Major Applied Research Paper No. 10

COSTS, FINANCING, AND EFFICIENCY OF GOVERNMENT HEALTH FACILITIES IN SENEGAL

Phases 2 and 3: Field Work, Research Results, and Policy Recommendations

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ABSTRACT

The government of Senegal established and now operates and finances a country-wide network of public health care facilities that complements a well-developed private sector. There have been dramatic improvements in health status, but weaknesses remain in the public health sector which stem from a lack of public sector resources, inefficiency in health services production, and skewed expenditure patterns. The government has acknowledged these problems and has undertaken reforms to address them. This research study seeks to identify such problems and to formulate feasible solutions.

The study assesses the costs, financing, and efficiency of public health facilities in Senegal. It finds that although government resources are spent primarily on personnel, medical staff productivity is very low. At the same time, utilization rates for curative, preventive, obstetric, and family planning services are low. The quality of health care in public facilities is poor primarily because of a lack of drugs and medical supplies, poor staff training, inadequate or nonexistent protocols and standards for care, and insufficient supervision. The pricing system does not promote efficient patterns of consumption among the various levels of care in the health care system or among various types of services.

The study identifies opportunities for making significant improvements in the performance of the system within existing resource levels. It recommends that the government decentralize management of its health services; focus scarce resources on those services and activities with the greatest social return, such as preventive services, and on facilities that are cost-effective and that benefit the needy; force urban facilities to rely more on cost recovery; and undertake initiatives to improve management and information systems to monitor the efficiency and equity of public health spending.

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The study was originally proposed by consultant Robin Barlow. Its methodology was further developed by USAID/Dakar's HPN office and by HFS staff members Marty Makinen and Brad Barker.

HFS Task Manager for Senegal, Suzanne McLees, was instrumental in ensuring that the study was completed. We greatly appreciate her input. Jerry Wein, Denise Lionetti, Hugo Espinoza, Barbara Stevens, and other HFS staff members all contributed to the successful completion of this research.

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ACRONYMS

AID	(United States) Agency for International Development
ALOS	Average length of stay
AR	Applied Research
BI	Bamako Initiative
CESAG	Centre Africain d'Etudes Supérieures en Gestion/African Center for Advanced Studies in Management
DPT	Diphtheria
EPI-INFO	Epidemiological database created by the Centers for Disease Control
FCFA	Franc Communauté Financière Africaine
FY91	Fiscal Year 1991
GDP	Gross Domestic Product
GNP	Gross National Product
GOS	Government of Senegal
HFS	Health Financing and Sustainability Project
HHRAA	Health and Human Resources Analysis for Africa
MAR	Major Applied Research
MSAS	Ministère de la Santé Publique et de l'Action Sociale du Senegal/ Ministry of Public Health and Social Affairs of Senegal
PNA	Pharmacie nationale d'Approvisionnement/National Pharmacy of Senegal
REACH	Resources for Child Health Project
SDA	Social Dimensions of Adjustment Program of the World Bank
SSA	Sub-Saharan Africa
USAID	United States Agency for International Development

EXCHANGE RATE

US 1$ = 270 FCFA (1991)

FOREWORD

This paper is one in a series of reports on findings and policy recommendations from Phase 3 of the Major Applied Research conducted by the Health Financing and Sustainability Project (HFS).

The Health Financing and Sustainability Project (HFS) is a five-year initiative funded by the United States Agency for International Development (USAID). The project's mandate is to provide technical assistance, conduct applied research, implement training, and disseminate information on health care financing throughout the developing world. The project seeks to influence policy change by advancing knowledge; testing and improving delivery, financing, and administrative methods; strengthening institutional capacity; and enhancing technical capabilities. To date, HFS has been involved in health care financing activities in over 30 developing countries around the world. Applied research activities account for one-quarter of HFS project activities.

HFS has conducted its major applied research in three phases. Phase 1 included a review of the literature and of past experience and the development of a conceptual framework. The papers generated under Phase 1 are essentially conceptual and methodological and are therefore oriented to field researchers and teachers. Nevertheless, because these papers also underscore current gaps in knowledge, they are of use to international donors, health ministry decision-makers, and others who are concerned with health care policy.

Phases 2 and 3 were designed to reduce the gap in current knowledge identified in Phase 1. Phase 2 comprised the field research and data collection, and Phase 3 has involved data analysis, report writing, and dissemination. Phase 3 papers have as their main audience developing country decision-makers and policymakers, inside and outside the countries where the research was conducted. Methods, findings, and recommendations are written in nontechnical language, with technical information provided in appendices.

Phase 3 products also will be of interest to international donors because they validate or reject important hypotheses and evaluate existing policies. These papers also test new or improved research methods, identify directions for further research, and contribute empirical information to the general body of knowledge. Therefore they should be useful to researchers and academicians.

THE ROLE OF APPLIED RESEARCH IN HEALTH POLICY REFORM

Health financing reform is a prominent political issue and a priority for the health sector around the world. In industrialized nations, containing health care costs has been one main impetus behind efforts to reform health financing policies. In developing countries, a key motivating factor for reform efforts has been the growing demand on increasingly strained public resources represented by the traditional commitment of governments to provide free health services to all.

At the center of the policy debate are discussions about ways to improve equity and efficiency. Ideally, health care financing practices and policies should promote both equity — financial and physical access to care — and efficiency — maximization of health gains through reductions in the costs of production and increases in appropriate consumption. These discussions also include debate about the impact of health financing reforms on quality of care, access by the poor, and the respective roles of the public and private sectors.

Formulating effective policies to address these issues requires sound empirical information about a broad range of questions on the demand and supply sides of the market for health services. In many developing countries, sound empirical data are seldom available and the public debate about health financing

often is dominated by conventional wisdom that may not be well grounded in reality. Some examples of conventional wisdom that require empirical testing include:

- "The poor will not pay for health care services."
- "The private sector is more efficient than the public sector in producing health services."
- "The private sector has no role in meeting the public health agenda."
- "Where the largest share of total health resources is spent on curative care, the allocation of resources is inefficient."
- "Social financing and risk-sharing schemes will not be effective in poor, rural areas."

A new body of research has begun to emerge that tests the validity of some of these common beliefs about health financing. For example, empirical studies of health care demand in developing countries have demonstrated that when given the choice, even the poorest often prefer to pay for better-quality health care rather than obtain free but low quality health services.

Public policy concerning health finance can greatly benefit from improved knowledge about such issues as the willingness of people to pay for health services, the relative efficiency of public and private providers, private sector roles, and the cost-effectiveness of investment in curative and preventive care. Yet despite the greater attention recently given to applied research in health finance, large gaps in our knowledge remain.

AN AGENDA FOR APPLIED RESEARCH

HFS applied research seeks to advance knowledge in key policy areas and to develop analytical capabilities among developing country researchers. The research is designed to address key policy questions, explore neglected areas of research, improve analytical methods, and test new methodological techniques. With the review and advice of an external Technial Advisory Group, the project identified four broad areas of inquiry where major applied research was warranted: cost recovery, productive efficiency, social financing, and the private sector. To meet AID contractual requirements, the project also identified nine specific topics within these categories (see box).

HFS MAJOR APPLIED RESEARCH: AREAS, TOPICS, AND QUESTIONS		
Research Area	**Phase 1 Research Topic**	**Main Research Question**
COST RECOVERY	Quality of Care	Willingness to pay for improvements in quality
	Protecting the Poor	Design of equitable cost recovery systems
	Efficiency in Consumption	Design of monetary and other mechanisms that promote efficient patterns of demand for care
PRODUCTIVE EFFICIENCY	Pubic Sector Reform	Feasibility of improving efficiency in production through personnel incentives
	Reallocating Public Sector Spending	Definition of optimal allocation pattern and appropriateness of current allocation patterns
SOCIAL FINANCING	Expanding Its Role	Feasibility of risk sharing for the poor
PRIVATE SECTOR	Development of Private Health Care Markets	Determinants and implications of private sector development
	Public-Private Differences in Efficiency	Existence of differences in productive efficiency between government and private providers
	Public-Private Interactions	Feasibility of socially beneficial collaboration between government and private sector

HFS conducted literature reviews (Phase 1) for all but one of these nine topics (the exception was reallocating public sector spending). At AID's request, an additional field research topic — an assessment of the economic impact of malaria — was also studied. Field research has been conducted (Phase 2) and analytical papers have been written (Phase 3) in all four of the major research areas. These cover the six specific topics as follows:

- Willingness to pay for improvements in health service quality in the context of cost recovery
- Impact of health service quality improvements on costs, efficiency, and demand
- Efficiency of public sector health services
- Comparison of public and private sector efficiency in health service delivery
- Impact of social financing of health services on demand, equity, and sustainability
- Development of private sector health services
- Economic impact of malaria

In addition to these applied research papers, HFS has produced a wide array of research instruments and data bases. (A list of these is provided in a separate project document, "Research Instruments and Databases of the Health Financing and Sustainability Project.")

POLICY-ORIENTED APPROACH TO APPLIED RESEARCH

HFS has conducted all the field research activities with active collaboration and involvement of local researchers and decision-makers. In addition, when considering alternative field sites for major applied research, HFS sought to identify opportunities where research results would feed directly into the policy reform process.

In Niger, for example, HFS provided technical assistance to the government to test two cost recovery systems for curative care in ambulatory public facilities: a fee per episode of illness and a household tax with a copayment. Major applied research was conducted to assess and compare key indicators under the two financing systems, including the improvements in quality of care, the costs of quality improvements, people's willingness to pay for quality improvements, and equity implications of the financing methods. Research activities were intertwined with technical assistance to design and implement improved management systems for health facilities, new management procedures for clerical personnel, and improved diagnostic and treatment practices for medical staffs.

In Senegal, HFS conducted applied research to assess various dimensions of the current health system, including the legal and regulatory framework of health financing; the effectiveness of village health committees; the costs, financing, and efficiency of public and private providers; the size, role, and evolution of the private sector; and the demand for health care. The government of Senegal is planning major regional demonstration projects to implement some of the recommendations that emerged from this research.

All HFS major applied research products undergo a formal review process that involves project staff, external experts from academic and international institutions, and members of the project's Technical Advisory Group. HFS seeks excellence in its products and welcomes comments or suggestions about its research work.

If you have questions or comments about our applied research work, please contact the Technical or Applied Research Directors. For information about or to order written HFS products on research, technical assistance, and training, please contact the project's Information Center.

Ricardo A. Bitran
Director of Applied Research

EXECUTIVE SUMMARY

BACKGROUND

Despite a stalling economy and constraints on health spending, Senegal has exhibited important health gains over the past 30 years. Life expectancy has increased considerably, child mortality has been halved, and immunization rates have exceeded 60 percent. According to some health indicators, such as child mortality and median age of death, Senegal has outperformed Sub-Saharan Africa as a whole. According to others, however, such as adult female mortality, Senegal's health achievements have been less commendable. A relatively poor performance is a source of concern in light of the higher income and greater health spending in Senegal compared to many of the countries in Sub-Saharan Africa.

Senegal's health sector faces multiple problems. Constrained public resources, inefficiency in health services production, and skewed expenditure patterns have been identified in the past as major barriers to improved performance (World Bank, 1992). These troubles are not unique to Senegal, however, and have been recognized throughout Sub-Saharan Africa (World Bank, 1993).

To address its many problems and challenges, in 1989 the government adopted a sectoral reform package known as National Health Policy (World Bank, 1992). The policy package seeks to decentralize health services; redeploy government health staff; set up a legal framework for enhanced community participation in health decision-making; and reform drug procurement and prescription practices in government health facilities, including the adoption of an essential drugs strategy. In addition, in 1991, in an effort to alleviate budget constraints, the government adopted the Bamako Initiative to help pay for pharmaceutical products through user fees.

To assist the government in its policy reform initiative, the Health Financing and Sustainability Project (HFS) carried out the current study of public health care services. Funding for the study was provided by USAID/Dakar. An Inter-Ministerial Steering Committee (*Comité de pilotage*), headed by the Ministry of Health, acted as HFS's counterpart within the government throughout the study.

The study seeks to provide the government with information about the system's costs, financing, and efficiency. Information about health facility costs can help to improve budgeting and identify allocative imbalances and inequities. Cost data also constitute the basis for an assessment of system efficiency. Data on the relative magnitude of government, user, and donor funding can help the government to better grasp the current level of, and potential for, nongovernmental funding of public services. They also help to enhance knowledge about financing mechanisms adopted by regions and facilities, thereby enabling policymakers to recommend improvements where needed. Knowledge of levels and determinants of efficiency offers the opportunity to evaluate the performance of facilities, programs, and health professionals and to identify measures for achieving greater health gains with existing resources.

Since 1991 the HFS project has been involved in several related research activities in Senegal (see *Appendix* for a list of such studies). Such a broad research effort is ex-pected to produce a comprehensive review of problems and opportunities in the health sector.

This paper constitutes Phase 3 of a three-phase HFS major applied research study in the area of Public-Private Differences in Efficiency (see HFS 1991). The Phase 1 work (Bitran 1992) presented a review of the literature and experiences on the measurement of health services costs and efficiency; it also proposed a preliminary research design for the efficiency work in Senegal and elsewhere. The Phase 1 paper is a companion piece to this document. The field data collection work carried out by HFS and described in the present document constituted Phase 2.

METHODOLOGY

A nationally representative sample of three government hospitals, 23 health centers, 46 health posts, and 23 health huts was drawn using a sampling framework developed earlier by the World Bank under its Social Dimensions of Adjustment's *Priorities Survey*. Questionnaires for measuring costs, physical plant, staff, financing sources, utilization, and quality of care were specially designed by the research and data collection team through an interactive and participatory process. Data were collected for fiscal year 1991 (FY91), or July 1, 1990—June 30, 1991.

A team of 12 enumerators with backgrounds in finance and accounting, most on temporary leave from government posts, was selected and trained in Dakar and in the field. Likewise, a team of four nurses, two of them with doctorates in public health and former university professors, was selected and trained. Facility staff were informed in advance of the survey team's goals and schedule and collaborated actively with the data collection team.

Data collection took place over a three-month period and was carried out by HFS and the African Center for Advanced Studies in Management (CESAG), a local subcontractor to HFS. Data quality control was performed by HFS. Data were collected through personal interviews, analysis of facility records, observation of medical staff performance, and surveys of staff and patients about quality perceptions. The data were entered in microcomputers using specialized software.

Facility costs were inferred from observations on resource use and prevailing prices rather than being derived from budgets or accounting records. The findings of the survey were interpreted with the help of the authors' constructs of average and marginal costs, shadow prices, economic costs, and economic efficiency explained in more detail below.

FINDINGS AND RECOMMENDATIONS

Senegal has made great progress in health. The government has set up, operated, and financed a country-wide network of public providers that complements a well-developed private sector. Health status indicators have improved dramatically since independence. The government has recognized weaknesses in the public health sector and has undertaken reform to address them. To further assist the government in its reform process, this research has sought to identify remaining problems in the public system and to formulate feasible solutions. What follows is a brief overview of the study's findings and policy recommendations and a more detailed discussion of both.

Overview

The study revealed that the government health system faces multiple problems that severely hinder its efficiency and compromise its equity. Government resources are spent primarily on personnel expenses, yet medical staff productivity is very low. At the same time, utilization rates for curative, preventive, obstetric, and family planning services are low. The quality of health care in public facilities is poor primarily because of a lack of drugs and medical supplies, poor personnel training, inadequate or nonexistent protocols and standards for care, and insufficient supervision. The referral system functions poorly. Cost recovery is a main source of revenue in smaller and peripheral facilities but is relatively negligible in more affluent urban and upper-level facilities. The pricing system does not promote efficient patterns of consumption among levels of care in the delivery system or among types of services.

The efficiency and equity of the government health system could be dramatically improved within the existing level of public resources. In fact, unless the system's multiple problems are addressed, a strategy that promoted pumping additional resources into it would be irresponsible and ineffective.

To improve the system's performance, the government must effectively decentralize the management of health services, including delegation to the regions and communities of the power to hire and fire staff and to determine compensation policies. The government must focus its scarce resources on those services and activities that bring the greatest social returns, such as promoting efforts to stimulate the demand for preventive services. Larger, more urban facilities must rely more heavily on cost recovery. Public resources must be shifted away from those facilities and toward provision of services that are more cost-effective and that benefit the needy. The government must fund initiatives to improve management systems in public facilities and must implement information systems to monitor the efficiency and equity of its health spending.

The quality of care in public facilities must be monitored and improved through more appropriate and frequent staff training and supervision and through adoption of standards for diagnosis and treatment. To improve the quality of care, the government must reform the pharmaceutical market by liberalizing the importation and distribution of generic and essential pharmaceuticals. The government's participation in the market for pharmaceuticals must be confined to a regulatory capacity. Finally, the government must explore ways to stimulate greater private-sector activity in the financing and provision of services. It must identify and take advantage of opportunities to achieve efficiency through collaboration with the nongovernmental sector.

Preliminary findings from this research were presented at a major policy workshop held in Saly-Portudal in November 1993 with representatives of USAID/Dakar, the ministers of Health and Social Affairs, and about 60 representatives from these and other government ministries participating. Workshop participants recommended that the most effective way to adopt and assess the entire package of study recommendations was to carry out demonstration projects in one or more regions of the country. During subsequent discussions with ministry officials and regional health officers, the government decided that the projects would be carried out in two regions of Thies and Kaolack. The government should take immediate steps to implementation of these demonstration projects.

Findings and Recommendations

The study uncovered multiple deficiencies in the government health delivery system, each of which is discussed below, along with recommendations for addressing them. They included:

- Nonexistent or inadequate information management systems
- Low utilization and coverage
- High personnel expenses and low staff productivity
- Widespread shortages of basic drugs and medical supplies which lowers the quality of care
- A lack of protocols for care and inappropriate medical practices, which also leads to poor quality care
- Poor perceptions of quality among patients and staff
- Inappropriate referral patterns
- Low rates of cost recovery
- Inappropriate pricing for preventive care

Non-Existent or Inadequate Information Management Systems

Reliable financial data on costs and revenue were seldom available either in facilities or at the ministry's level. To infer costs, the study team collected information about resource use (labor, supplies) and their prevailing prices; to derive facility revenue, it collected data on services provided and prices.

In recent years the government has announced a policy to decentralize public services. It is expected that regional and local health authorities, along with local communities, will share with the central government the responsibility of allocating and managing resources. However, he absence of appropriate management systems in public health facilities is inconsistent with this decentralization initiative.

To make the decentralization policy effective, the government must help communities and facility managers develop and implement appropriate systems that are consistent with the principles of management autonomy. The lack of revenue and cost data in facilities impedes financial and resource planning and management control, thus negatively affecting system efficiency and equity. New systems and procedures need not be uniform and should be defined to respond to local management needs. However, because the central government will continue to be the main funding source of regional offices and health facilities for the foreseeable future, it should set minimum reporting standards to monitor spending, to inform the planning process, and to evaluate the efficiency and equity of government health spending.

The government's role should be to fund technical assistance for local development of information management systems and to train users. The recently proposed health demonstration projects are an appropriate opportunity for developing and testing such systems.

Low Utilization and Coverage

In FY91, health system output was low relative to both the presumed need for curative services and the government's targets of delivery for preventive and family planning services. The average citizen sought curative services in a government facility just once every 15 months; only one in eight women in reproductive age used family planning services; and only two-thirds of pregnant women sought prenatal care, just over one-fourth of infants and about one-third of children under age 5 were enrolled in well-baby care; only one-third of children under age 5 were fully vaccinated.

Low use of preventive services, which are more labor-intensive and require fewer drugs and supplies, may be a result of low consumer appreciation of the benefits of prevention. To stimulate greater demand for preventive and family planning services, the central government, regional health authorities, facility staff, and local communities must more actively promote the benefits of preventive care.

Low utilization of curative care is likely the result of poor quality of services due to a lack of drugs and supplies (see below) and alternative provider options in the private sector. It is also possible (although this study has no evidence of it) that facility staff do not comply with work hours in public facilities, as is the case in other developing countries. Whichever the reasons, underutilization of public services implies inefficient use of public resources. To stimulate demand for curative care, the government must adopt policies to improve quality of care (see specific recommendations below) and, if applicable, to enforce staff compliance with work hours.

