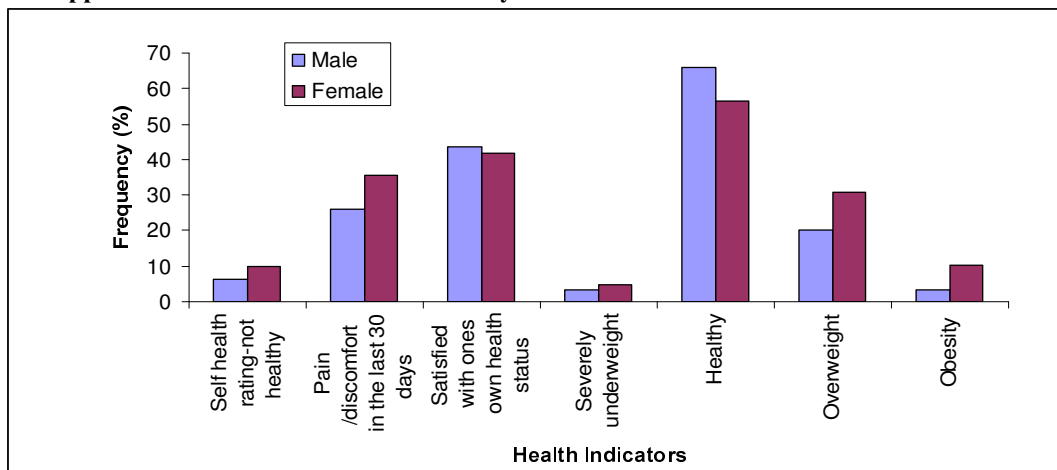
* Difference is significant at better than the 1 % level

⁺ Difference is significant at better than the 10 % level

Appendix 4. Health Status Indicators by Expenditure Quintile

Variable	Frequency by Expenditure Quintile (%)					
	1st	2nd	3rd	4th	5th	F-stat
Self evaluation						
Self health rating-not healthy	9.19	8.13	6.42	7.87	7.98	0.73
Pain /discomfort in the last 30 days	30.18	30.41	21.69	28.22	31.73	0.55
Satisfied with ones own health status	39.70	42.26	40.67	43.65	47.05	1.76
Anthropometrics (BMI)						
Severely underweight	6.21	4.06	4.05	3.25	2.39	1.72
Under weight	15.52	15.87	12.77	13.35	11.17	1.05
Healthy	65.86	66.42	63.86	58.58	57.56	2.35 ⁺
Overweight	18.62	17.71	23.36	27.81	31.03	5.87*
Obesity	5.17	5.17	6.85	6.80	6.63	0.40

Appendix 5. Health Status Indicators by Gender



Appendix 6. Determinants of Health Status: Logit Regression Results

Explanatory Variable	Dependent variables			
	Self health rating -not healthy	Pain/ Discomfort	Satisfied with ones health	Healthy (BMI b/n 18.5 and 25)
Sex (1 = female)	0.464***	0.477***	-0.097	-0.500***
Insured (1 = insured)	-0.284	-0.126	0.176	-0.260
Illiterate(reference)				
Elementary	-0.117	0.030	-0.031	-0.270
High school	-0.277	0.077	0.043	0.166
College	-1.368*	-0.332	-0.444**	-0.214
First quintile (reference)				
Second quintile	0.113	-0.077	0.066	-0.107
Third quintile	-0.116	0.020	0.016	-0.169
Fourth quintile	0.204	-0.074	0.128	-0.534***
Fifth quintile	0.379	0.111	0.221	-0.390**
age	0.044***	0.032***	-0.001	-0.009
urban/semi-urban)	-0.494***	-0.086	0.081	0.145
Family size	-0.008	-0.018	-0.009	0.030
Constant	-4.313***	-2.141***	-0.238	1.089
Log likelihood	-548.063	-1341.32	-1501.376	-846.140
Number of observation	2228	2306	2205	1311
LR chi2(12)	110.38	135	10.58	41.7
Prob > chi2	0.0000	0.0000	0.565	0.0000
Pseudo R2	0.0915	0.0479	0.0035	0.0240