High Personnel Expenses and Low Staff Productivity

Personnel expenses account for a large share of facilities' recurrent costs, particularly in health centers (83 percent) and in health posts (75 percent). In well-functioning ambulatory facilities elsewhere in Sub-Sahara African, personnel expenses are generally lower, similar in proportion to pharmaceutical expenses. The imbalance between personnel and nonpersonnel costs (drugs, medical supplies, maintenance, and so on) is severely hurting the efficiency of the public health system. Medical staff lack the drugs and supplies they need to treat patients. In turn, patients avoid public facilities due to their poor perceptions of the quality of care they dispense (more on this below). As a result, system output, staff productivity, quality of care, and utilization rates are low, which has negative consequences for the health status of the population.

In this study, staff productivity was defined as the number of patients, curative and preventive, seen per medical employee per work day. Because of specialization in the type of care provided, and thanks to appropriate recording, it was possible to compute productivity for each category of medical staff: doctors, nurses/medical technicians, midwives, and birth attendants.

Staff productivity was very low for most medical staff categories but varied substantially among regions and staff group. Selected findings on productivity are presented for health centers, health posts and huts (data constraints precluded the calculation of productivity for hospitals).

In health centers, doctor productivity was lowest in Dakar, where the average doctor saw fewer than two ambulatory and about three hospitalized patients daily; it was highest in Tambacounde-Kolda, with five outpatients and four inpatients per doctor per day. Health center nurses and medical technicians saw fewer than three curative and preventive patients per day in Dakar and about 15 in Tambacounde-Kolda. Health center midwifes, in charge of providing an array of curative, obstetric, and preventive services, saw barely four patients per average work day in Dakar and about nine patients in Tambacounde-Kolda.

In health posts, the productivity of nurses and medical technicians seemed to be a mirror image of that in health centers: it was highest in Dakar, with 35 daily contacts per employee, and lowest in Tambacounde-Kolda, with 10 visits per day. Aside from midwife output of prenatal visits, the output of preventive care per medical employee was alarmingly low in health posts, generally well below one daily unit. In health huts, productivity was consistently low, with an average of about one visit per day.

The low levels of productivity observed reveal a poor allocation of scarce health resources. If a greater share of the government health budget were allocated to drugs, medical supplies, and health promotion, and away from personnel, health care quality would improve along with demand; total medical output would likely be higher and so would the population's health status.

The hypothesis that productivity is low because many facilities are at an earlier stage of their life cycle seems implausible given how widespread the low levels of output are. Maintaining current staff levels and allocation, in the hope that over the longer term they will be fully occupied, is a highly wasteful policy.

The extremely low level of health staff productivity suggests that facilities suffer from being overstaffed, being too close together, or being poorly located. The location and staffing of facilities may not reflect local epidemiological and socioeconomic conditions or the level of competition from nongovernmental providers of care. Reallocating or laying-off staff and closing or relocating facilities may be possible solutions. Data on staff productivity by region and facility type provided by this study may give a preliminary idea of how staff and facilities should be redistributed.

While the problem of inappropriate staffing has been raised in the past, solutions have not been forthcoming under the current system, where staffing decisions are made centrally. Rigidities in the current public administration system make it unlikely that a significant change in staffing will occur in Ministry of Health facilities. It is unlikely that current staffing patterns would prevail under a policy of decentralized management, where regional health authorities and communities had the power to hire and fire staff according to local needs and constraints.

Widespread Shortages of Basic Drugs and Medical Supplies

About half of the data collection effort was devoted to measuring the quality of health care services. To assess quality, the research team collected information about staff training, availability of drugs and other medical supplies, medical staff compliance with clinical standards of treatment, patient quality perceptions, and staff quality perceptions.

The inquiry into the availability of selected drugs revealed that most of the facilities experienced inventory stockouts during FY91. These stockouts lasted anywhere from a few weeks to an entire year. Chloroquine, oral rehydration salts, and vaccines were the products most often out of stock. For both health centers and posts, stockouts were most severe in the regions and least severe in Dakar. Health huts had the poorest performance, with one-half of the facilities reporting stockouts of all selected products in FY91. Data for hospitals were not available.

Similar findings were obtained regarding the availability of medical supplies. Inventory stockouts were common in the majority of facilities. One-half of the facilities did not have a thermometer at the time of the survey. Supplies for laboratory exams, such as micro-slides and dyes, were lacking in one-half of the facilities. Dakar health centers and posts were the best endowed, and health posts exhibited fewer stockouts than health centers. As a group, the worst performers were regional health centers.

The government has taken steps since the data collection effort for this study to improve the performance of its drug and distribution monopoly, the National Pharmacy (PNA). The government should assess now whether such changes have improved PNA operations. In addition, the government should examine its current policies toward the pharmaceutical sector and should consider permitting greater competition in both importation and distribution. With appropriate regulation, enhanced competition can improve drug availability in the market, and thereby can help improve the efficiency of the government health system. The great variety and number of pharmaceutical items carried by facilities suggests that an essential drugs policy was not in place at the time of the study or, if it was, that it was not properly enforced. Adopting or enforcing such an essential drugs policy would result in great savings to the system and important efficiency gains.

Lack of Protocols for Care and Inappropriate Medical Practices

The majority of the medical staff reported having no standard protocols for diagnosis and treatment of patients. In addition, only a small proportion of medical staff had received refresher training in the two years preceding the survey.

Medical staff members were observed examining and treating patients whose chief complaints were fever or diarrhea, and their behavior was measured against norms agreed on by a team of Senegalese doctors and nurses. It was found that medical staff communicated poorly with patients. Most often they failed to explain the procedures involved in the examination, the conclusions arising from it, and the appropriate type of treatment. For example, medical personnel in hospitals failed to communicate adequately with patients in three-fourths of the instances. Staff routinely skipped standard tests, questions, and exams. Concerning appropriateness of treatment, health huts and hospitals exhibited the poorest performance; health posts were the best, followed by health centers.

The use of drugs varied across facilities and regions, particularly, in the use of antibiotics. For example, whereas Dakar health centers prescribed antibiotics to about every other patient, health huts did so for one in every five patients. Hospitals prescribed chloroquine to approximately one-half of fever patients, while health huts did so in three out of four instances.

The team also studied compliance with treatment norms for routine medical procedures, such as baby weighing and vaccinations. No important differences in staff practices were found among the types of facilities. The procedures were done correctly in over 80 percent of the instances, but certain deficiencies were pervasive throughout the system. For example, health center staff washed their hands less than 5 percent of the times between patient visits and disinfected their hands in only 15 percent of the time. Compliance was studied according to personnel categories: nurses performed best, while doctors fared worst.

To improve quality of care, medical staff must be supervised and training routinely. Standards for diagnosis and treatment must be defined and adopted nationally through intensive training, followup supervision, and refresher training. A list of essential generic pharmaceuticals for public facilities must be adopted and supplied.

Poor Perceptions of Quality among Patients and Staff

To assess quality perceptions, the research team interviewed facility patients and staff. When asked about their main reasons for choosing a government facility, patients most often cited geographic convenience. When asked about overall satisfaction and willingness to return to the facility for treatment of in the future, patient responses varied by facility type, with the lowest scores assigned to hospitals and the highest to health huts.

Use of health care services was closely linked to drug provision practices: use was greatest in facilities with the highest rates of drug provision and lowest in facilities that most often prescribed, but did not actually provide, drugs.

Staff members were asked to assess their own care as well as that of the entire facility, as compared to care provided by colleagues and care available at facilities providing similar services. Answers varied in an important way among facilities of the same type and across different types of facility. Fewer than one in five employees rated their own quality as good and about as many rated it as poor. Most thought that the quality of their facility was average relative to other facilities. The main reasons given to explain poor quality were lack of supplies, medicines, and personnel.

Inappropriate Referral Patterns

The study revealed awkward and seemingly inefficient referral patterns. Hospitals and health centers referred most patients to higher-level facilities, while health posts and health huts referred only a few patients to higher-level facilities. For example, high referral rates were observed in Dakar health centers (70 percent) and in hospitals (35 percent). This practice was contrary to what would be expected from a well-functioning referral system.

The causes behind these inefficient referral patterns should be identified and solutions should be implemented. Improved quality at hospitals and health centers, through better availability of medicines and supplies, may help to remedy this problem. Improving the quality of primary-level facilities should help as well. Higher referral fees for patients and the adoption of referral fees for facilities should be considered as a means of discouraging nonessential referrals.

Low Rates of Cost Recovery

The sources and uses of funds were analyzed to assess recurrent cost financing in government health facilities. The inquiry revealed that while all four types of facilities practiced cost recovery through user fees, for the largest types of facility (hospitals and health centers), cost recovery represented only a small proportion of total recurrent cost funding (8 percent for hospitals and 10 percent for health centers). Smaller facilities relied less on government funding and more on user fees: health posts and health huts recovered, respectively, 28 percent and 87 percent of their recurrent costs through user fees.

Charging fees for government services was found to be a common practice in all facilities in the sample, from hospitals to health huts. The prices recorded were those in place prior to the adoption of the UNICEF-sponsored Bamako Initiative, found that the Initiative does not seem to have resulted in important price changes.

Appropriately, prices for equivalent services were highest in hospitals and tended to fall with the level of the facility, to reach their minimum in huts. They were higher for adults than for children, and they varied across facilities—suggesting that facilities had a fair amount of autonomy in setting price levels.

In hospitals and health centers, prices were low relative to cost. With the exception of dental care and exams in hospitals, all other services in hospitals and elsewhere were priced below 300 FCFA ($1.11). Accordingly, cost recovery revenue represented a small share of facility revenue for hospitals and health centers.

To alleviate budget constraints, fees should be increased selectively (see next section) at the same time that the quality of care is improved. The quality improvements should be paid for through higher cost recovery revenue. Systems of sliding fees and exemptions should be adopted to minimize accessibility problems for those with a modest ability to pay. The pricing of services should respond to local circumstances. Therefore, the decision to revise fees and to adopt differential pricing should be transferred from the central to the regional or community level.

Inappropriate Pricing for Preventive Care

Preventive services were sold at prices about equal to curative care. This is an uncommon practice in the Sub-Saharan African region. Elsewhere (e.g., Niger and Zaire), preventive services are delivered free of charge or at nominal fees. Family planning services also were sold. The policy of charging above-nominal prices for preventive and family planning services should be reviewed, particularly in light of two important study findings: that there is widespread underutilization of preventive and family planning services, and that these services make a minimal contribution to cost recovery revenue.

1.0 INTRODUCTION

1.1 HEALTH SECTOR PERFORMANCE

Senegal's economy has performed poorly over the past 30 years which has exerted downward pressure on government spending in the health sector. Between 1965 and 1991, GNP per capita, expressed in constant dollars, fell by about 10 percent to $720 at the end of the period; between 1980 and 1991, the average annual growth rate in per capita GNP was a mere 0.1 percent (see *Exhibit 1-1*)(World Bank, 1989). Government health spending, while steady in nominal terms over the past several years, has been falling steadily in real per capita terms. In 1991, government expenditure for health accounted for 2.3 percent of GDP and for 62 percent of the $29 spent on health care per inhabitant. During this same year, donor health spending amounted to about $5, representing 17 percent of total per capita health expenditure, with private spending accounting for the remaining 21 percent.

When compared with Sub-Saharan Africa (SSA) as a whole, Senegal spent more in 1991 on health ($24 versus $29, respectively), although Senegal spent less on health, as a percentage of GDP. In relative terms, the private sector was less important as a source of health financing in Senegal than in SSA, with private sector spending accounting for 21 percent of sectoral expenditures in Senegal, compared to 34 percent for SSA. On a per capita basis and in dollar terms, external development assistance to Senegal's health sector was almost twice as large as in the average country in the region.

Despite a stalling economy and constrained health spending, Senegal has demonstrated important health progress over the past 30 years (*Exhibit 1-1*). Between 1960 and 1990 life expectancy increased by 15 years to 50. During the same period, the country halved its child mortality rate from 303 to 156 per thousand. During 1990-91 child immunization coverage rates reached 60 percent for the third dose of diphtheria (DPT) and for measles.

In some respects, the performance of Senegal's health sector compares favorably with that of Sub-Saharan Africa. While starting off with a significantly higher child mortality rate in 1960, by 1990 Senegal had been able to outperform the region. Senegal's median age at death of 15 years in 1990 exceeded substantially the median age of 5 years for the region as a whole, in 1991. Senegal also exhibited higher child immunization rates. This superior performance was achieved despite Senegal's relatively modest endowment of doctors and nurses.

In other respects, however, Senegal's health accomplishments are less commendable when compared with those of the region, particularly in light of the country's relatively higher income and greater health sector spending. In 1991, life expectancy and adult female mortality in Senegal lagged behind the regional average. Also, despite higher spending on a per capita basis Senegal's endowment of doctors was about half that of the region and the number of nurses was one-fifth as large.

EXHIBIT 1-1
SELECTED ECONOMIC, DEMOGRAPHIC, AND HEALTH INDICATORS
SENEGAL AND SUB-SAHARAN AFRICA, 1960, 1990-91

INDICATOR	SENEGAL	SUB-SAHARAN AFRICA
Economic Output and Growth GNP per capita, 1991 (dollars)	720.0	600.0[1]
Average annual growth rate in GNP per capita (percent, 1980-91)	0.1	-1.24
Literacy, Population, and Fertility Adult Illiteracy (percent)	62.0	50.0
Population, 1990 (millions)	7.6	510.0
Total fertility rate, 1990	6.5	6.4
Health Indicators Life expectancy at birth		
1960	35.0	43.0
1990	50.0	52.0
Median Age at death, 1990	15.0	5.0
Child mortality rate		
1960	303.0	251.0
1990	156.0	175.0
Adult female mortality rate, 1990 (ages 15-59)	340.0	322.0
Children immunized, age less than 1 year (percent)		
Third dose of DPT, 1990-91[2]	60.0	52.0
Measles, 1990-91[2]	59.0	52.0
Human Medical Resources Doctors per 1,000 population, 1988-92[2]	0.05	0.12
Nurse-to-doctor ratio, 1988-92[2]	2.6	5.1
Health Expenditure Total per capita health expenditure, 1990 (official exchange rate dollars)	29.0	24.0
Health expenditures as a percentage of GDP, 1990		
Total	3.7	4.5
Public sector	2.3	2.5
Development assistance for health per capita, 1990 (dollars)	4.9	2.5

Sources: Unless otherwise noted, data are from: World Bank. 1993. *World Development Report 1993*. New York: Oxford University Press (pp. 200, 208-211, 238).
[1]World Bank. 1993. *Better Health in Africa*. Technical Working Paper No. 7. Washington, DC. Africa Technical Department. Human Resources and Poverty Division, World Bank.
[2]Each value refers to one particular but not specified year within the time period denoted.

In fact, Senegal's health sector is not exempt from problems. Lack of public sector resources, inefficiency in health services production, and skewed expenditure patterns are among the many difficulties identified in the past as major barriers to improved performance (World Bank, 1992). These troubles are not unique to Senegal; however, inefficiency in government health care operations is viewed as a chief obstacle to health status improvements throughout Sub-Saharan Africa (World Bank, 1993). Likewise, severe budgetary constraints and unbalanced budgets are common throughout much of the region.

To address the problems and challenges, in 1989 the government adopted a sectoral reform package known as National Health Policy (World Bank, 1992). The new policy seeks to decentralize health services; redeploy government health staff; set up a legal framework for enhanced community participation in health-related decision-making; and reform drug procurement and prescription practices in government health facilities, including the adoption of an essential drugs strategy. In addition, in 1991 in an effort to alleviate

budget constraints, the government adopted the Bamako Initiative to help pay for pharmaceutical products through user fees.

To assist the policy reform process, this study seeks to provide the government with information about three dimensions of its health system: costs, financing, and efficiency. Information on health facility costs can help improve budgeting and identify allocative imbalances and inequities. Data on the relative magnitude of user and donor funding can aid in determining the current level of, and potential for, nongovernmental funding of public services. They can enhance also knowledge about financing mechanisms adopted by regions and facilities, thereby enabling policymakers to recommend improvements where needed. Knowledge of levels and determinants of efficiency offers the opportunity to evaluate the performance of facilities, programs, and health professionals and to identify measures for achieving greater efficiency.

While much has been said about the need to improve productive efficiency in developing country government operations, little has been done to systematically measure efficiency levels and inefficiency sources.[1] In fact, the widely promoted policy of privatizing government health services to improve efficiency, which would seem sensible in light of the apparently greater efficiency of private provision of services in other sectors, is a proposed reform that rests on weak, almost nonexistent empirical foundations in the health sector.[2]

This research is expected to contribute to knowledge about costs, financing, and efficiency of public facilities in Senegal. A related study of efficiency among nongovernmental providers in Senegal (see below) will allow comparisons of efficiency between the two sectors, thereby enabling government decision makers to assess the desirability of public-private collaboration in health services provision.

This report presents the research aims, method, results, and recommendations of a descriptive analysis of costs, financing, and efficiency in a sample of government health facilities in Senegal. A forthcoming document that uses comparable data from the private sector will present a statistical study of efficiency, using an econometric estimation of cost and production functions and estimating related measures of efficiency.

The information presented in this paper includes, in Section 2, a description of the study's conceptual framework and research method; in Section 3, presentation of results; and in Section 4, a summary, conclusions, and recommendations for policy. The remainder of this section provides background information, describes the research goals and objectives, and outlines related HFS research in Senegal and elsewhere.

1.2 BACKGROUND

In 1990, the Health Financing and Sustainability Project (HFS) responded to a request by the USAID Mission in Dakar to visit Senegal and reassess the feasibility and appropriateness of three studies previously proposed by the Resources for Child Health Project (REACH). The first study proposed by REACH, to be undertaken in collaboration with the Senegalese Ministry of Health (MSAS), would assess costs and financing for a sample of government health care facilities. A second study would synthesize findings from previous health care financing studies in the country and, in addition, would review the legislation governing public and private sector delivery and financing of health services. A third study would assess health care demand from a representative national sample of households.

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[1]For developing countries studies of health services efficiency, see Lewis et al. (1990) and Bitran and Dunlop (1989).

[2]Wouters (1990) has measured and compared efficiency of government and non-governmental providers in Nigeria.

In the fall of 1990, HFS staff visited Senegal and advised that the three studies were necessary and that they be conducted in close collaboration with the MSAS and other government representatives. An inter-ministerial steering committee (*Comité de pilotage*), which had been formed earlier to serve as the main government counterpart to REACH, was revived at the time of the HFS assessment visit and designated to serve as HFS's main counterpart within the Senegalese government.

HFS recommended that the first two studies—an exploration of costs and financing and a review of previous studies and legislation—should be conducted more or less as originally proposed by REACH. The scope of the first study was somewhat expanded by HFS and USAID/Dakar to include as an explicit objective the measurement of health service efficiency. A third study to assess the demand for health care would be conducted also but, instead of relying on a primary household survey, it would analyze data collected from a household survey conducted by the World Bank's Social Dimensions of Adjustment Program.

The bulk of the data collection for the study took place between October 1991 and January 1992 and was carried out the African Center for Advanced Studies in Management (CESAG), a local subcontractor, under close HFS technical supervision. This research was financed primarily through a mission buy-in to HFS, with additional research core funding by HFS.

This paper constitutes Phase 3 of a three-phase HFS major applied research study in the area of Public-Private Differences in Efficiency (see HFS, 1991). The Phase 1 work (Bitran 1992) presented a review of the literature and experiences on the measurement of health services costs and efficiency and a preliminary research design for the efficiency work in Senegal and elsewhere (Bitran, 1992). The Phase 1 paper is a companion piece to this document. Phase 2 comprised the field data collection work carried out by HFS and CESAG and described below in Section 2.

1.3 STUDY GOALS AND OBJECTIVES

Based on a sample of government health facilities (see description of the sampling frame in Section 3), the goals of this study are to:

(1) Provide information on government services costs and financing to improve budgeting for health services; and

(2) Assess and identify determinants of efficiency and formulate policies that can help improve productive efficiency of public health services.

Improved budgeting and higher efficiency of government health services are expected to contribute to the ultimate goal of raising the health status of the Senegalese population.

The principal objectives are to:

(1) Gather information on utilization;

(2) Measure total and unit costs for the main curative and preventive services delivered by various types of health facilities;

(3) Measure quality of care, both technical and perceived;

(4) Derive measures of technical and economic efficiency from the information on costs and quality;

(5) Identify health care financing sources, including user payments, community contributions, government budgetary support, and donor funding; and

(6) Describe cost recovery methods and levels.

1.4 RELATED HFS APPLIED RESEARCH ACTIVITIES IN SENEGAL AND ELSEWHERE

Research in Senegal

In addition to the current study, HFS is expected to participate in six other related research activities in Senegal:

Health Committee Performance

A qualitative study of health committee performance was carried out for HFS by its subcontractor, CESAG, in Senegal. The study sought to clarify the role played by health committees in the operations and financing of government health facilities. Using a case study approach and a sample of ten committees from around the country, the study attempted to identify factors contributing to the success and failure of health committees as they pertain to their influence on health facility performance. Funding for this study was provided by USAID/Dakar.

Private Sector Costs, Financing, and Efficiency

To provide empirical evidence to expand the limited information available on relative sectoral efficiency, HFS undertook a study of private sector costs, financing, and efficiency in Senegal. Complementary research, now being conducted in the private sector, employs the same methods and instruments as the government sector study and will allow comparisons of costs, financing, and efficiency between the two sectors. The study is based on a sample of about 60 nongovernmental facilities—about two-thirds the size of the government sector study sample. Financing for this research comes from HFS's internal research funds. Study results will be available in the summer of 1994. The findings will be shared with the government of Senegal and with USAID/Dakar.

Health Care Quality

AID's Africa Bureau, through its Health and Human Resources Analysis for Africa Project (HHRAA), is providing funding for an in-depth study of quality of health care in Senegal. The study is expected to reveal levels and differences between the public and private sectors in four aspects of health care quality: availability of production inputs (labor, equipment, buildings, pharmaceutical products); the extent of compliance with standard treatment protocols; and perception of quality by health staff and patients. The HHRAA research overlaps with the studies of the public and private sectors described above.

Household Health Care Demand

A survey of household consumption patterns, known as the Priority Survey, was undertaken by the World Bank's Social Dimensions of Adjustment (SDA) Program in 1991. Based on consultations with HFS, several questions on health care consumption were included in the survey. A preliminary analysis of this information was performed by the World Bank (Republic of Senegal, 1993). USAID/Dakar requested that HFS conduct an analysis of health care expenditure, consumption patterns, and demand. This analysis supplements HFS's efficiency work and helps to provide a more global view of the health care market by adding information from the household (or consumer) side to the supply-based study of costs, financing, and efficiency. As described below, the sampling framework for public facilities is similar to that used by the World Bank's survey. Therefore, HFS expects to be able to match facility with household data. The household study may provide information otherwise not available to HFS, such as patterns of provider choice, use of traditional medicine, home care, and self-medication. This demand-side research is now underway and is expected to be concluded in mid-1994. Funding for the study is being provided by USAID/Dakar.

Determinants of Private Sector Development

An analysis of determinants of private sector development in health will be conducted by the HFS project in Senegal with the financial support of HHRAA. The study will provide a picture of current private provision of health services, document the development of these services over time, and identify determinants of sectoral development. The research will consider government policies, within and without of the health sector, and factors beyond government control that affect private sector development.

Research Elsewhere

In Niger, HFS is involved in a major health care financing demonstration project to test and evaluate two cost recovery options. As part of this evaluation, HFS is gathering data about quality of care from government facilities in two test districts. These data include availability of drugs and other pharmaceutical supplies, provider compliance with diagnostic and treatment protocols, and perceptions of quality of care by providers and consumers. As part of the same effort, HFS is conducting a household-based study of health care demand.

In Tanzania HFS is undertaking a study of private sector development similar to that in Senegal, also with funding from HHRAA.

1.5 ROLE OF THE STUDY WITHIN THE HFS APPLIED RESEARCH AGENDA

Public-Private Differences in Efficiency represents one of nine areas for major applied research (MAR) identified in the HFS Applied Research Agenda (HFS 1991). The research in Senegal is expected to answer the following policy and methodological questions:

- How efficient is the government sector in producing health services?
- How efficient is the private sector?
- What is the relative efficiency of both sectors?
- Can government subsidies be used more efficiently by relying partially or fully on government-subsidized, private sector provision?

- What mutually beneficial collaboration can be undertaken between the public and private sectors?
- What measures can be taken to improve productive efficiency in government and private facilities?
- How useful are various methods used for efficiency measurement?

HFS is involved in several research activities in Senegal, the product of which is expected to inform the policy process and lead to sectoral reform. The following section describes the research methods used in the current study.

2.0 METHODS

This section first presents definitions of key technical terms used in the study. Second, it explains the sampling method adopted to select government facilities and patients and staff within facilities. Third, it describes the data collection instruments and methods used. The study covers the period of July 1, 1990—June 30, 1991, i.e., Senegal's fiscal year 1991 (FY91).

2.1 DEFINITIONS

Cost

The cost of producing a health service is the monetary value of all resources employed in production. Generally, many inputs are required to produce a service. These include various categories of labor (doctor, nurse, accountant, porter), supplies (medicines, syringes, alcohol, food), and equipment and buildings (microscope, X-ray machine, vehicles, beds, facilities).

Total cost and unit cost

Total cost is the sum of all costs incurred to produce a certain volume of services. Economists and accountants alike are interested in measuring total cost. However, economists have a particular interest in measuring the cost of one unit of service, or the *unit cost*. For example, an economist may ask: how much does it cost to vaccinate one child, or what is the unit cost of vaccinating a child? Two measures of unit cost are commonly used: *average cost* and *marginal cost*. For instance, if TC is the total cost of vaccinating Q children, then the average cost of vaccinating one child is the total cost divided by the number of children vaccinated, or TC/Q. Marginal cost is the cost that the provider must incur to produce one additional unit of service, for example, the additional cost that the facility must incur to vaccinate child number Q+1. Generally, average cost and marginal cost differ. Each measure conveys useful but different economic information.

This report focuses almost exclusively on the estimation of total facility cost, although some estimates of average cost are provided. A separate econometric analysis of government and private sector provider costs (see Section 1) derives estimates of both average and marginal cost.

Cost and Expenditure

For notational convenience, the terms cost and expenditure are used interchangeably in this paper. However, because expenditures tend to capture cash outlays only, expenditure is generally smaller than actual cost. Examples of costs that are often omitted from of expenditure records are depreciation and training.

A thorough measurement of cost requires that all inputs used directly or indirectly in production be valued. The cost information provided in this study comes from facility records, but these unfortunately did not value all production inputs. For example, labor costs were not recorded as such at the facility level. To derive those costs, the researchers had to record the number and types of employees in the facility and cost them out using data on salaries obtained from the central offices of the MSAS. Similarly, facility records did not include any information about investment and depreciation costs for equipment, vehicles, and buildings. The study team thus collected information about number, type, and condition of equipment, vehicles, and

buildings, with the aim of deriving their cost using centrally obtained information about investments, market value, or depreciation.[3] Finally, facilities did not always keep information about payments for purchases of pharmaceutical products. The team thus collected data on supplies consumed during the one-year reference period, and then derived expenditure figures based on price information obtained at the local or central level. Given the vast number of products consumed, this proved time consuming.

Economic Cost and Accounting Cost

Economists generally derive the cost of resources used in production based on the value that society assigns to those resources. Such a value is know as *social price* or *shadow price*. Accountants, in contrast, commonly measure cost based on the amount of cash that is used to purchase the inputs consumed in production. These measures often differ. For example, accountants record the cost of pharmaceuticals consumed as the amount of money paid to the suppliers of such products. Economists, in contrast, may adjust such a payment upward or downward if they believe that the local currency is under- or over-valued relative to the foreign exchange used to purchase such imported products. Alternatively, economists may assign a cost of zero to an asset with no economic value, while an accountant, complying with reporting regulations, may continue for years to account as a cost the depreciation of such an asset.

In this report, the accounting approach is used to compute cost, i.e., cost information provided reflects cash payments made for the labor and supplies consumed in production. These payments are made locally at the facility level—for example, the payment of certain personnel categories hired by the community—or centrally—for example, salaries of government employees.

Technical Efficiency

Two important concepts intervene in the analysis of efficiency of a production process: *technical efficiency* and *economic efficiency*.[4] A procedure is technically efficient, if production inputs (e.g., labor, drugs, equipment) are combined in a way that yields the maximum feasible output (e.g., outpatient visits, hospitalizations) (Pauly, 1970, 114). Thus, one procedure is considered more technically efficient than another if it either produces the same quantity of output using fewer inputs, or produces a greater quantity of outputs using the same inputs. The measurement of technical efficiency does not incorporate any information about input prices and cost; it deals exclusively with physical quantities of inputs.

Economic Efficiency

Economic efficiency extends the concept of technical efficiency to take into account the prices of production inputs. A procedure is economically efficient if inputs are combined to produce a given level of output *at minimum cost*. In general, while many technically efficient alternatives might present themselves to produce a given quantity Q, there is only *one* economically efficient way of doing so.[5]

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[3]In the end, time and data availability constraints meant that the research team was unable to include depreciation in its cost estimates.

[4]Health service researchers in the United States use the terms “efficacy” to refer to technical efficiency and “appropriateness” to denote economic efficiency.

[5]There are some unusual production processes which display more than one economically efficient configuration.

This study deals with both efficiency concepts-technical and economic. To assess technical efficiency, output levels are related to input levels. For example, one measures the number of outpatient consultations produced by a doctor per day. To estimate economic efficiency, output is related to production cost.

To be economically efficient a provider must combine production inputs in the least expensive way to achieve any given level of output. In addition, the provider must purchase production inputs at the lowest available prices. In many cases, particularly in centralized systems where producers have little to no freedom over the selection of suppliers and thus over input prices, their only way of improving economic efficiency is by combining the resources in the least costly manner. Rigidities in the hiring of resources, however, often limit the ability of facility managers to minimize their production cost. This is often the case in highly centralized systems where decisions about resource levels, particularly labor, are made by upper-level decision- makers, sometimes in a fashion that is unresponsive to local needs.

Two factors make the measurement of efficiency a challenging exercise. First, quality of care generally varies among providers. Unless quality is measured and adjusted for, efficiency measurements may be mistaken. For example, consider two providers, one who uses small amounts of inputs to produce a low-quality service and another who uses more resources to produce a better-quality product. Assume that the two produce the same volume of services (e.g., equal numbers of deliveries). If quality is not taken into account, one may wrongly conclude that the provider who uses fewer resources (the low-quality provider) is the most efficient. If quality is considered, however, a different picture may emerge.[6] To measure efficiency, the researcher must ask: At a given quality level, which provider produces a given volume of service with the smallest quantity of inputs (technical efficiency) or at the lowest cost (economic efficiency)?

Second, case mix also varies from one provider to another, complicating the measurement of efficiency. For example, one provider may produce mainly normal deliveries while another may deal more with complicated deliveries. Because complicated deliveries are more resource-intensive, the difference in patient case mix must be considered before making any inferences about efficiency.

Much of the data collection for this study was devoted to the measurement of quality of care and case mix. Two aspects of quality of care were assessed: technical and perceived. Technical quality was gauged by measuring provider compliance with standard norms of care. Perceived quality of care was measured from the perspective of both patients and health workers. Case mix information was obtained through careful recording of facility output, i.e., the types and volumes of services delivered during the reference year.

Allocative efficiency

A health system is efficient if resources are allocated among levels, facilities, and services to achieve the highest possible level of output or outcome. Allocative efficiency is a broader concept that also implies technical and economic efficiency. This study not only looks at technical and economic efficiency at the facility level but also attempts to assess overall system efficiency. This is done by comparing efficiency among facilities of a given kind (e.g., various health centers in different regions), and across different types of facilities (e.g., health centers and health posts).

Financing

Four sources of financing were identified: government cash expenditures, community cash contributions, user fees, and other sources.

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[6]This example in no way implies that higher-quality providers are always more costly; the opposite can be true.

Government cash expenditures include all payments made locally by the facility for the purchase of labor and non-labor resources used in production during the reference year. They include also all payments made centrally or regionally by the government on behalf of the facility, for production inputs used during that period. Central government payments include salaries, fuel, and certain pharmaceutical products.

Community cash contributions consist of revenue raised by the community through taxation or other mechanisms and allocated to the financing of government health services.

User fee revenue refers to sums collected during the year through payments by users of health services. The only cost recovery modality found was that of user fees; no insurance or prepayment mechanisms were observed. User fees existed in government facilities well before the Bamako Initiative (BI) was officially adopted in 1991. The study's reference period, however, ended before the adoption of the BI. To assess possible changes in pricing policies, the study collected information about any changes in prices after the implementation of the BI. These data were not analyzed in detail, but a preliminary analysis suggests that prices did not change in an important way.

Other revenue consists of funds from donors and from any sources other than the government, the users, and the community.

2.2 SAMPLING OF FACILITIES

The study is based on a sample of government health facilities, selected according to the criterion that the sample be as geographically representative as possible, given the study's resource constraints. An attempt was made to include in the sample government facilities drawn attempted to include facilities from each administrative district, but unfortunately, political disturbances precluded the team from obtaining data in Ziguinchor (region of Casamance).

Government health services are organized according to a traditional pyramidal structure, with facilities at the lower level delivering the most basic care and those at the higher level, providing more complex secondary and tertiary care. Lower-level facilities refer more complex or specialized problems to the better-equipped providers in the upper levels of the referral system.

At the top of the Senegalese government system are 13 hospitals. Under these hospitals there are 48 health centers, about five per hospital. Below each health center there are 10-11 health posts, on average, a total of 520 nationwide. Finally, under the health posts there are on average two health huts, for a total of approximately 1,400 huts.

Using the World Bank's SDA sampling framework, the study team drew a sample of three hospitals, 23 health centers, 46 health posts, and 23 health huts. In *Exhibit 2-2*, the entire study sample size is broken down by facility type and region. *Exhibits 2-2 — 2-4* present more detailed information about the sample of health centers, posts, and huts, including the theoretical catchment area population and the distribution of sample facilities according to region and curative care utilization quartile.

EXHIBIT 2-1
STUDY SAMPLE SIZE AND UNIVERSE OF GOVERNMENT HEALTH CARE FACILITIES IN SENEGAL

Facility Type	Planned Sample Size	Actual Sample Size	Universe	Sample as Percentage of Universe
Hospital	3	3	13	23
Health Center	23	23	48	48
Health Post	46	46	520	9
Health Hut	23	11	1400	<1
Total	95	83	1,981	4

Information on the catchment area population was obtained at the facility level. The catchment area is a theoretical concept commonly used by health planners and public health experts for health planning purposes. In theory, a health facility's catchment area is the geographic region that is served by the facility. The population contained within this region is referred to as the catchment area population. In practice, however, actual information about the origin of health facility users often shows that a catchment area is a theoretical artifact with little empirical validity. For example, in a study of patient origin in Honduras (Bitran and Heinig 1992), it was shown that about 40 percent of the patients using government health centers came from outside the facility's officially designated catchment area. In cases where there is little local competition among providers, i.e., where travel barriers mean that patients have limited facility choice, the concept of

catchment area may be more valid. Since no information was available about patients' origins, it was not possible to judge the appropriateness of catchment area population data in this study. Nevertheless, with this limitation in mind, catchment area population information is used to put some of the study results into perspective.

To aid in the interpretation of cost, financing, utilization, and quality of care information, the data are sometimes presented according to curative care utilization quartiles. To construct quartiles, the sample of facilities is broken into four equal groups. The first group contains the 25 percent of facilities with the lowest reported annual utilization of curative ambulatory care. The fourth group contains the 25 percent with the highest utilization.

2.3 QUESTIONNAIRE DESIGN AND TESTING

Two sets of survey instruments were designed especially for the study: one dealing with facility costs, utilization, and financing, and a second dealing with quality of care. Both were the product of involved discussions with local researchers, enumerators, and HFS staff. Both were tested repeatedly in several facilities in or near the city of Dakar. Final versions of the survey instruments were obtained only after several iterations between the office and the field. The costs/utilization/financing instrument was modelled after the one used by Abt Associates in Zaire as part of a comprehensive study of health care financing at the facility level (Bitran, Vian, et al. 1986). The quality of care instrument was originally designed for this study and benefited greatly from the input provided by Ministry of Health doctors and survey enumerators with formal training in nursing and public health.

Exhibit 2-5 depicts the different questionnaire components. Four groups of questionnaires were designed for each of the four types of facilities surveyed. Differences among the four groups correspond primarily to differences in the types of services offered and the categories of staff employed in the facility. The table, while not mirroring any one of the four instruments, characterizes the data requirements that were common to all.

2.4 SAMPLING OF PATIENTS

As shown in *Exhibit 2-5*, within facilities, samples of patients were drawn randomly to observe provider compliance with diagnostic and treatment practices and to elicit patient quality perceptions. For the treatment of diarrhea and malaria by various categories of medical staff, the enumerators observed a maximum of 10 ambulatory patients during a two-day interval. For each of several general medical procedures (see *Exhibit 2-5*) samples of five patients were obtained. To improve randomness of selection, patients were drawn into the sample at different times of the day during the two-day facility survey. For patients undergoing surgery, a maximum sample of 10 individuals was drawn. For patient quality perceptions, 20 patients were interviewed in each facility. For staff perceptions of quality, all medical employees were interviewed.

EXHIBIT 2-2
HEALTH CENTERS:
SAMPLE SIZE AND CATCHMENT AREA POPULATION

Region	Utilization Quartile (curative ambulatory visits per month)				
	UT1 Under 9,000	UT2 9,000-12,999	UT3 13,000-15,749	UT4 15,750 and Over	Total
Distribution of facilities					
Dakar	1	1	1	1	4
Fatick-Kaolack	1	2	2	2	7
St. Louis-Louga	1	1	1	1	4
Thies-Diourbel	3	1	1	1	6
Tambacounde-Kolda	0	1	0	1	2
Total	6	6	5	6	23
Total catchment area population of facilities					
Dakar	48,009	100,243	300,000	300,000	748,252
Fatick-Kaolack	10,147	99,535	40,455	243,177	393,314
St. Louis-Louga	132,722	71,930	28,462	n.a.	233,114
Thies-Diourbel	164,126	44,176	225,933	100,647	534,882
Tambacounde-Kolda	—	12,090	—	n.a.	12,090
Total	355,004	327,974	594,850	643,824	1,921,652
Average catchment area population per facility					
Dakar	48,009	100,243	300,000	300,000	187,063
Fatick-Kaolack	10,147	49,768	20,228	121,589	56,188
St. Louis-Louga	132,722	71,930	28,462	n.a.	77,705
Thies-Diourbel	54,709	44,176	225,933	100,647	89,147
Tambacounde-Kolda	—	12,090	—	n.a.	12,090
Total	59,167	54,662	118,970	160,956	91,507

— Not applicable
n.a. Not available

EXHIBIT 2-3
HEALTH POSTS:
SAMPLE SIZE AND CATCHMENT AREA POPULATION

Region	Utilization Quartile (curative ambulatory visits per month)				
	UT1 Under 3,000	UT2 3,000-5,799	UT3 5,800-9,999	UT4 10,000 and Over	Total
Distribution of facilities					
Dakar	0	0	2	6	8
Fatick-Kaolack	4	4	3	3	14
St. Louis-Louga	3	2	2	1	8
Thies-Diourbel	3	5	2	2	12
Tambacounde-Kolda	2	0	2	0	4
Total	12	11	11	12	46
Total catchment area population of facilities					
Dakar	—	—	27,845	75,093	102,938
Fatick-Kaolack	63,551	56,503	45,551	57,464	223,069
St. Louis-Louga	17,956	17,755	45,261	6,547	87,519
Thies-Diourbel	18,464	64,053	10,143	56,208	148,868
Tambacounde-Kolda	2,170	—	5,610	—	7,780
Total	102,141	138,311	134,410	195,312	570,174
Average catchment area population per facility					
Dakar	—	—	13,923	12,516	12,867
Fatick-Kaolack	15,888	14,126	15,184	19,155	15,934
St. Louis-Louga	5,985	8,878	22,631	6,547	10,940
Thies-Diourbel	6,155	12,811	5,072	28,104	12,406
Tambacounde-Kolda	1,085	—	2,805	—	1,945
Total	8,512	12,574	12,219	16,276	12,395

— Not applicable

EXHIBIT 2-4 HEALTH HUTS: SAMPLE SIZE AND CATCHMENT AREA POPULATION			
Region	Utilization Group (curative ambulatory visits per month)		
	UT1 Under 200	UT2 200 and Over	Total
Distribution of facilities			
Fatick-Kaolack	2	2	4
St. Louis-Louga	1	1	2
Thies-Diourbel	1	3	4
Tambacounde-Kolda	1	0	1
Total	5	6	11
Average catchment area population per facility			
Fatick-Kaolack	n.a	n.a	2,047
St. Louis-Louga	n.a	n.a	740
Thies-Diourbel	n.a	n.a	2,479
Tambacounde-Kolda	n.a	n.a	n.a.
Total			1,755
n.a. Not available			

2.5 SELECTION, TRAINING, AND SUPERVISION OF ENUMERATORS

Two data collection teams were formed to obtain: (a) data on costs, financing, and utilization, and (b) information on quality of care. The team comprised 12 enumerators, with backgrounds in finance, accounting, or economics. Most were government employees from the MSAS or the Ministry of Planning, who took leave from their regular posts during the study. All four enumerators on the quality of care team were nurses, two of whom were former university professors of nursing who held doctorate degrees in public health. All enumerators participated in the design and field testing of the questionnaires and all underwent several sessions of training.