***, **, and * significant at 1, 5 and 10 percent levels, respectively

Appendix 7. Health Care Utilization Indicator Variables

No.	Variable	Description
I	Maternity Care	Women aged 18-49 years old with a live birth in last 5 years
i.	Antenatal visit	1 if the women had at least one antenatal visit
ii.	No of visits	Number of antenatal visits made
iii.	Blood pressure test	1 if blood pressure test is done
iv.	Blood test	1 if blood sample is taken
v	Delivery assisted by skilled personnel	1 if delivery is assisted by a doctor, nurse, or midwife
II.	Child Care	
i.	Vaccination card	1 if the child has a vaccination card
ii.	No of DPT vaccination	Number of DPT vaccination
iii.	Ever vaccination against any disease	1 if the child is ever vaccinated against any disease
iv.	Vitamin A supplement	1 if the child ever receive a vitamin A supplement
v	Child seek care	1 if the child seek care given illness
vi	Child get care soon	1 if the child get care within the same day
III	Adult/Child Care	
3.1	General care	
	Get health care at a time of need	1 if got health care at the time of need
	Could not afford	1 if the respondent could not get health care b/s s/he could not afford
	Get most medicine	1 if could get all the medicine prescribed
	Could not afford medicine	Couldn't get all the medicine prescribed: couldn't afford
	Satisfied with the health care system	1 if the respondent was very/fairly satisfied with the health care system
	Greeted well (in-patient service)	1 if the patient was greeted very good or good in in-patient case
	Greeted well (out-patient service)	1 if the patient was greeted very good or good in out-patient case
3.2	In pati nt car	
	Visit hospital within 5years	1 if the person stayed overnight in a hospital in the last 5 years
	Hospitalized the same day needed	1 if the person hospitalized the same day needed"
3.3	Out-patient care	
	Received out-patient care	1 if the person received any out patient health care in the last 12 months

Appendix 8. Maternal Health Care Utilization by Education Level and Expenditure Quintile

	Maternal Health Care Utilization Indicators				
Variables	Pregnancy check	No of visits made	Blood pressure test	Blood test	Delivery assisted by a professional.
Valid Cases	648	475	530	522	462
Frequency (%)	81.02	4 (mean)	93.77	56.32	61.69
Education					
Illiterate	79.8	3.905724	91.82	48.32	58.00
Elementary & less	82.21	3.95082	95.68	64.49	62.39
High school & less	86.21	4.475	100	79.07	77.78
College	93.33	5.307693	100	92.86	86.67
F-Stat	2.84*		2.37*	10.12***	8.89***
Expenditure Quintile					
1 st	79.59	3.908257	93.28	39.83	45.79
2 nd	80.99	3.718446	97.35	46.36	56.48
3 rd	78.95	4.024096	90.72	59.18	63.16
4 th	80.8	4	92.86	64.21	78.41
5 th	84.55	4.536585	93.81	77.89	72.97
F-Stat	0.68		1.04	10.21***	25.14***
Insurance Status					
None-insured	81.27	3.932161	92.89	53.81	61.79
Insured	88.89	4.366667	100	83.87	73.08
F-stat	1.31		2.44	10.81***	1.32
Location					
Rural	77.01	3.85849	91.98	43.97	47.89
Urban	85.71	4.179245	95.82	65.96	74.52
F-test	7.27***		3.06*	23.89***	33.75***