Quality control conducted during the data collection process revealed gaps in information and misconceptions among the enumerators about some of the data sought. Re-training and clarification were provided on site, and corrections were made. Return visits to several facilities were required to collect missing or faulty data.

EXHIBIT 2-5
STRUCTURE OF SURVEY INSTRUMENTS

Costs, Financing, and Utilization			Quality
Costs	Financing	Utilization	
(1) In matrix form, facility staff classified according to payer category. Payer categories included: • Government • Local community • User fees • Other sources For each staff category the following information was recorded: • Number of staff • Average annual salary • Total payroll (2) Investments in equipment and buildings. For equipment, information on age was gathered (<1 year; 1-5 years; 6 years or more) For buildingS, information on surface and age of wards was obtained	(1) Payroll payments by the four sources of funding listed under the previous column (2) For each service offered, the following information on cost recovery was sought: • Price • Revenue for one-year reference period • Percentage of nonpaying patients • Change in price after adoption of Bamako Initiative, if any • Average monthly revenue since adoption of Bamako Initiative (3) Sources and uses of funds matrix, including all recurrent costs and uses (rows) and all four sources of funds identified (columns)	(1) In matrix form, this section collected data on units of service provided for children and adults (rows) by personnel category (columns). Services recorded included: • Curative outpatient visits and episodes • Pre-natal visits and episodes • Growth monitoring visits • Family planning, new and old acceptors • Family planning products distributed • Cases of diarrhea treated with oral rehydration salts • Vaccinations (BCG, 3 DTCO doses, measles, yellow fever) • Hospitalizations (wards, isolation, maternity) • Hospitalization days • Supervisory visits to lower-level facilities Medical staff listed included: • Doctor • Nurse • Health Officer • Traditional birth attendant • Dental technician (2) Number of laboratory and radiology exams provided, distinguishing between outpatients and inpatients (3) Volume of drugs prescribed for a selected list of about 40 frequently used drugs accounting for 80 percent or more of the total value of drugs dispensed	(1) For medical equipment and vehicles, number of functional units during reference year (2) For drugs and other medical supplies: • Availability of product at the time of the survey • Duration of stockouts during reference year (3) For medical staff, number of employees who received refresher training over past two years (4) Cleanliness of premises and availability of: • Hygienic services • Electricity • Potable water • Treatment protocols for selected health problems • Family planning supplies • Laboratory exams (5) Observation and assessment of medical staff compliance with standard diagnostic and treatment practices for: • Sample of patients showing up with fever or diarrhea as main symptom • Sample of deliveries • Sample of patients undergoing several routine medical procedures (drawing blood samples, blood transfusion, disinfection of wound, injection, umbilical cord perfusion, organ or tissue, weighing) (6) Personnel quality perceptions, including: • Availability of basic medical supplies • Self-assessment of quality of care in facility • Assessments of quality improvements required in facility (7) Quality perceptions of a random sample of patients

2.6 DATA COLLECTION

The data were collected over a two- to three-month period using four vehicles, with four teams of three people each collecting data on costs, financing, and utilization, and one team for quality of care information. Political disturbances in the region of Casamance prevented collection of data in this area.

2.7 DATA CODING, ENTRY, AND ANALYSIS

Data entry programs were designed using EPI-INFO, a software developed by the U.S. Centers for Disease Control especially for health surveys. Data analysis, consisting mostly of frequency and two-dimensional tables, was performed also with EPI-INFO.

3.0 RESULTS

This chapter begins with an analysis of health facility utilization statistics followed by an analysis of provider costs. Utilization and cost data are then combined to draw basic unit cost ratios and personnel productivity measures. Facility pricing practices are then described, followed by an assessment of provider financing. Quality of care information is then presented. Cost, utilization, and quality of care information are then combined to derive efficiency measures.

3.1 UTILIZATION

This section presents annual utilization statistics for all four types of facility for fiscal year 1991 (FY91).

Hospitals

Hospital utilization statistics are presented in *Exhibit 3-1*. Utilization records were generally incomplete; the information presented in the table reflects what was available at the facility level. Data on preventive care and family planning were unavailable in all three hospitals.

Of the three hospitals in the sample, St. Louis provided the highest volume of service in FY91, while the smallest level of output was found at Tambacounde Hospital. St. Louis and Thies Hospitals exhibited similar utilization statistics for inpatient care, with nearly equal numbers of patients for surgery, internal medicine, and pediatric services. The number of hospitalization days and X-ray exams for both hospitals were also similar. St. Louis was especially active in the provision of dental and outpatient specialty services.

Health Centers

Statistics measuring medical output at health centers are shown by service category in *Exhibit 3-2.* The top section of the table refers to total annual utilization for all sample facilities in each region; the center part presents annual utilization for an average facility within the region; the bottom section includes utilization statistics according to curative ambulatory care utilization quartiles (see definition of quartiles in Section 2).

To quantify broadly the health care output of each facility, the sum of output across the six categories of ambulatory care was computed, and is shown (expressed in thousands of units) in the row labeled “Total Outpatient.” For example, the average health center in Dakar produced 34,000 units of ambulatory output in FY91, of which 17,700 were curative visits, 1,300 were prenatal visits, and so on. Adding up different types of output to obtain an aggregate output measure is a valid exercise here because, with only one partial exception (Tambacounde-Kolda), output mix for ambulatory care was very similar across facilities. A weighted average output mix for health center ambulatory care is shown on the right-hand side of the table.

EXHIBIT 3-1 HOSPITALS: UTILIZATION STATISTICS				
	Utilization Statistics (000s of units of output)			
	St. Louis-Louga	Tambacounde-Kolda	Thies-Diourbel	Total
Sample Size	1	1	1	3
Surgery Visits	5.1	1.7	4.7	3.8
Outpatient Clinic Visits	7.8	0.0	8.1	5.3
General Medicine Visits	8.6	3.5	7.9	6.7
Pediatrics Visits	6.9	0.0	6.0	4.3
Gynecological Visits	4.7	0.0	2.7	2.5
Dental Visits	11.7	1.0	2.4	5.0
Specialty Visits	11.9	6.0	3.8	7.2
Subtotal Curative	56.7	12.2	35.5	34.8
Prenatal	n.a.	n.a.	0.6	n.a.
Preschool	n.a.	n.a.	n.a.	n.a.
Deliveries	3.8	1.2	4.5	3.2
Family Planning	n.a.	n.a.	n.a.	n.a.
Hospital Days	50.6	11.9	50.2	37.6
Laboratory Exams	21.6	1.5	13.3	12.1
X-Ray Exams	6.7	1.3	7.8	5.3
n.a. Not available				

EXHIBIT 3-2
HEALTH CENTERS: UTILIZATION STATISTICS BY REGION AND UTILIZATION QUARTILE 1991 (1000s of units of output)

	REGION						
	Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Tambacounde-Kolda	Total	Weighted Average Output Mix (%)
Sample Size	4	7	4	6	2	23.0	
Total Utilization All Facilities (1000s)	70.6	94.7	56.2	64.1	92.8	378.4	
Prenatal	4.0	3.2	3.9	6.4	2.0	19.6	
Preschool	6.1	9.9	3.2	10.3	0.0	29.6	
Deliveries	13.9	4.4	2.0	4.2	1.2	25.6	
Vaccinations	25.7	27.9	33.2	61.0	27.0	175.0	
Family Planning	6.1	7.3	1.2	5.7	0.2	20.5	
Total Outpatient	126.5	147.5	99.7	151.7	12.3	648.6	
Inpatient Admissions	36.2	10.9	11.2	7.5	4.4	70.2	
						Average	
Average per Facility (1000s)	17.7	13.5	14.1	10.7	46.4	22.7	64.7
Prenatal	1.3	0.6	1.0	1.3	1.0	1.0	2.8
Preschool	3.1	2.0	1.1	2.6	0.0	1.4	4.0
Deliveries	3.5	0.6	0.5	0.8	0.6	1.1	3.1
Vaccinations	6.4	4.0	8.3	10.2	13.5	8.2	23.4
Family Planning	2.0	1.0	0.3	0.9	0.1	0.8	2.3
Total Outpatient	34.0	21.8	25.2	26.5	61.6	35.1	100.3
Inpatient Admissions	9.0	1.6	2.8	1.2	2.2	3.1	
	UTILIZATION QUARTILE (CURATIVE AMBULATORY VISITS PER MONTH)						
	UT1 Under 9,000	UT2 9,000-12,999	UT3 13,000-15,749	UT4 15,750 and Over		Total	
Average per Facility (1000s) Curative	5.8	10.8	14.7	34.3		16.5	
Prenatal	1.2	1.0	0.9	1.1		1.0	
Preschool	1.5	1.0	3.2	1.9		2.1	
Deliveries	0.9	0.6	1.1	2.0		1.2	
Vaccinations	7.0	5.0	6.1	12.1		7.6	
Family Planning	1.0	0.4	0.8	1.4		0.9	
Total	17.4	18.8	26.7	52.7		29.3	

* Case mix for ambulatory care and deliveries only; hospitalizations excluded

The composition of ambulatory care output was similar across facilities in the regions of Dakar, Fatick-Kaolack, St. Louis-Louga, and Thies-Diourbel. In these four locations, curative visits accounted for approximately one-half of all outpatient output, with vaccinations being the second most used service in terms of output volume. In Tambacounde-Kolda, in contrast, the output mix differed, with curative consultations accounting for three-fourths (46,400/ 61,600) of total ambulatory output and with virtually no activity in the other four main service categories except for vaccinations.

A broad range of output was observed across regions. Concerning ambulatory care, the most active facilities were found in Tambacounde-Kolda, with 61,600 annual units of medical output. Assuming a six-day work week (312 work days per year), the average facility in that region provided care to 197 outpatients per day. In contrast, an average facility in Fatick-Kaolack produced about one-third that volume, or 70 daily units. Surprisingly, the average facility in Dakar did not display the largest volume of ambulatory output (at only 34,000 units per year), as one might expect considering the much larger catchment area for the average facility in the capital city (see catchment area populations in *Exhibit 2-2*).

Concerning inpatient activity, Dakar facilities exhibited a much larger output volume than facilities in the regions. Whereas the typical health center in Dakar admitted 9,000 inpatients per year (about 29 per day), the typical facility in St. Louis admitted less than a third as many while the average facility in Tambacounde-Kolda admitted about one-fourth as many.

The wide range of medical activity observed in health centers is further illustrated at the bottom of *Exhibit 3-2*. Each of the facilities in the lowest utilization quartile produced 17,400 units of ambulatory care output in FY91. Each of the quartile means 20 percent facilities in the top quartile, in contrast, produced 52,700 units, or three times as much. This difference may be attributable to several factors, including market competitiveness, population base, epidemiological circumstances, and facility and personnel productivity.[7]

Utilization statistics, such as those discussed in preceding paragraphs, are difficult to interpret, unless they are associated with information on the facilities' client base or target population. Utilization figures can be converted into ratios using as the denominator the centers' theoretical catchment area population. Such an exercise is deemed useful here, despite the possible limitations identified earlier about the accuracy of theoretical catchment areas. *Exhibit 3-3* contains annual per capita utilization rates for health centers. These rates were computed by dividing the annual number of curative outpatient visits by the catchment area population by region and utilization quartile. Thus, the last column of the table shows the annual number of curative ambulatory visits made to a government health center by the average inhabitant in the respective region.

Per capita utilization rates varied considerably across regions, with the lowest utilization in Dakar, where the average person made a meager 0.05 visits to a government health center in FY91. This is equivalent to one visit in 20 years. The highest regional per capita utilization rate was observed in Tambacounde-Kolda, where the average inhabitant had slightly fewer than one annual contact with a government health center.

[7] Facility productivity is explored below.

EXHIBIT 3-3 HEALTH CENTERS: ANNUAL PER CAPITA UTILIZATION OF CURATIVE AMBULATORY CARE					
Region	Utilization quartile (curative ambulatory visits per month)				
	UT1 (lowest)	UT2	UT3	UT4 (highest)	Total
Dakar	0.04	0.03	0.04	0.10	0.05
Fatick-Kaolack	0.82	1.01	0.83	0.44	0.77
St. Louis-Louga	0.02	0.15	0.44	n.a.	0.20
Thies-Diourbel	0.03	0.21	0.04	0.17	0.10
Tambacounde-Kolda	—	0.80	—	n.a.	0.80
Total	0.19	0.54	0.44	0.29	0.37

— Not applicable
n.a. Not available

As already noted, the wide variation in per capita utilization rates observed in government facilities the result of several factors. On the demand side, these causes may include differences in disease patterns, income levels, physical accessibility, and education. On the supply side, they may encompass the degree of competition by other providers and possible supply constraints in government facilities that may restrict utilization and ration demand. The variation in per capita use may be explained also by the arbitrariness of the theoretically defined catchment areas. For example, if a catchment area is defined too broadly (that is, if it included a large proportion of people who never made use of that facility), then per capita utilization statistics would appear low.

Of all the factors that might explain regional variations in per capita use of curative care, the most important probably are the presence of competition (i.e., alternative sources of care) and the inadequacy of catchment area populations. The inhabitants of Dakar and Thies-Diourbel may face a much broader array of suppliers, including multiple government health facilities of all types, many nongovernmental providers, and traditional healers.

Additional selected health center utilization statistics are shown in *Exhibit 3-4*, including several that are expressed in relation to catchment area populations. The average length of stay of a typical hospitalization was 4.9 days, with the highest figure occurring in Dakar (5.8 days); the average length of stay for maternity was 2.5 days. While about 10 inpatients are admitted daily in the average facility, almost three times as many (29) are admitted in the typical center in Dakar. Bed occupancy rates varied significantly, from a low of 18 percent in Fatick-Kaolack and Thies-Diourbel to a high of 198 percent in Dakar. This last figure may seem implausible given that it exceeds 100 percent. Such rates, however, are often found in the records of hospitals in the region and reflect unusually high bed turnover, sharing of hospital beds by two or more patients, and hospitalized patients using the floor or halls of the premise. On average, for every 100 ambulatory patients there were 3.7 patients hospitalized. This ratio was significantly higher in Dakar (8.6), indicating that health center care in the capital city involves more hospitalizations.

EXHIBIT 3-4 HEALTH CENTERS: ADDITIONAL UTILIZATION STATISTICS							
		REGION					
		Dakar	Fatick-Kaolack	St. Louis -Louga	Thies-Diourbel	Tamba-counde-Kolda	Total
1	Average Length of Stay Hospitalizations	5.8	3.7	7.1	4.3	5.6	4.9
2	Average Length of Stay Maternity	2.1	2.2	3.2	2.6	1.5	2.5
3	Inpatient Admissions per Day	29	5	9	4	7	10
4	Inpatients per 100 Outpatients	8.6	2	3.5	4.8	2.3	3.7
5	Number of Laboratory Exams per 100 Curative Patients	27	7	6	17	8	11
6	Births as Percentage of Expected Pregnancies	39	74	20	24	83	47
7	Prenatal Patients as Percentage of Actual Births	48	105	198	144	170	132
8	Prenatal Patients as Percentage of Expected Pregnancies	30	101	33	37	135	61
9	Well-Baby Patients as Percentage of Actual Births	86	264	204	422	n.a.	271
10	Well-Baby Patients as Percentage of Expected Births	5	71	9	12	n.a.	28
11	Well-Baby Patients as Percentage of Children, Age 0-5	5	88	11	14	n.a.	34
12	Tetanus Vaccination as Percentage of Expected Pregnancies	18	78	32	42	100	51
13	DPT1 Vaccinations as Percentage of Expected Births	14	56	62	39	79	46
14	DPT2 Vaccinations as Percentage of Expected Births	4	7	3	5	1	20
15	DPT3 Vaccinations as Percentage of Expected Births	12	50	47	35	55	38
16	Measles Vaccinations as Percentage of Expected Births	10	46	57	30	52	37
17	Complete Vaccinations as Percentage of Expected Births	9	45	47	30	52	35
18	Women Using Family Planning as Percentage of Expected Women in Reproductive Age	5	27	2	6	5	13
n.a. Not available							

On average, for every 100 ambulatory patients, 11 laboratory exams were performed, or one for every 10 patients. This figure was three times as high in Dakar, where roughly one in three patients underwent laboratory exams.

To study the rate of institutional deliveries, the number of births in health centers was expressed as a proportion of the expected number of births in the reference year. The latter figure was computed by multiplying the population in the facility's theoretical catchment area times Senegal's crude birth rate of 47 per 1,000 (World Bank, 1993). For the entire sample, only about one-half (47 percent) of all expected deliveries occurred in government health centers. The lowest rates were observed in St. Louis-Louga (20 percent) and Tambacounde-Kolda (24 percent); the highest, in Thies-Diourbel (83 percent) and Fatick-Kaolack (74 percent). Again, low rates may be explained by several factors, including low consumer appreciation of the benefits of institutional deliveries and a preference for traditional, home-assisted deliveries.

Usage rates for prenatal care were computed in a similar fashion. Overall, 61 percent of all expected pregnant women benefited from prenatal care in government health centers, again with substantial regional variation. In contrast, a higher tendency to use preschool care was found, although overall use was low: for all sample facilities, well-baby patients represented only about one-third (34 percent) of the total number of children aged 0-5 years in the area. The lowest utilization rates for preventive services for mothers and children occurred in Dakar.

Vaccination compliance rates also were low. The total number of children fully immunized represented only about one-third (35 percent) the number of infants. The smallest rates again were found in Dakar.

Finally, family planning utilization rates were very low and, with the exception of Fatick-Kaolack, there was very little regional variation. Overall, only 13 percent of women of reproductive age (15-44 years) used any kind of family planning service in the sample government health centers.

Health Posts

Exhibit 3-5 contains basic utilization statistics for health posts. It is identical in structure to *Exhibit 3-2* for health centers. Several important findings emerge from an analysis of *Exhibit 3-5* and from a comparison of both tables. First, there are both similarities and differences between health posts and centers in output mix. Like health centers, health posts primarily provide curative visits and vaccinations, which respectively account for two-thirds and one-fifth of total output in both posts and centers. In contrast, the provision of maternity and family planning services at health posts is negligible.

Second, the average health post produced 12,300 units of output, or about one-third as much as the typical health center (35,100 units). This difference, however, does not hold across regions. For example, the average post in Dakar produced about three-fourths as much as the average health center in the capital city. In contrast, the representative post in Tambacounde-Kolda produced one-tenth the output of the average center in that region.

Third, in the city of Dakar, an average health post delivered more curative visits than a representative health center (19,000 annual visits compared to 17,700). The relatively greater role of health posts in the delivery of curative care in Dakar can be understood in part by analyzing the per capita utilization rates of *Exhibit 3-6* and by comparing them with the rates reported in *Exhibit 3-3* for health centers. Whereas Dakar health centers exhibited the lowest per capita utilization rates (0.05 annual visits per person) among all regions, health posts displayed the highest (0.91). Health posts thus appear to be the primary governmental source of curative ambulatory care in the capital city. In contrast, posts and centers play a more balanced role as providers of curative care in the regions. Thus, while in Dakar centers and posts may be viewed by the population as complementary health facilities, in the regions they appear to be perceived as substitutes.

Fourth, with the exception of the facilities in Fatick-Kaolack, health post output mix was relatively homogeneous across regions: curative visits accounted for between two-thirds and three-fourths of total output, and vaccinations for about one-fifth.

EXHIBIT 3-5
HEALTH POSTS:
UTILIZATION STATISTICS BY REGION AND UTILIZATION QUARTILE

	REGION						
	Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Tambacoun-de-Kolda	Total	Case Mix (percent)
Sample Size	8	13	7	11	4		
Total All Facilities (1000s)							
Curative	151.8	86.0	42.1	62.6	16.7	359.2	
Prenatal	5.1	5.2	0.6	2.5	0.5	14.0	
Preschool	9.2	5.1	0.0	0.0	0.0	14.4	
Deliveries	0.0	2.2	0.4	2.5	0.4	5.6	
Vaccinations	23.0	54.5	7.9	29.3	3.3	118.0	
Family Planning	0.2	0.6	0.0	0.0	0.1	0.9	
Total	189.4	153.5	51.0	97.0	21.1	512.0	
Average per Facility (1000s)							
Curative	19.0	6.6	6.0	5.7	4.2	8.1	65.9
Prenatal	0.9	0.4	0.1	0.3	0.2	0.4	3.3
Preschool	1.8	1.0	0.0	0.0	0.0	1.1	8.9
Deliveries	0.0	0.2	0.1	0.2	0.1	0.1	0.8
Vaccinations	2.9	3.9	1.3	2.4	1.1	2.5	20.3
Family Planning	0.1	0.3	0.0	0.0	0.0	0.1	0.8
Total	24.7	12.3	7.6	8.7	5.6	12.3	100.0
	Utilization Quartile (curative ambulatory visits per month)						
	UT1 Under 3,000	UT2 3,000-5,799	UT3 5,800-9,999	UT4 10,000 and Over		Total	
Average per Facility (1000s)							
Curative	1.9	4.6	7.7	18.5		8.4	
Prenatal	0.1	0.2	0.4	0.8		0.4	
Preschool	0.1	1.1	0.9	1.8		1.1	
Deliveries	0.1	0.1	0.1	0.3		0.2	
Vaccinations	2.4	2.1	3.0	3.4		2.7	
Family Planning	0.0	0.0	0.1	0.2		0.1	
Total	4.7	8.2	12.2	25.0		12.9	

EXHIBIT 3-6 HEALTH POSTS: ANNUAL PER CAPITA UTILIZATION OF CURATIVE AMBULATORY CARE					
Region	Utilization quartile (curative ambulatory visits per month)				
	UT1 (lowest)	UT2	UT3	UT4 (highest)	Total
Dakar	—-	—-	0.31	1.21	0.91
Fatick-Kaolack	0.13	0.25	0.36	0.59	0.31
St. Louis-Louga	0.31	0.39	0.45	1.17	0.48
Thies-Diourbel	0.20	0.21	0.60	0.71	0.38
Tambacounde-Kolda	0.39	—-	0.77	—-	0.58
Total	0.22	0.25	0.44	0.92	0.47
—- Not applicable					

A comparative analysis of additional utilization statistics for posts and centers yields important findings. Supplementary information on service use in posts is provided in *Exhibit 3-7;* comparable with information for health centers in *Exhibit 3-4.* Probably the most noteworthy finding is the higher immunization coverage rates of health posts. Immunization rates for DPT and measles are much higher than in health centers and are in line with, if not higher than, the countrywide statistics reported in the introductory section (see *Exhibit 1-1*). Unlike health centers, health posts display more uniform regional immunization rates, including in Dakar. Also, overall utilization rates for preventive services of all kinds are considerably higher in posts.

Health Huts

Health huts provide a negligible amount of care—on average one unit of service per day—and huts handle almost exclusively curative visits (although they provide also a small volume of maternity care. Whereas a typical post produced 12,300 output units in FY91, the average hut delivered only 298 units, or 2.4 percent. The difficulties experienced by the survey team in identifying functioning huts suggests that these smaller units, operating at the very lowest level of the system, may be in the process of becoming extinct.

Summary

An analysis of utilization statistics exposed important differences in output mix and volume across facilities, although the incomplete nature of hospital utilization statistics precluded a detailed analysis. Of the three hospitals in the sample, two (St. Louis and Tambacounde) exhibited very similar utilization statistics, in both mix and volume. Tambacounde Hospital was substantially smaller in terms of volume, delivering one-fourth to one-fifth the output of the two larger institutions.

Utilization data for health centers and health posts were richer and thus permitted a more involved analysis. For both centers and posts, a broad variation in the average facility output per facility was observed across regions. The highest-output health centers were found in Tambacounde-Kolda and Dakar, with 61,600 and 34,000 annual units of outpatient output, respectively. The smallest-output centers were found in Fatick-

Kaolack, with 21,800 units of output. On average, the largest health posts were found in Dakar, with 24,700 annual output units, and in Fatick-Kaolack, with 12,300 units.

Unlike health posts, health centers deliver inpatient care. Although health centers in Dakar did not display the highest volume of outpatient output, their inpatient activity was much larger than in the regions. A typical health center in Dakar admitted an average of 29 patients per day. On the other extreme, the representative facility in Thies-Diourbel admitted only four inpatients daily. With the exception of Dakar, hospitalizations constituted a very small share of health center activity.

Generally, health centers delivered a much larger volume of output than posts, although output relationships varied widely by region. The ratio of total ambulatory output in health centers compared to health posts was largest in Tambacounde-Kolda (about 11 to 1) and narrowest in Dakar (about 1.4 to 1).

Both centers and posts exhibited similar overall output mix for ambulatory care: curative visits accounted for about two-thirds of total output and vaccinations for one-fifth. Deliveries and family planning services accounted for a greater share of output in health centers, whereas maternal and child preventive services were more important in health posts.

To compare utilization statistics across regions and facility groups, utilization statistics were expressed as ratios, using as the denominator the theoretical population in the catchment areas. Like total output, utilization rates fluctuated widely among regions, particularly for curative ambulatory care. For example, a typical health center in Dakar was visited at a rate of once in 20 years by the average inhabitant. In Thies-Diourbel, the equivalent rate was about one visit per year. Per capita utilization rates also varied by region for health posts, although not nearly as broadly as for health centers. The highest rate was observed in Dakar, where the average citizen visited a health post 0.91 times per annum.

Low per capita utilization of health centers coexisted with high utilization rates in health posts in Dakar. Both kinds of facility seem to function more like complementary institutions within the larger health care referral system: health posts appear to satisfy the bulk of the demand for curative ambulatory care and preventive services while health centers seem to focus more on referrals, obstetric care, family planning, and, of course, hospitalizations. This pattern does not emerge as clearly in the regions.

Health huts are minute entities, on average producing no more than one visit per day and only occasionally assisting with a birth. Difficulties in finding functional huts suggest that this kind of delivery mechanism may be disappearing.

EXHIBIT 3-7
HEALTH POSTS:
ADDITIONAL UTILIZATION STATISTICS

	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Thies-Diourbel	Tambacoun-de-Kolda	Total
Births as Percentage of Expected Pregnancies	n.a.	20	22	62	71	39
Prenatal Patients as Percentage of Actual Births	n.a.	232	200	127	206	209
Prenatal Patients as Percentage of Expected Pregnancies	120	47	25	104	53	58
Well-Baby Patients as Percentage of Actual Births	n.a.	936	n.a.	117	48	611
Well-Baby Patients as Percentage of Expected Births	59	30	n.a.	7	1	33
Well-Baby Patients as Percentage of Children, Age 0-5	77	33	0	10	5	41
Tetanus Vaccination as Percentage of Expected Pregnancies	68	55	27	45	114	67
DPT1 Vaccinations as Percentage of Expected Births	88	71	48	67	63	67
DPT2 Vaccinations as Percentage of Expected Births	83	66	49	57	56	62
DPT3 Vaccinations as Percentage of Expected Births	96	65	47	39	50	60
Measles Vaccinations as Percentage of Expected Births	108	61	38	44	49	59
Complete Vaccinations as Percentage of Expected Births	59	51	37	39	43	47
Women Using Family Planning as Percentage of Expected Women in Reproductive Age	6	5	1	1	n.a.	4

n.a. Not available

EXHIBIT 3-8 HEALTH HUTS: UTILIZATION STATISTICS BY REGION					
	REGION				
	Fatick-Kaolack	St.Louis-Louga	Tambacounde-Kolda	Thies-Diourbel	Total
Sample Size	4	2	1	4	11
Total All Facilities					
Consultations	947	503	71	1,570	3,091
Deliveries	45	12	13	114	184
Total	992	515	84	1,684	3,275
Average per Facility					
Consultations	237	252	71	393	281
Deliveries	11	6	13	29	17
Total	248	258	84	421	298

3.2 COSTS

Annual costs for the four kinds of facilities are presented in *Exhibits 3-9 — 3-12*. The cost structure of facilities is presented in *Graph 3-1*. Since only three hospitals were included in the sample, their individual cost information is shown. For centers, posts, and huts, of which a larger number of facilities were included, total facility cost information is presented in the form of averages by region and utilization quartile.

Hospitals

As shown in *Exhibit 3-9*, the hospitals of St. Louis and Thies exhibited very similar aggregate cost information for FY91, with St. Louis spending 284.7 million FCFA (about one million dollars) [8] and Thies spending 257.9 million FCFA. Tambacounde hospital, a much smaller unit, spent about one-fourth as much as the larger facilities.

The two larger facilities also displayed similar cost structures: salaries accounted for about 60 percent of total costs, medicines for 12 to 16 percent, and other inputs for just over 25 percent (see *Graph 3-1)*. In contrast, salaries accounted for most of Tambacounde Hospital's costs, with a relatively minute amount of money devoted to nonpersonnel categories. This last finding may signal an unbalanced budget in Tambacounde, possibly translating into shortages of medical supplies and lower quality care.

[8] As noted above, the exchange rate used was US$1=270 FCFA (1991).

Health Centers

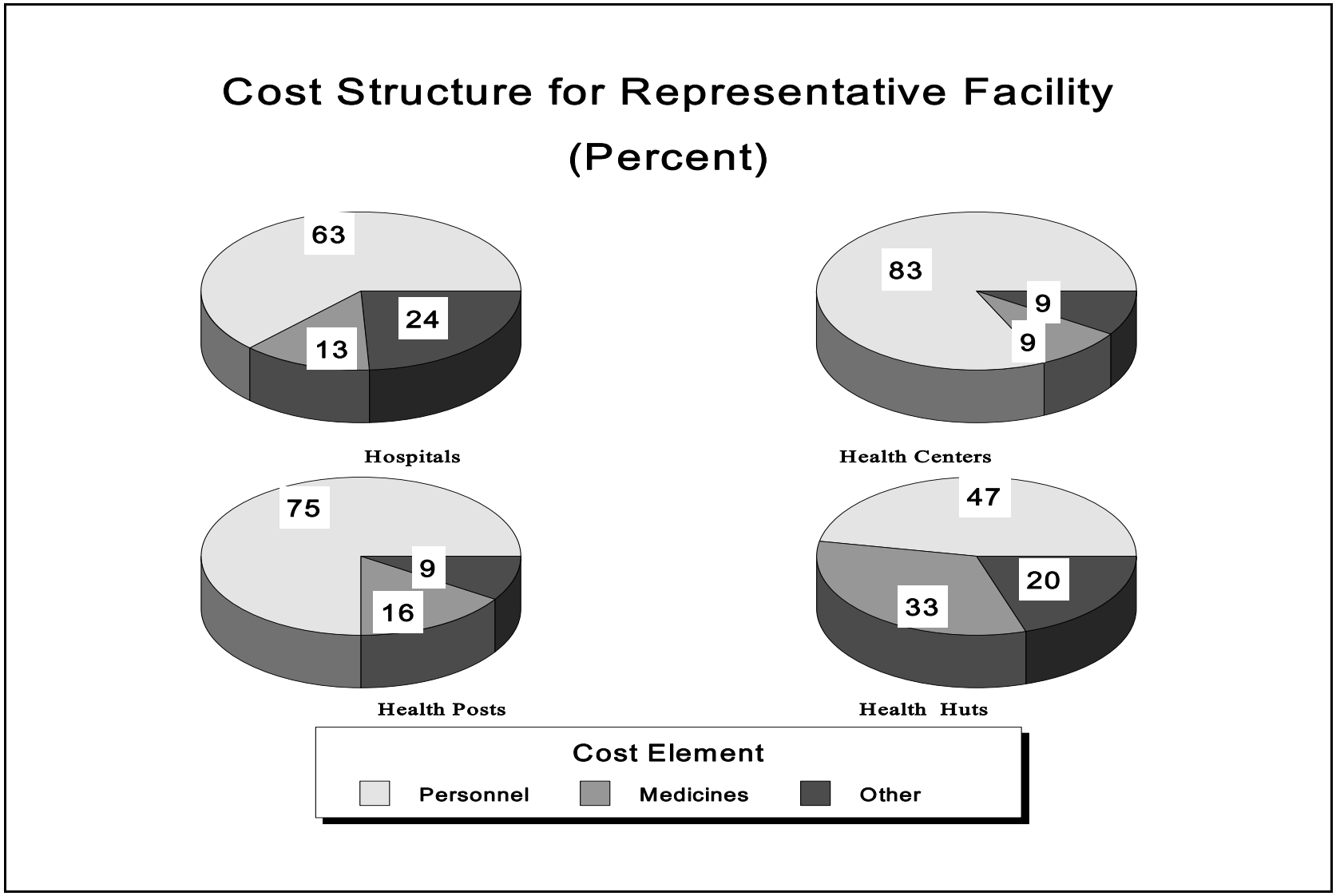
Health centers are considerably smaller health units than hospitals (*Exhibit 3-10*); note that data for Tambacounde-Kolda were not available. In FY91, the average health center spent 46.9 million FCFA (173,700), or less than one-fourth the amount devoted to an average hospital. Health centers devoted, on average, a much larger share of the resources than hospitals to personnel, with medicines and other inputs accounting for only about 9 percent of total costs. Data from other countries in the SSA region suggest that, in a well-functioning health center, about 40-50 percent of expenditures are allocated to pharmaceutical products.[9]

Like hospitals, health centers exhibited a wide range of expenditures. The average facility in Dakar spent 60 percent more than the sample average (75.4 million FCFA versus 46.9 million FCFA). Differences in facility cost may be explained, in part, by differences in the composition and levels of output. The ambulatory care output of a typical health center in Dakar was about equal to the average output for the entire sample (34,000 visits in FY91, see *Exhibit 3-2*). In contrast, the average facility in Dakar delivered three times as many admissions as the example average (see *Exhibit 3-2*). The higher expenditure in Dakar thus may be explained, at least partially, by the greater volume of inpatient care available in the capital city.

Health center cost structures varied little across regions (the middle-section of *Exhibit 3-10*), with the exception of Dakar where drugs accounted for a relatively large share (14 percent) of total expenditures. Health centers in Dakar seem to have considerably greater access to pharmaceutical products than those in the regions. This apparent imbalance in the availability of essential medical supplies may signal an important inequity in the system, which may favor higher-income populations in the capital city and at the expense of poorer populations in the regions.

When analyzed according to utilization groups (the bottom section of *Exhibit 3-10*), expenditure increased with utilization for the three highest utilization quartiles. The facilities falling in the lowest utilization group, however, displayed a rather high total cost, which is not in line with their medical activity. In fact, as is shown at the bottom row of *Exhibit 3-2*, health centers in the lowest utilization quartile had a total outpatient output equal to about two-thirds that of facilities in the third quartile (17.4 thousand units compared with 26.7 thousand) and inpatient output equal to about one-third that of the third quartile. Yet total facility cost in the lower-utilization centers was almost as high as in the third quartile. The unexpectedly high facility cost among the low output facilities may signal economic inefficiency. (This issue is explored below.)

[9] Examples include the health zones in Zaire in 1986 (Bitran, Vian, et al. 1986) and government facilities in Niger in the early 1980s.



Graph 3-1 Facility Cost Structure

EXHIBIT 3-9 HOSPITALS: TOTAL FACILITY COSTS				
	REGION			
	St. Louis-Louga	Tambacounde-Kolda	Thies-Diourbel	Total
Sample Size	1	1	1	3
Costs (1000s of FCFA)				
Personnel	170,802	66,663	150,020	129,162
Medicines	35,033	2,774	40,839	26,215
Other	78,860	4,260	67,011	50,044
Total	284,695	73,697	257,870	205,421
Cost Structure (percent)				
Personnel	60	90	58	63
Medicines	12	4	16	13
Other	28	6	26	24
Total	100	100	100	100

Health Posts

Compared to health centers, health posts are significantly smaller facilities, in terms of both output and cost (*Exhibit 3-11*). Concerning output, as noted in Section 3.1, the average health post's ambulatory output of 12,300 units was about 35 percent that of a typical health center (35,100 units). Moreover, the average health center hospitalized 3,100 patients annually, whereas health posts provided no inpatient care.

Regarding expenditure, the average health post spent 3.9 million FCFA ($14,440), or about 8.5 percent of the expenditure of a typical health center (46.9 million FCFA). The higher costs of health centers is thus explained, at least partly, by the centers' higher output.

Outside of Dakar, health posts exhibited a rather uniform distribution of expenditure, varying from 2.3 million FCFA in St. Louis-Louga to 2.9 million FCFA in Thies-Diourbel. In contrast, as in the case of health centers, the average facility in Dakar spent a substantially higher amount of money (between three and four times more) than those in the regions. Health post output (see *Exhibit 3-4*) in Dakar was also between three and four times as high as in the regions, and therefore this difference in cost is not a disquieting finding.

EXHIBIT 3-10
HEALTH CENTERS:
AVERAGE TOTAL FACILITY COSTS BY REGION
AND UTILIZATION QUARTILE

Cost Category	REGION				
	Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Total
Sample size	3	6	3	6	18
Costs (1000s of FCFA)					
Personnel	58,608	33,704	20,993	42,560	38,688
Medicines	10,642	1,640	1,335	4,728	4,119
Other	6,102	3,714	3,440	3,754	4,080
Total	75,353	39,057	25,768	51,042	46,886
Cost Structure (percent)					
Personnel	78	86	81	83	83
Medicines	14	4	5	9	9
Other	8	10	13	7	9
Total	100	100	100	100	100
	Utilization Quartile (curative ambulatory visits per month)				
	UT1 (lowest)	UT2	UT3	UT4 (highest)	Total
Sample size	6	3	4	5	18
Costs (1000s of FCFA)					
Personnel	36,280	28,478	37,103	48,972	38,688
Medicines	4,107	2,120	3,265	6,015	4,119
Other	3,447	3,592	4,795	4,560	4,080
Total	43,833	34,190	45,164	59,546	46,886

EXHIBIT 3-11 HEALTH POSTS: AVERAGE TOTAL FACILITY COSTS BY REGION AND UTILIZATION QUARTILE					
Cost Category	REGION				
	Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Total
Sample size	7	12	6	11	36
Costs (1000s of FCFA)					
Personnel	6,721	2,113	1,887	2,065	2,957
Medicines	1,636	356	243	479	624
Other	868	202	151	326	361
Total	9,225	2,671	2,281	2,869	3,941
Cost Structure (percent)					
Personnel	73	79	83	72	75
Medicines	18	13	11	17	16
Other	9	8	7	11	9
Total	100	100	100	100	100
	Utilization Quartile				
	UT1 (lowest)	UT2	UT3	UT4 (highest)	Total
Sample size	4	5	4	4	17
Costs (1000s of FCFA)					
Personnel	1,514	1,543	1,966	5,554	2,579
Medicines	240	213	653	1,172	549
Other	183	136	262	709	311
Total	1,936	1,892	2,881	7,435	3,440

The cost structure at health posts appeared rather uniform across regions, with personnel accounting for 72-83 percent of total expenditures, medicines for 11-18 percent, and other inputs for 7-11 percent. Cost structures of health posts differ from those of health centers. While both kinds of facilities devoted about the same share of resources to personnel, health posts devoted between two and three times as much to drugs as health centers. The latter, in contrast, allocated a greater share of their money to other cost categories, such as maintenance, transportation, and fuel. While this difference in cost structure may reflect, to some extent, the different role that the two types of facilities play in the delivery system, the proportionately higher spending on drugs in posts may reflect also greater availability of pharmaceuticals and possibly better quality of care for some types of services (e.g., curative).