Appendix 9. Child Health Care Utilization by Location and Level of Education

Child Health Services Utilization Indicators	Valid cases	Freq. (%)	Location			Level of Education				
			Rural	Urban	F-Stat	Illiterate	Elementary	High school	College	F-Stat
Vaccination card	1264	87.66	84.3	92.26	17.02***	84.18	92.9	93.28	97.87	21.79***
No of DPT vaccination	367	2.4 (mean)	2.349	2.483	1.17	2.426	2.304	2.394	2.545	0.03
Ever vaccinated	746	83.51	82.09	84.26	0.55	80.05	86.47	93.22	87.8	3.19**
Vitamin A supp.	1017	77.09	78.35	76.1	0.65	76.17	79.46	77.08	76.19	0.37
Seek care	808	74.63	70.43	78.9	6.79***	70.39	77.34	83.1	96.97	5.64***
Seek care soon	584	56.34	51.69	59.36	3.09**	54.49	60	52.38	67.74	0.85

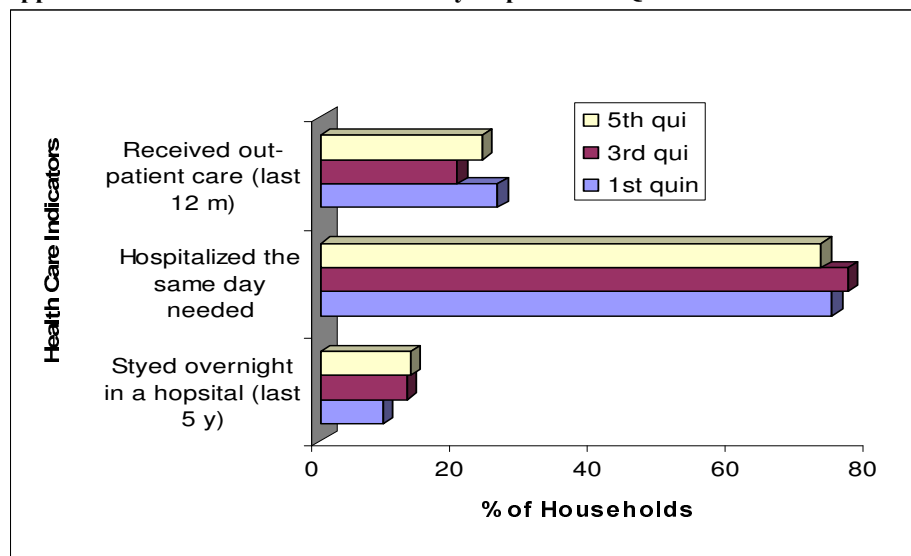
Appendix 10. Child Health Care Utilization by Expenditure Quintile and Health Insurance Status

Child Health Services Utilization Indicators	Expenditure Quintile						Health Insurance Status		
	1st	2nd	3rd	4th	5th	F-Stat	Non-insured	Insured	F-Stat
Vacc. card	81.85	86.18	89.77	89.2	93.97	17.25***	87.15	94.59	3.55**
No of DPT vaccination	2.342	2.557	2.298	2.25	2.508	2.74*	2.388	2.263	0.31
Ever vaccinated	79.65	83.97	89.03	80.16	86.29	1.78	83.38	87.18	0.39
Vacc. aga. disease	79.45	85.53	86.76	89.53	84.51	0.84	84.52	90.63	0.85
Vitamin A supp.	75.4	76.92	76.19	80	79.25	0.42	76.94	78.13	0.05
Seek care	72.47	71.18	71.51	81.12	79.84	1.88	74.15	78.18	0.43
Seek care soon	56.59	49.58	55	62.04	58.59	0.98	55.93	60	0.28

Appendix 11. Health Care Utilization by Insurance Status and Expenditure Quintile

Health Indicators	Expenditure Quintile						Insurance Status			
	1 st Quintile		3 rd Quintile		5 th Quintile		Non-insured		Insured	
	No.	%	No.	%	No.	%	No.	%	No.	%
Need health care	377	59.56	411	65.34	394	63.04	1764	61.85	117	71.78
Could not get health care	20	5.31	25	6.08	14	3.55	89	5.05	3	2.56
Could not afford to get health care/did not get care	17	85.00	16	64.00	6	42.86	56	62.92	1	33.33
Medicine prescribed	252		305		297		1275		91	
Could not get most of the medicine / prescribed	46	18.25	58	19.02	28	9.43	220	17.25	8	8.79
Could not afford to get the medicine / could not get most of the medicine	34	73.91	36	62.07	12	42.86	139	63.18	0	0