Concerning expenditure by utilization groups (the bottom section of *Exhibit 3-11*), the same pattern found for health centers emerges in the case of health posts: for facilities in the three highest utilization quartiles, expenditures grow with output, yet facilities in the lowest utilization group exhibit unexpectedly high expenditures that are not in line with their low output. This finding is discussed in further detail below.

Health Huts

Health hut cost information is shown in *Exhibit 3-12*. In FY91, the average hut spent 93 thousand FCFA ($344, or $1 per day), or one-fortieth the amount spent by the average health posts and 1/500 that of the average health center.

As with the other kinds of facilities, regional variation in expenditure was observed for huts. While the units in Fatick-Kaolack and Tambacounde-Kolda exhibited similar annual expenditures (69-70,000 FCFA), the average facility in Thies-Diourbel spent 66 percent more (116,000 FCFA).

In contrast to centers and posts, health huts exhibit an odd cost structure. In Thies-Diourbel, personnel costs accounted for two-thirds (67 percent) of the total, somewhat in line with, albeit below, the personnel expenditures of health centers and posts. In contrast, posts in Tambacounde-Kolda devoted only one-fifth of their resources to personnel (21 percent), while spending almost three-fourths (72 percent) of their money on medicines. Finally, the health hut in Fatick-Kaolack exhibited the third possible permutation in cost structure, devoting about two-thirds of its resources to the cost category “other,” and only 11 percent and 22 percent respectively to personnel and drugs.

Health expenditure was in line with utilization as shown in the bottom row of *Exhibit 3-12*. The five smaller huts spent approximately one-eighth as much as the two largest units.

EXHIBIT 3-12
HEALTH HUTS:
AVERAGE TOTAL FACILITY COSTS BY
REGION AND UTILIZATION QUARTILE

Cost Category	REGION			
	Fatick-Kaolack	Tambacounde-Kolda	Thies-Diourbel	Total
Sample Size	3	1	4	8
Costs (1000s of FCFA)				
Personnel	7	14	78	43
Medicines	16	50	37	31
Other	47	5	1	19
Total	70	69	116	93
Cost Structure (percent)				
Personnel	11	21	67	47
Medicines	22	72	32	33
Other	67	7	1	20
Total	100	100	100	100
	Utilization Group (curative ambulatory visits per month)			
	UT1 (lowest)	UT2 (highest)		Total
Sample Size	5	2		7
Costs (1000s of FCFA)				
Personnel	9	150		50
Medicines	19	66		32
Other	1	2		2
Total	29	218		83

Summary

Annual hospital expenditures varied between 73,700 FCFA ($250,000) and 284,7000 FCFA (just over $1 million). The two facilities with the highest expenditure had similar cost structures, devoting 58-60 percent of their resources to personnel and 12-16 percent to pharmaceutical products. In contrast, the lower-output hospital of Tambacounde devoted most of its resources (90 percent) to personnel, with a meager 4 percent going to medicines.

The average health center spent 46.9 million FCFA per year, or about one-fourth as much as the average hospital. Health center expenditure varied widely among regions, with the highest-spending facilities located in Dakar. Cost structure varied little among facilities outside of Dakar, with the average facility devoting over 81 percent of its money to salaries and 4-9 percent to drugs. In Dakar, the average facility spent relatively less on salaries (78 percent of total expenditures) and more on drugs (14 percent), suggesting either that facilities in the capital city had more resources and discretion to purchase medicines or that the MSAS drug procurement system favored Dakar over the regions. Finally, health center expenditure increased with output, except for facilities in the lowest utilization group. This odd result may imply economic inefficiency in low-output facilities.

The average health post spent 3.9 million FCFA ($14,440) in FY 1991, or approximately one-twelfth as much as a typical health center. Average health post output was significantly smaller than health center output. The ambulatory care output of posts was about one-third that of the average health center. Also, health posts did not hospitalize patients whereas the average health center admitted 3,100 patients annually. Additionally, differences in case mix, quality of care, and the nature of health facility activity (e.g., health centers are referral facilities for posts) may account for the much higher facility cost of health centers.

Dakar health posts spent between three and four times as much as regional posts, a difference that may be explained largely by a proportionately equal difference in output between Dakar and the regions. Health posts outside Dakar exhibited a rather homogeneous pattern of expenditure. Overall, health posts had a somewhat uniform expenditure pattern across regions, with about 75 percent of expenditure going to salaries and 15 percent to medicines. Relative to health centers, health posts devoted a somewhat smaller share of their money to personnel, a significantly higher share to drugs, and a less important share to other production inputs. As in the case of health centers, health post expenditure increased with output for facilities in the three highest utilization quartiles. As with health centers also, posts in the lowest utilization group exhibit proportionally high total expenditures.

Relative to the other ambulatory health facilities, the health hut is a very small operation. Annual hut expenditures were one-fortieth those in health posts and 1/500 those in health centers. Cost structure for huts varied considerably, with some facilities devoting most of their resources to personnel, others devoting most of their resources to medicines, and yet others spending most on neither personnel nor medicine. Higher-output health huts spent significantly more than those with low utilization.

3.3 PER CAPITA RECURRENT COSTS OF GOVERNMENT HEALTH FACILITIES

To better assess the magnitude of government facility costs, annual recurrent cost was expressed on a per capita basis. This was done by dividing yearly facility expenditures by the population contained within the facility's theoretical catchment area. An average cost figure was computed for each of the four types of facilities using as the denominator the average catchment area sizes (shown in the exhibits of Section 2). The results of this exercise are presented in *Graph 3-2*.

On a per inhabitant basis, health centers were the most expensive type of facility, costing about 500 FCFA annually. Hospitals were second, followed by health posts and huts. Based on these results, government recurrent expenditures on health facilities amounted to about 1,220 FCFA ($4.52), of which 350 FCFA went to finance hospital costs, 500 FCFA to health centers, 320 FCFA to health posts and, finally, 50 FCFA to health huts.

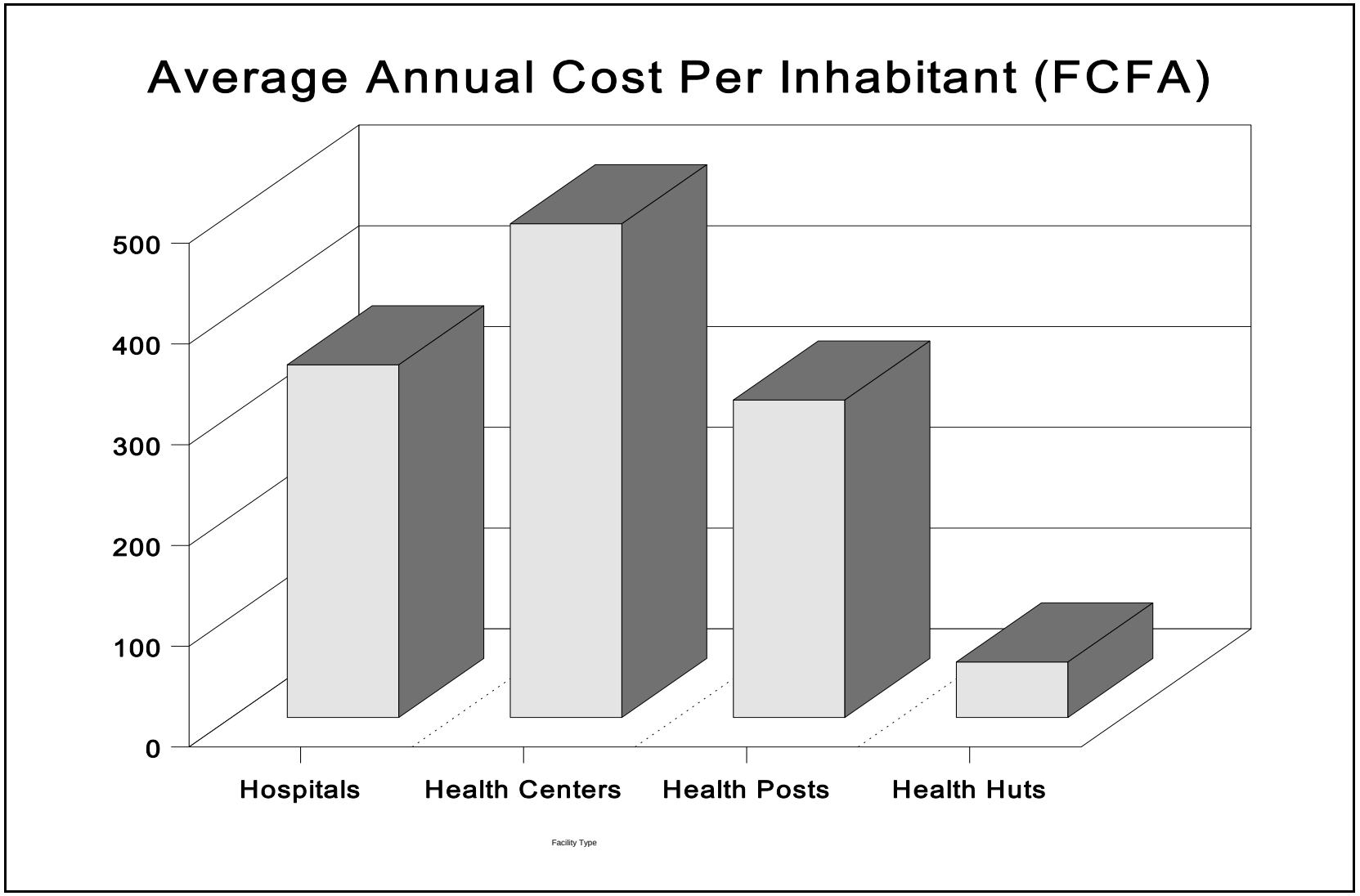
These sums of money appear modest relative to Senegal's per capita income. The $4.52 annual expenditure per inhabitant represents about 0.6 percent of per capita GNP. These amounts also appear modest when compared with Senegal's reported government health expenditure (see *Exhibit 1-1*). Public sector health expenditures are reported as 2.3 percent of GDP. Disregarding small differences between *GNP* and *GDP*, the information obtained here suggests that of the 2.3 percent of GDP that the government spent on health care in 1990, only 0.6 percent (or one-fourth) seems to have been devoted to facility recurrent expenditures. A close analysis of government health budgets would be useful to better judge this seemingly puzzling finding. It is likely that investment expenditure and higher per capita expenditures in larger referral hospitals, neither of which is captured by this study, accounted for part of the difference between the reported expenditures of 2.3 percent of GDP and the findings here that spending is instead 0.6 percent of GNP.

3.4 UNIT COST ANALYSIS

To compare costs within facilities of the same type and across facilities of different type, average cost calculations were performed for health posts and huts. Owing to the complexity of their output mix and the associated difficulty of defining an aggregate output measure, average cost was not computed for hospitals and health centers. Further, given their much larger size and more complex nature, hospitals were omitted from this analysis.

For posts and huts, average cost was obtained by dividing total cost by total output for the average facility within each region (and within each utilization quartile in the case of posts). Total output was the sum of all outpatient care plus deliveries. This aggregate output measure allows meaningful comparisons across facilities because, as explained in Section 3.1, case mix was similar among facilities.

The average cost health centers could not be computed as above because centers also produce inpatient care. Health center output cannot be combined into a single, meaningful output figure that conveys information about resource use because case mix varied among health centers and because it is likely that the true average cost of an admission is significantly higher than that of an outpatient visit or a delivery.



Graph 3-2 Annual Recurrent Expenditures of Health Facilities on a Per Capita Basis

Nevertheless, in an effort to explain the much higher cost of health centers relative to posts—and, of course, relative to huts (see discussion in the preceding section)—an attempt was made to derive the average cost of an admission. To do so, it was assumed that centers had the same average cost for outpatient care and deliveries as posts. This average cost figure was multiplied by health centers' non-inpatient output (ambulatory care + deliveries) to derive an estimate of the total cost of outpatient care and deliveries in centers. The residual, that is, the difference between total facility cost and the preceding estimate, is an estimate of health center total inpatient cost. By dividing this last figure by the number of admissions, one obtains a rough estimate of the average cost of an admission in health centers.

Graph 3-2 contains average cost information for health huts and posts, by region (and by utilization quartile for posts). Also shown is the imputed average cost of health centers (equal to that of posts within each region), the estimate of the total cost of admissions in health centers, and the derived average cost of an admission. In the bottom section of the table, where the data are presented according to utilization quartiles, the imputed average cost of outpatient care plus deliveries in health centers was the average cost in posts that belong in the highest utilization quartile (i.e., 297 FCFA per unit of output). Finally, the exhibit provides an estimate of the total cost of admissions in health centers as a percentage of total health center cost.

Average costs were similar in huts and posts, i.e., 296 FCFA for the former and 304 FCFA for the latter. Absolute amounts varied between 217 FCFA and 373 FCFA. Average cost were highest in Dakar health posts. One possible interpretation of the similarity in average cost between posts and huts is that both types of facility devoted about the same amount of resources to the production of each unit of care. Other interpretations are possible, however; one is that, if posts benefited from economies of scale, they would be able to provide a higher volume of better quality care than huts while having similar average cost.

The question of economies of scale in posts can be explored by analyzing the information on the bottom half of the exhibit. The curve for average costs at posts is U-shaped: it is highest at the lowest output level (lowest quartile, UT1); it then reaches a minimum at the second quartile, and the increases through the fourth. Production of health care in posts thus seems to exhibit economies of scale at low output levels (facilities in the second quartile produce between 3,000 and 6,000 units of output per year, see *Exhibit 3-5*) and then diseconomies of scale. An efficient size post, i.e., one where average cost is lowest, would be one producing between 3,000 and 6,000 units of output annually.

The presence of economies of scale in the production of inpatient care in health centers was assessed as well. The average cost of inpatient care in health centers is estimated at the bottom of the exhibit.[10] At the lowest output quartile, where annual admissions were only 1,300 per facility, estimated average cost was 29,737 FCFA ($110) per admission. The average cost of admissions declined steeply with output, however. At the fourth quartile, where annual inpatient output was over five times higher (6,900 admissions per annum), average cost was only 6,358 FCFA ($24).

[10] Behind this exercise is the assumption that the average cost of ambulatory care and admissions in health centers is equal to that of posts at the highest observed output level (to make it consistent with the higher output of health centers).

EXHIBIT 3-13
HEALTH CENTERS, POSTS, AND HUTS:
AVERAGE COST COMPUTATION[1]

		REGION				
		Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Total
Health Huts						
1	Sample Size	---	3	n.a.	4	8
2	Total Cost (1000s FCFA)	---	70	n.a.	116	93
3	Total Output visits + deliveries (000s units)	---	0.25	n.a.	0.42	0.31
4	Average Cost/Per Unit of Output FCFA	---	282	n.a.	276	296
Health Posts						
5	Sample Size	8	13	7	11	39
6	Total Cost (1000s FCFA)	9,225	2,671	2,281	2,869	3,941
7	Total Output visits + deliveries (000s units)	24.7	12.3	7.6	8.7	13
8	Average Cost/Per Unit of Output FCFA	373	217	300	330	304
Health Centers						
9	Sample Size	4	7	4	6	21
10	Total Cost (1000s FCFA)	75,353	39,057	25,768	51,042	46,886
11	Visits + Deliveries (000s units)	34.0	21.8	25.2	26.5	26.1
12	Admissions (000s units)	9.0	1.6	2.8	1.2	3.1
13	Imputed Average Cost Vis.+ Dels. FCFA	373	217	300	330	304
14	Estimated Total Cost of Vis.+Dels. (000s FCFA)	12,698	4,734	7,563	8,739	7,926
15	Estimated Total Cost of Admissions (000s FCFA)	62,655	34,323	18,205	42,303	38,960
16	Estimated Average Cost Per Admission FCFA	6,962	21,452	6,502	35,253	12,472
17	Estimated Admissions Cost as % of Total Cost	83	88	71	83	83
		UTILIZATION QUARTILE				
		UT1 lowest	UT2	UT3	UT4 highest	Total
Health Posts						
5	Sample Size	12	7	10	7	36
6	Total Cost (000s FCFA)	1,936	1,892	2,881	7,435	3,259
7	Ambulatory Output (000s units)	4.7	8.2	12.2	25.0	11.4
8	Average Cost FCFA	412	231	236	297	286
Health Centers						
9	Sample Size	6	3	4	5	18
10	Total Cost 000s FCFA	43,833	34,190	45,164	59,546	46,886
11	Ambulatory Output (000s units)	17.4	18.8	26.7	52.7	29.5
12	Inpatient output (000s units)	1.3	1.6	3.0	6.9	3.3
13	Imputed Average Cost/Per Visit FCFA	297	297	297	297	297
14	Estimated Total Cost of Ambulatory Care	5,175	5,591	7,941	15,673	8,775
15	Estimated Cost of Inpatient Care	38,658	28,599	37,223	43,873	38,111
16	Estimated Average Cost of Inpatient Care	29,737	17,874	12,408	6,358	11,608
17	Estimated Inpatient Cost as % of Total Cost	88	84	82	74	81

[1]Explanation of calculations:

4	=	2/3	14	=	13x11
8	=	6/7	15	=	10-14
13	=	8	16	=	15/12
			17	=	100x15/10

The preceding calculations suggest that health centers may benefit from important economies of scale in the production of inpatient care. Average (and marginal) cost decline throughout the observed range of inpatient output, indicating that large health centers make economic sense, insofar as inpatient production is concerned. Nevertheless, the policy implication of these results is not necessarily that health centers should be larger and fewer or that they should be banned in favor of hospitals. The efficiency benefits of having larger and fewer health centers (or of providing inpatient care in regional hospitals rather than in health centers) must be weighed against the losses resulting from higher patient access costs.

The estimates of inpatient costs suggest not only that steep economies of scale exist in the production of inpatient care, but also that inpatient costs may account for a large share of health center costs. The validity of this finding, of course, rests on the assumption that average cost of outpatient care and deliveries is the same in posts and centers. The presence of economies of scale in the production of inpatient care is not dependent on such an assumption, however.

3.5 PERSONNEL PRODUCTIVITY

Personnel productivity is an important measure of efficiency in production, since it establishes a relationship between health care output and medical labor input. Other things been equal (especially quality), the higher the ratio of output to input, the greater the efficiency of the production process.

Productivity is a direct measure of technical efficiency of labor (see the definition of technical and economic efficiency in Section 2.1). Low personnel productivity means low technical efficiency: presumably, fewer staff could be hired thereby increasing individual productivity. This would also reduce labor costs and thereby improve economic efficiency.

Unfortunately, labor productivity is not always under the control of workers and managers. Political and technical considerations, as well as exogenous factors, may result in low productivity and thus in low levels of both technical and economic efficiency. For example, low demand for a certain service may imply low productivity. To improve productivity, staff would have to be laid off or their hours reduced. While in many instances this may be advisable, in others it may be neither possible nor politically acceptable. For example, for equity reasons, a political decision may be made whereby specialty doctors are sent to a region with naturally low demand (e.g., ophthalmologists, psychiatrists). Due to labor law constraints, these specialists can be hired only on a full-time basis and not by the hour. Their output per unit of time is therefore low. Of course, where demand can be accommodated by only one ophthalmologist, a second ophthalmologist is unnecessary; he or she should be reassigned to a different location.

For every category of medical personnel, productivity was obtained by computing a ratio of the number of units of health care output to the number of hours of medical input devoted to the production of that output. Information on output volume by personnel category was collected through the facility questionnaire with the aid of a matrix. The rows of the matrix were the categories of output; the columns were the categories of medical staff. The cells contained annual output data. A separate section of the questionnaire gathered information about the facility's number of medical staff per category.

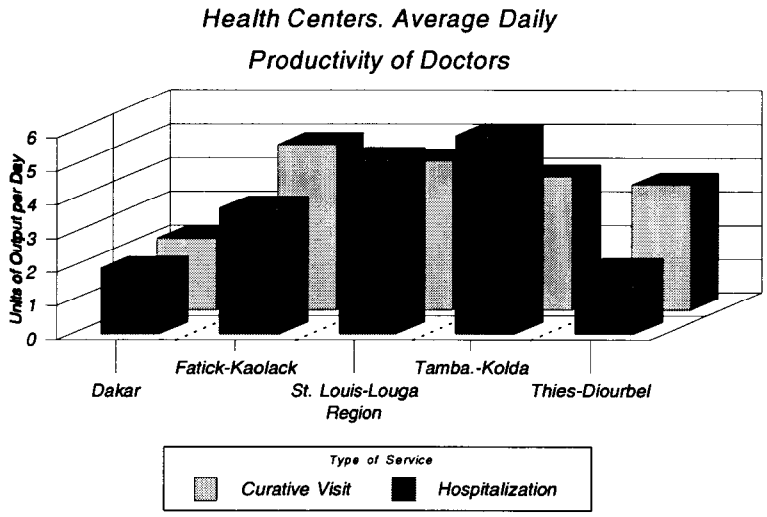
In each facility, each category of personnel produced a well-defined set of services. For example, in health centers doctors produced primarily curative ambulatory visits and provided care to hospitalized patients. Likewise, birth attendants (*matrones*) assisted deliveries and cared for hospitalized mothers after birth. Since information about total output by personnel category and number of staff by category was collected, it was possible to computed staff productivity ratios.

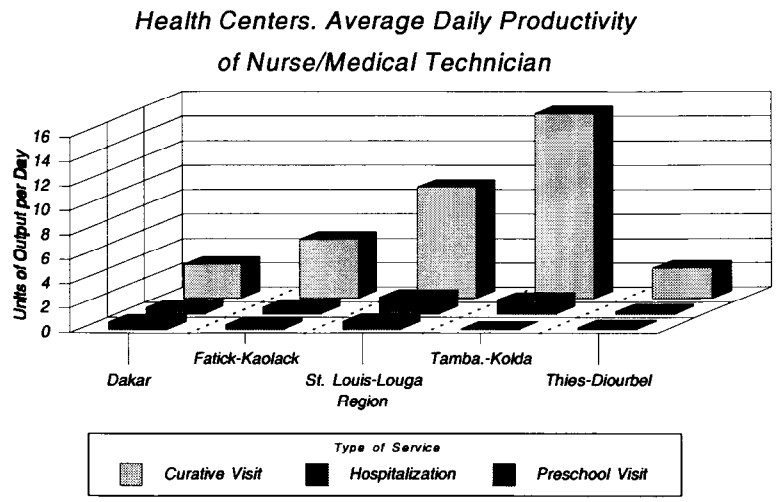
Collecting the above information proved impossible in hospitals, however, and, for this reason productivity data were not derived for the larger type of facility. Concerning health huts, although the information was obtained, output was so low that productivity ratios were not derived.

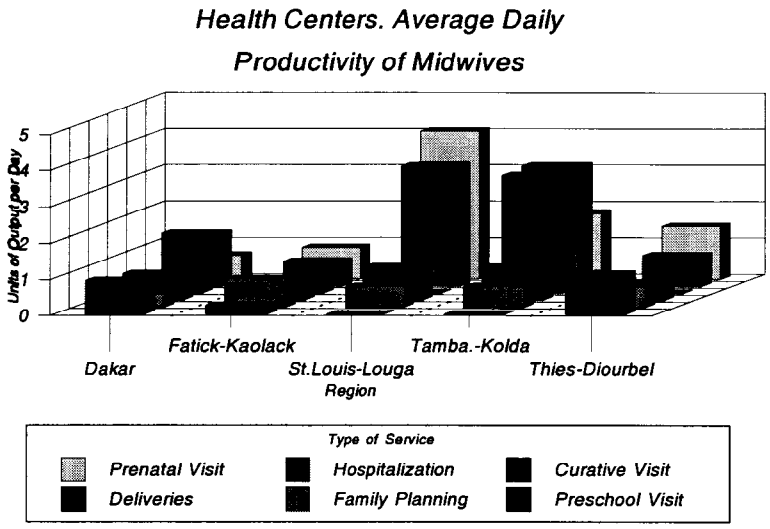
Staff productivity data for health centers and health posts are presented graphically in *Graphs 3-3 and 3-4*, respectively. It is important to point out that the scale of the vertical axis, measuring daily productivity, varies from chart to chart. An appropriate interpretation of results requires careful reading of the Y-axis scale. The findings emerging from an analysis of these graphs are reviewed in detail in the following paragraphs, beginning with health centers.

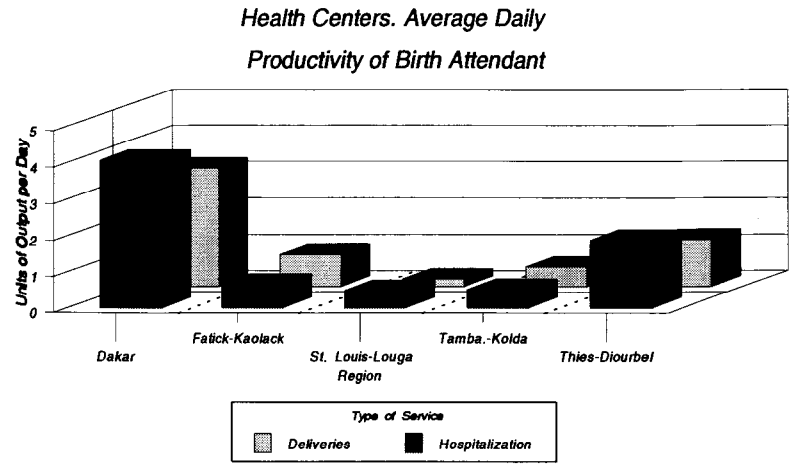
In general, although important regional variations were observed in staff productivity in health centers, overall productivity was low. For doctors, nurses and medical technicians, and midwives, the lowest productivity was noted in Dakar. In contrast, for birth attendants, productivity was highest in Dakar.

On any given day, a doctor in the capital city saw on average fewer than two ambulatory patients, and fewer than two hospitalized patients. The highest productivity was observed in Tambacounde-Kolda, with the average physician seeing about five patients of each type daily. With the exception of St. Louis-Louga and Tambacounde-Kolda, health center nurses and medical technicians exhibited very low productivity. For example, the average nurse or medical technician in Thies Diourbel handled about two outpatient visits a day and a negligible output of preschool visits and inpatient care.

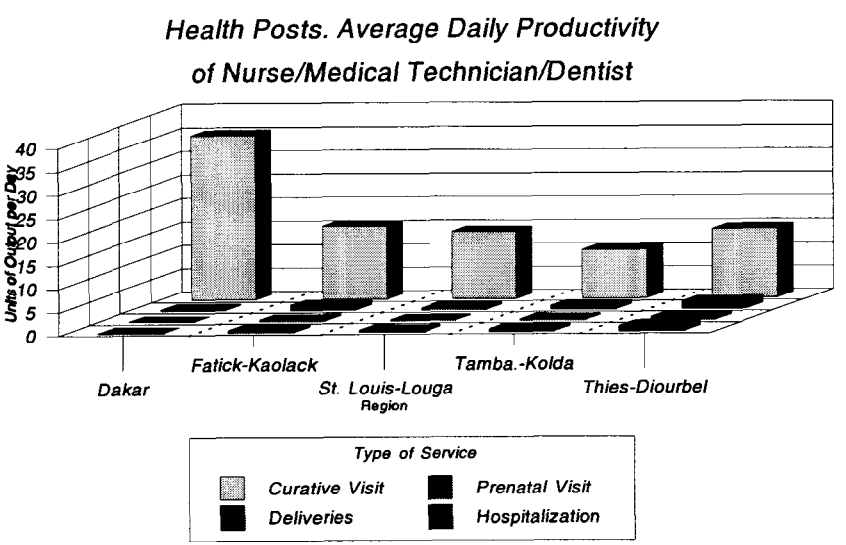


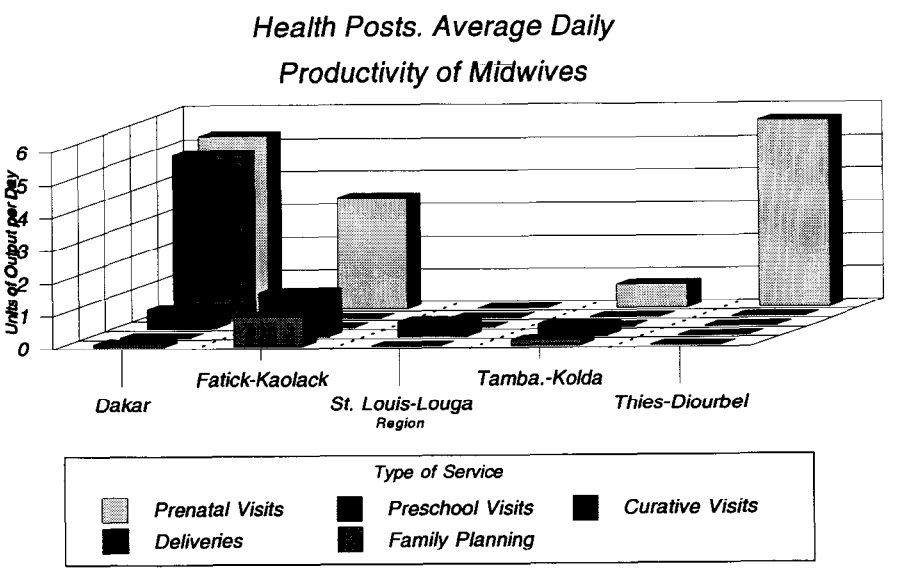


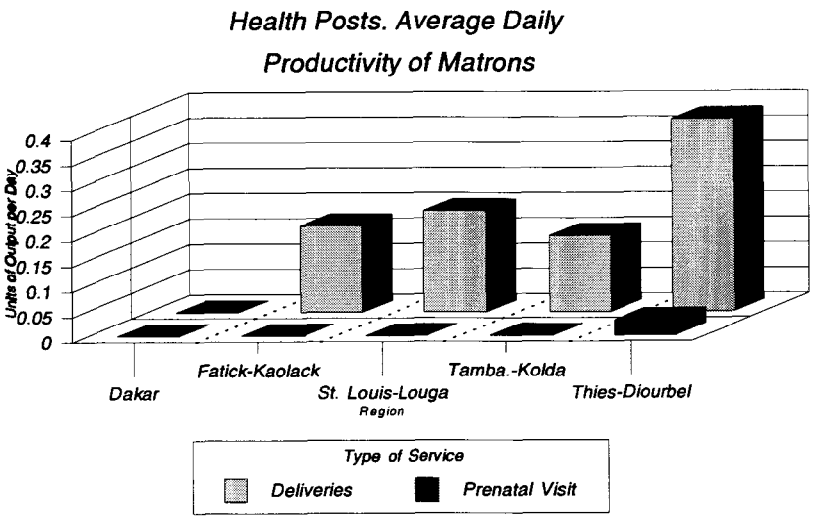




Graph 3-3 Personnel Productivity in Health Centers







Graph 3.4 Personnel Productivity in Health Posts

Midwives were busiest in St. Louis-Louga and Tambacounde-Kolda. Elsewhere, daily productivity seldom exceeded the unit for each type of service. Whereas Dakar birth attendants assisted several deliveries per day and cared for many inpatients, elsewhere they exhibited very low productivity.

Staff productivity in health posts was higher than in centers. This finding does not apply to doctors, however, because they are not assigned to posts. The difference in productivity between centers and posts was most striking in Dakar. Whereas the average health center doctor or nurse produced only about two curative outpatient visits per day, the typical nurse in a health post produced almost 18 times as many (35 visits). In health posts, most preventive care was in the form of prenatal visits, provided primarily by midwives. The productivity of birth attendants' (*matrones*) was very low in posts. The highest performance was observed in Thies-Diourbel, with fewer than 0.5 daily deliveries per birth attendant.

3.6 PRICING

For over a decade now, government health facilities in Senegal have charged for their services. In 1991, the country officially adopted the UNICEF-sponsored Bamako Initiative, a policy that promotes the introduction of user fees in government facilities to pay for the cost of pharmaceutical products. By collecting information about prices of services and revenue from cost recovery, this study attempted to assess pricing policies and cost recovery levels.

The study's reference period, FY91, preceded the introduction of the Bamako Initiative. The price information collected, therefore, reflects pricing policies in place before the adoption of the new regime. A systematic effort was made to determine whether pricing had changed significantly as a result of the Bamako Initiative. The results from this inquiry suggested that price changes, if any, were small.

An analysis of the information collected shows that prices were charged for most services provided in government facilities. Also, prices were a common practice in all facilities visited, from hospitals to health huts. Fees were generally highest in hospitals and decreased with the level of the facility, with the lowest prices being observed in health huts.

Facility prices are presented in *Exhibits 3-14—3-16* for hospitals, health centers, and health posts, respectively. Health huts provided only three services (curative ambulatory visits for adults and children and deliveries); their prices therefore are not presented in a separate exhibit. A graphical summary of government facility prices is presented in *Graph 3-5*.

With few exceptions, a fair degree of price variation was observed across regions for each type of facility. For example, prices in Thies Hospital were 50 percent higher than in St. Louis Hospital. In the case of health centers, the price of an adult curative consultation varied between an average of 100 FCFA in the regions of St. Louis-Louga and Thies-Diourbel and a mean of 167 FCFA in Dakar. In the region of Dakar health centers and posts exhibited the highest price levels for most services with the exception of well-baby care, vaccinations, and laboratory exams. For most services, the region of St. Louis-Louga displayed the lowest prices for health center care.

Regional price variation in government premises reveals a certain degree of decentralization, as least as far as pricing practices are concerned. The adoption of higher price levels in Dakar and lower ones in other regions, such as Tambacounde-Kolda, may reflect regional price levels of other goods and services in the economy, as well as differences in population income levels and purchasing power.

Although regional variation in price levels was observed, the relative magnitude of prices among services was constant across regions. For example, for both health centers and posts, the highest priced service was a delivery, at about 1,375 FCFA for health centers and 1,169 FCFA for health posts. Hospitalization prices in health centers were almost identical to those of deliveries, although slightly lower. In descending order, delivery and hospitalization prices were followed by laboratory exams, family planning visits, and prenatal care. Health posts did not offer laboratory exams or family planning services. Like health centers, however, health posts also priced deliveries highest, followed by prenatal care.

In the case of curative ambulatory care, both health centers and posts charged prices for children that were about half as high as those for adults. In health centers, adult visits were priced on average at 118 FCFA for adults and 64 FCFA for children. Almost identical prices are observed in health posts.

Charging lower prices for curative child care makes sense from both a medical and an economic viewpoint. Children have less developed immune systems and therefore are subject to greater health risks from disease than adults. Obtaining timely curative care for children is therefore a priority. Charging a lower price to children recognizes the fact that people are responsive to prices—lower prices being associated with higher demand, everything else being equal—and thus increases the likelihood that parents will demand care for their sick children. Price differentiation between adults and children for curative care is a common practice in the region and a sensible one. It has been documented in Zaire, The Gambia, and Niger.

It is surprising to observe that both health centers and posts charged prices for all services, including preventive care with potential externalities, such as immunizations and well-baby care. It is commonly argued that the benefits from consumption of certain preventive services accrue to the individual consumer as well as the rest of the community. For example, immunizing one more child may not only benefit the recipient but also all those not yet immunized through a reduction in the infection's transmission rate. Subsidizing, partially or fully, the price of immunizations is a strategy that recognizes the fact that social benefits from consumption exceed individual benefits and therefore one that promotes consumption.

EXHIBIT 3-14
HOSPITALS
FEES BY FACILITY AND SERVICE CATEGORY (FCFA)[1]

Service Category	FACILITY		
	St.Louis-	Thies-	Average
Sample Size	1	1	—
Surgery visits	200	300	250
Outpatient Clinic Visits	200	300	250
General Medicine Visits	200	300	250
Pediatrics Visits	200	300	250
Gynecological Visits	200	300	250
Dental Visits	500	300	400
Specialties Visits	200	300	250
Average Curative	243	300	271
Prenatal Care	200	300	250
Preschool Care	n.a.	n.a.	n.a.
Deliveries	2,000	3,000	2,500
Family Planning	n.a.	n.a.	n.a.
Hospitalization Total	2,000	8,333	5,167
Laboratory Exam	500	675	587
X-Ray Exam	2,500	5,611	4,056

[1] Prices for Tambacounde Hospital were not available
n.a. Not available

EXHIBIT 3-15
HEALTH CENTER FEES
REGIONAL AVERAGES YEAR 1991

Service	REGION					
	Dakar	Fatick-Kaolack	St. Louis-Louga	Tambacoun-de-Kolda	Thies-Diourbel	Average
Curative care children	83	64	50	75	58	64
Curative care adults	167	114	100	150	100	118
Prenatal care	233	129	100	200	200	165
Well-baby care	50	67	50	100	107	73
Deliveries	2,000	1,286	1,167	1,500	1,200	1,375
Vaccination card	175	88	n.a.	n.a.	83	106
Vaccination	50	60	50	n.a.	83	64
Family planning	200	200	n.a.	200	240	215
Hospitalization	2,000	1,071	1,167	1,000	1,400	1,300
Laboratory exam	300	167	600	200	250	235

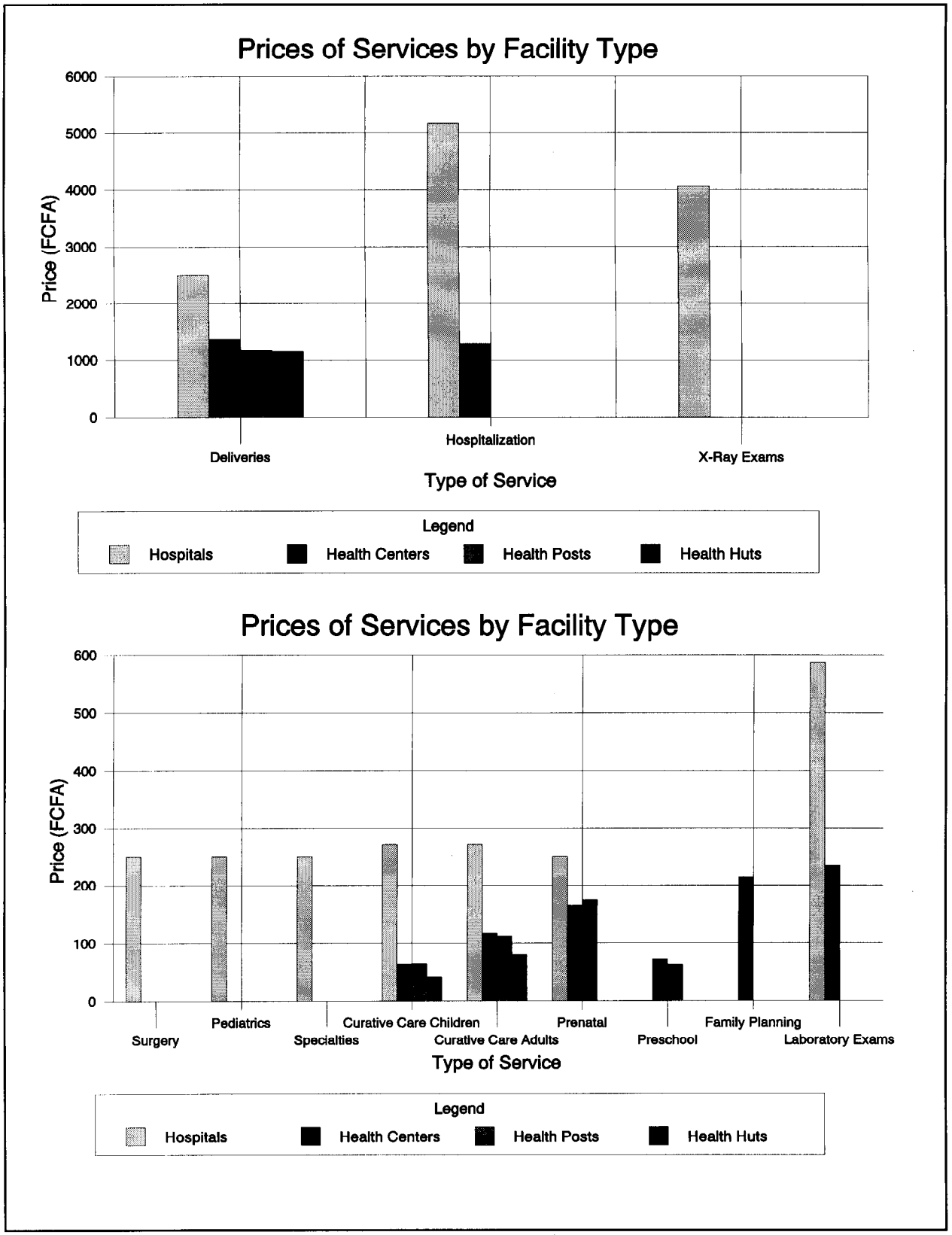
n.a. Not available

EXHIBIT 3-16 HEALTH POST FEES REGIONAL AVERAGES YEAR 1991						
Service	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Tambacoun-de-Kolda	Thies-Diourbel	Total
Curative care children	75	63	50	75	67	65
Curative care adults	150	96	100	125	113	113
Prenatal care	225	154	100	175	183	174
Well-baby care	50	54	50	83	80	63
Deliveries	n.a.	1,179	1,286	1,050	1,120	1,169
Vaccination card	50	55	100	n.a.	111	81
Vaccination	71	59	50	50	60	61
Family planning	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
n.a. Not available						

Preventive services like immunizations, well-baby, and prenatal care may not only be under-consumed because of externalities but also because of insufficient appreciation of health benefits from consumption among the population. Health education campaigns help to reduce the information gap and seek to promote greater consumer appreciation and thus consumption. However, consumer under-valuation of the benefits of prevention may still be an important problem in Senegal, as evidenced by very low rates of consumption (see Section 3).