Appendix 12. In-and out-Patient Care by Expenditure Quintile



Appendix 13. Determinants of Health Care Utilization and Health Responsiveness

Variable	Health Care Utilization					Health Responsiveness		
	Need health care	Got health care	Could not afford	Got all medicine	Couldn't afford all medicine	Satisfied with the health care system	Greeted well (in-patient)	Greeted well (out-patient)
Safe drinking water	-							
Hard floor	-							
Smoking (1=smoker)	-							
Sex (1 = female)	+***	+	+	+	+	+	+	+
Insured (1 = insured)	+***	P.S.P	P.F.P	+	P.F.P	+***	+*	+*
Illiterate (reference)								
Elementary	+	-	-	-	._**	-	-	-
High school	+	+	-	+	._**	-	-	+
College	+	-	P.F.P	+	-	+	-	+
ln per capita exp	+***	+	._**	+***	._***	+	+	+
age	+**	+	+	._***	+	+	-	-
urban/semi-urban)	._**	-	+	._***	+	-	+	+
Family size	-	+	-	-	-	._*	-	-
Constant	._***	+	+	+	+***	+	+	+
No of observation	1992	1476	50	1166	183	2125	340	338
LR Chi ²	48.81	6.63	10.14	28.69	24.75	14.22	11.28	10.58
Pro > Chi ²	.0000	.0214	.1810	.0007	.0017	.1146	.2570	.3059
Pseudo R ²	.0219	.0112	0.1581	.0184	.1025	.0048	.0280	.0237

P.D.S = Predicts success (dependent variable = 1) perfectly

P.F.P = Predicts failure (dependent variable = 0) perfectly

***, **, * significant at one, five and ten percent level, respectively

Appendix 14. Total and Health Expenditure by Income quintile*

	Mean				
	No of valid observation	Overall	1 st quintile	3 rd quintile	5 th quintile
Total monthly expenditure	3040	128000	26300	89600	329900
Equivalised per capita monthly expenditure	3040	41500	9900	30400	103900
Monthly non-food expenditure	3040	66360	8250	35400	205200
Total monthly out-of-pocket health payments	3040	14710	1690	6900	45800
Total monthly out-of-pocket health payments given health expenditure	1654	27000	4700	13300	62300
Per capita health exp per month	3040	2080	1690	6904	45800
Per capita health exp per month given health exp	1749	4000	730	1980	8900
Share of out-of-pocket exp from the total exp	1654	0.170	0.232	0.147	0.179
Share of out-of-pocket exp from capacity to pay	3040	0.179	0.211	0.141	0.159
Share of out-of-pocket exp from capacity to pay given health exp	1749	0.321	0.587	0.272	0.216

Note: F CFA 735 = US\$1 (July 2002)

* Outliers not included ⁴

Appendix 15. Distribution of Ill health as a reason for not working for Pay

Reasons		Ill health as a reason for not working for pay (% of respondents)	F (Prob > F)
Setting	Rural	5.32	1.51 (0.2204)
	Urban	3.02	
Education	Illiterate	5.38	2.16 (0.1420)
	Literate	2.66	
Gender	Female	2.76	9.27 (0.0024)
	Male	8.54	
Age category	Young	1.83	3.57 (0.0289)
	Medium	4.91	
	Old	7.34	
Family size	Small	6.52	1.53 (0.2179)
	Medium	3.02	
	Big	4.03	
Expenditure quintile	1 st	3.94	1.16 (0.3265)
	2 nd	4.65	
	3 rd	2.73	
	4 th	8.24	
	5 th	2.41	
Insurance Status	Non-insured	4.76	
	Insured	0	

⁴ Cases with monthly total expenditure of above 2 million and less than 10 F CFA and with health expenditure of above 1 million and less than 10 F CFA are considered as outliers.