Under-appreciation of consumption benefits may not be limited to preventive care only, but may also affect other types of services such as family planning and institutional deliveries. The consumption rates shown in Section 3 imply rather low coverage, particularly for family planning. Thus, charging prices for these services may further depress an already weak demand attributable to low consumer information.

The above discussion does not necessarily imply that preventive services, institutional deliveries, and family planning activities should be provided free of charge in government facilities. Rather, it is intended to foster further reflection among government officials about the social desirability of promoting consumption of these services, the negative effect that prices may have on demand, and the need for further investment in health education.



Graph 3-5 Facility Prices

Summary

Charging fees for government services was found to be a common practice in all facilities in the sample, from hospitals to health huts. Prices recorded through the study were those in place prior to the adoption of the UNICEF-sponsored Bamako Initiative. Nevertheless, it was found that the initiative did not seem to result in important price changes.

For all medical services, price levels varied in an important way across facilities of the same type. For example, Thies hospital charged prices that exceeded those in St. Louis Hospital by 50 percent or more. Similarly, curative care visits for adults in Dakar health centers were 67 percent more expensive than in the centers of St.Louis-Louga.

For any given medical service, prices were highest in hospitals. They tended to fall with the level of the facility, to reach their minimum in huts. Higher level facilities tend to devote more resources to the production of care. From this angle, pricing in government facilities was consistent with a fundamental principle of economic efficiency, namely, that prices ought to be set in accordance with the cost of the service.

Hospitalizations and deliveries were the highest-priced services. With the exception of dental care and exams in hospitals, all other services in hospitals and elsewhere were priced below 300 FCFA.

Regional and intra-facility differences in price levels suggest that facilities had a fair amount of autonomy in setting their prices. It is striking, however, that most facilities had adopted pricing policies that maintained similar relationships among service prices.

Preventive services were sold at prices about equal to curative care. This is an uncommon practice relative to other countries in the region. Elsewhere (e.g., Niger and Zaire), preventive services have been found to be delivered free of charge or at nominal prices only. Family planning services were also sold. The policy of charging above-nominal prices for preventive and family planning services should be reviewed, particularly in light of two important study findings: widespread under-utilization of preventive and family planning services (see Section 3) and the services' low contribution to cost recovery revenue (see next section).

Curative care prices to adults were on average about twice as high as for children. Considering that children have weaker immune systems, this is a sensible policy, for it is one that encourages higher demand for child care.

3.7 FINANCING

This section presents an analysis of facility's recurrent cost financing during the reference period FY91. To aid in the presentation, exhibits are provided that summarize the sources and uses of funds. Columns in these exhibits represent all possible sources of funding, including government budgetary allocations, community funding, user fee revenue, and other funding (see Section 2.1 for definitions of funding sources). In the rows, the exhibit shows all expenditure categories, including personnel salaries, medicines, and other recurrent costs. The sum of all funding equals the sum of all expenditures. This type of presentation is consistent with the method and instrument used for data collection. As noted in Section 2, facility personnel were presented with empty exhibits and, with the aid of enumerators, they filled in the sources and uses of funds using information from facility accounting records.

As already noted, the total sample effectively surveyed for this study consisted of 3 hospitals, 23 health centers, 46 health posts, and 11 health huts. However, owing to missing information from facilities, the number that were able to provide complete information on the sources and uses of funds was only a subset of the total. *Exhibit 3-17* describes the sample size used in the analysis that follows, by region and facility type.

EXHIBIT 3-17
FACILITY SAMPLE SIZE ANALYSIS OF THE SOURCES AND USES OF FUNDS

	REGION					
	Dakar	Fatick-Kaolack	St. Louis-Louga	Thies-Diourbel	Tambacoun-de-Kolda	Total
Hospitals	0	0	1	1	1	3
Health Centers	3	6	3	6	0	18
Health Posts	7	12	6	11	0	36
Health Huts	0	4	0	4	0	8
Total	10	22	10	22	1	65

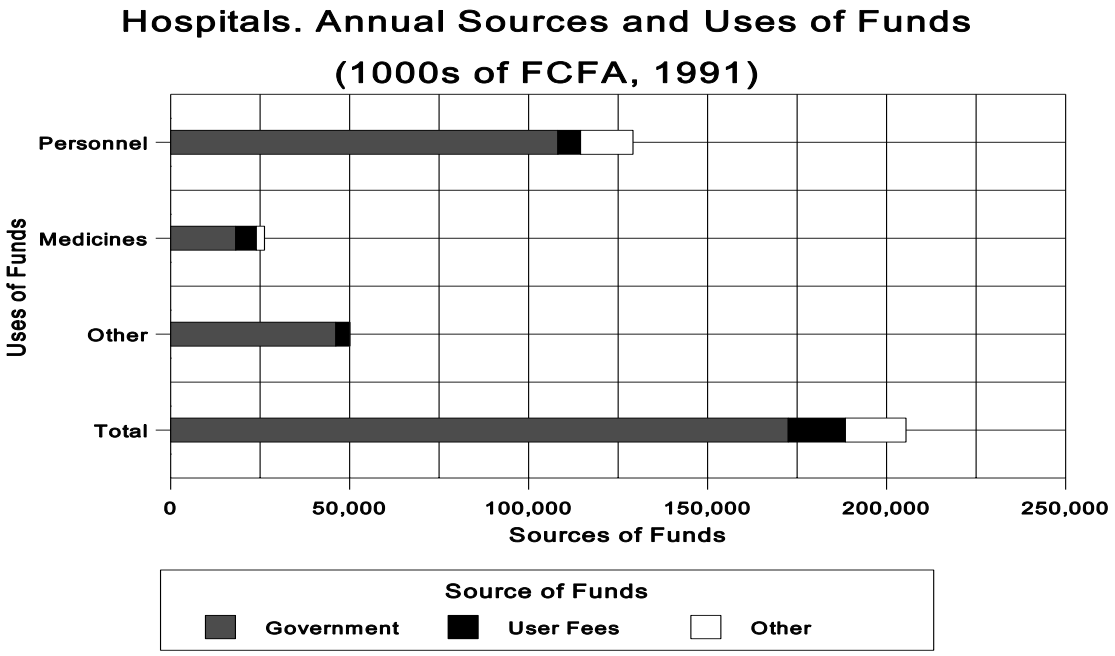
Hospitals

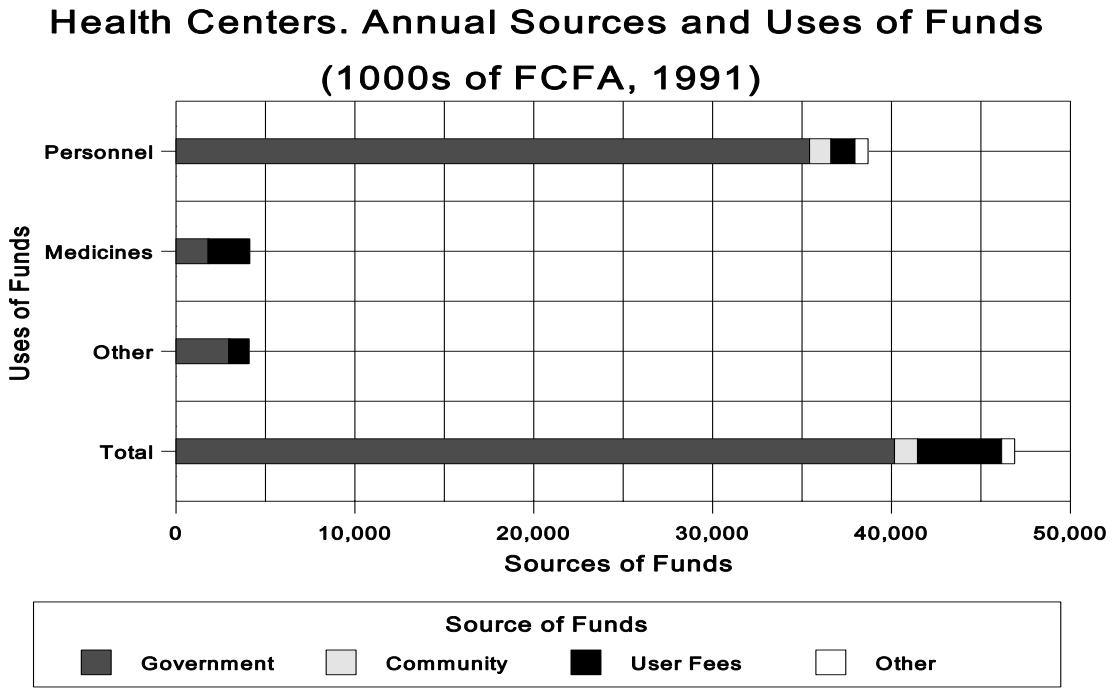
Government budget allocations constituted the primary source of revenue for hospitals in the sample, paying for 84 percent of total expenditures (*Exhibit 3-18*). User fees and other sources of funds each represented 8 percent of hospital expenditures. *Graph 3-6* summarizes the study's analysis of the sources and uses of funds for hospitals and health centers; *Graph 3-7* does so for health posts and huts.

As shown below (*Exhibit 3-18*), 63 percent of government funding was devoted to personnel payments, only 11 percent to pharmaceutical products, and 27 percent to other inputs. Other funding sources were devoted in a even greater share to personnel, with only 13 percent being allocated to medicines and no resources being devoted to other categories. In contrast, revenue from user fees was more evenly spread across the three main budget categories.

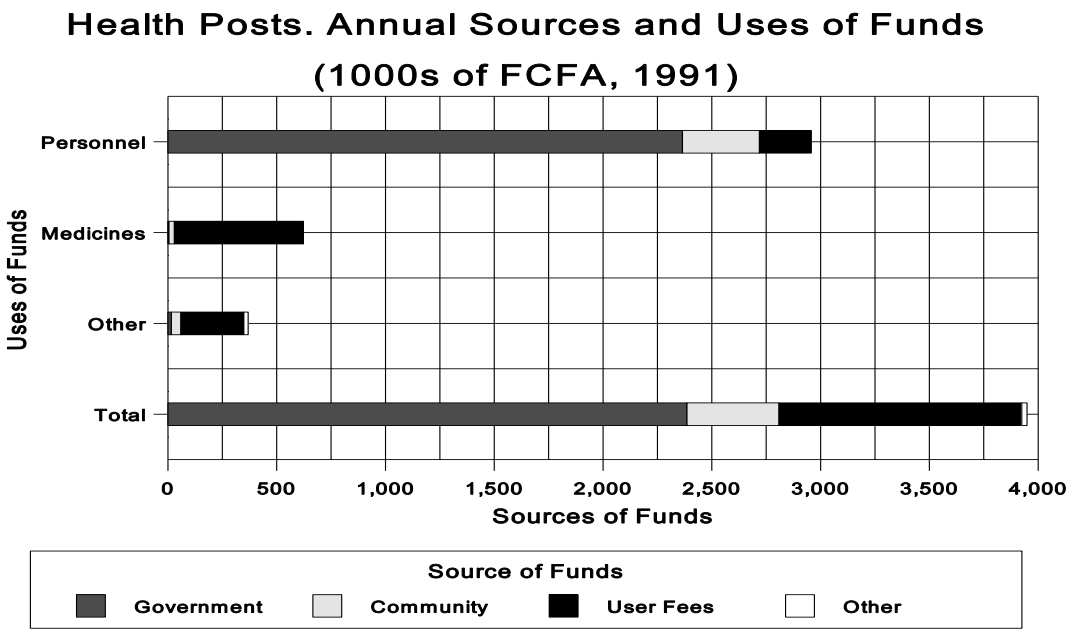
EXHIBIT 3-18 HOSPITALS: FUNDING SOURCES BY BUDGET CATEGORY				
BUDGET CATEGORY	FUNDING SOURCE			
	Government	User Fees	Other	Total
Costs (1000s of FCFA)				
Personnel	108,178	6,342	14,643	129,162
Medicines	18,194	5,739	2,282	26,215
Other	46,151	3,893	0	50,044
Total	172,523	15,974	16,924	205,421
Percent of Total Cost				
Personnel	63	40	87	63
Medicines	11	36	13	13
Other	27	24	0	24
Total	100	100	100	100
Percent of Total Funding	84	8	8	100

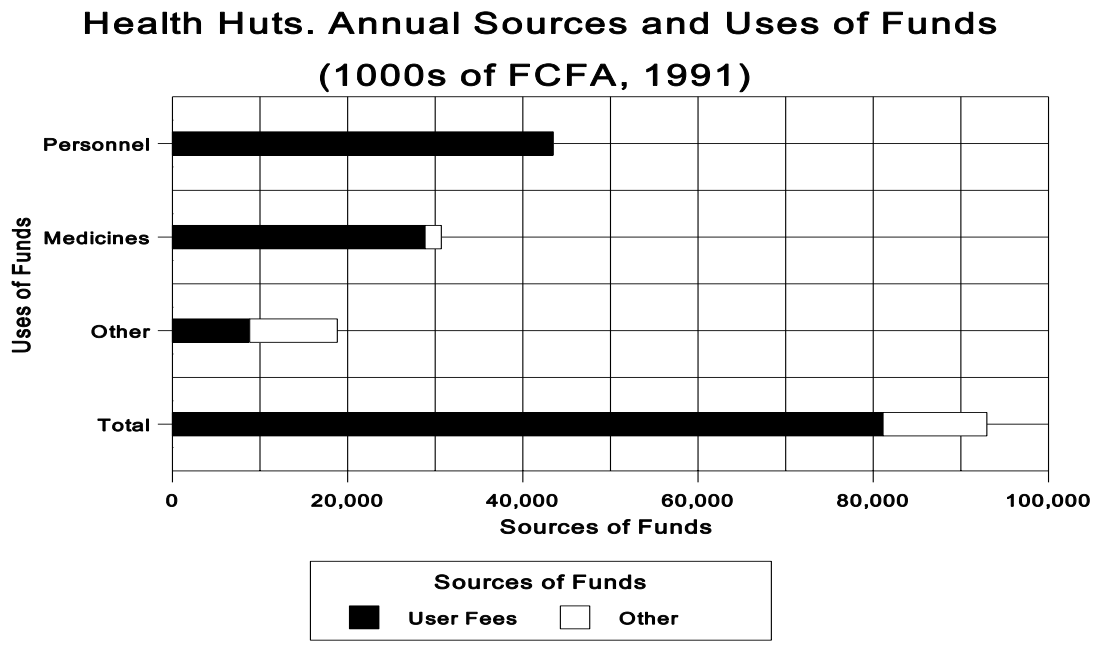
Data on government and user-fee funding of hospital expenditures are shown in *Exhibit 3-19*. All three hospitals relied heavily on the government to pay for their recurrent costs. Tambacounde Hospital, with 92 percent of its costs paid by the government, showed the greatest dependency. St. Louis Hospital, the least dependent on public support—with 81 percent of its expenditures covered through public funds—was able to pay for about one-fourth of its personnel costs and just under one-third of its medicine expenditures from funding sources other than the government. St. Louis's greater autonomy was largely attributable to funding from other sources. As is shown in the lower section of the exhibit, user fees helped pay for only 4 percent of personnel costs, the balance (22 percent) being covered by external, nongovernmental subsidies. User fees paid for 16 percent of drug costs in St. Louis, while the difference (13 percent) was financed through other, non-governmental sources. Thies Hospital, although heavily dependent on public subsidies, recovered 28 percent of its drugs costs and 15 percent of other recurrent costs through user fees.





Graph 3-6 Sources and Uses of Funds: Hospitals and Health Centers





Graph 3-7 Sources and Uses of Funds: Health Posts and Health Huts

EXHIBIT 3-19 HOSPITALS: COSTS PAID BY GOVERNMENT AND BY USER FEES					
	FACILITY				
	St. Louis-Louga	Tambacounde-Kolda	Thies-Diourbel	Total	Average
Total Costs of Average Facility in Region (1000s FCFA) (from Exhibit 3-9)					
Personnel	170,802	66,663	150,020	387,485	129,162
Medicines	35,033	2,774	40,839	78,646	26,215
Other	78,860	4,260	67,011	150,131	50,044
Total	284,695	73,697	257,870	616,262	205,421
Costs Paid by Government in Average Regional Facility (1000s FCFA)					
Personnel	126,943	61,693	135,897	324,533	108,178
Medicines	25,000	2,583	27,000	54,583	18,194
Other	77,583	3,690	57,179	138,452	46,151
Total	229,526	67,966	220,076	517,568	172,523
Costs Paid by Government (percent)					
Personnel	74	93	91	84%	84
Medicines	71	93	66	69%	69
Other	98	87	85	92%	92
Total	81	92	85	84%	84
Costs Paid through User Fees in Average Regional Facility (1000s FCFA)					
Personnel	7,094	4,970	6,960	19,024	6,341
Medicines	5,704	191	11,322	17,217	5,739
Other	1,277	570	9,832	11,679	3,893
Total	14,075	5,731	28,114	47,920	15,973
Costs Paid through User Fees (percent)					
Personnel	4	7	5	5	5
Medicines	16	7	28	22	22
Other	2	13	15	8	8
Total	5	8	11	8	8

Information about cost recovery revenue by type of health care service was sought, but facility records were generally incomplete. The limited data available which are presented in *Exhibit 3-20* allow only a superficial and tentative analysis. Thies Hospital had the most complete statistics. In ascending order of importance, the top five contributors to cost recovery revenue in Thies Hospital were maternity (deliveries), X-ray exams, surgery, laboratory exams, and general medicine.

EXHIBIT 3-20 HOSPITALS: CONTRIBUTION TO COST RECOVERY BY TYPE OF SERVICE[1]		
	FACILITY	
	St. Louis-Louga	Thies-Diourbel
Percent		
Surgery	n.a.	14.3
Outpatient	n.a.	5.5
General	n.a.	13.0
Pediatrics	n.a.	7.8
Gynecological	n.a.	n.a.
Dental	12.2	4.1
Specialties	n.a.	n.a.
Unspecified	1.0	n.a.
Prenatal	n.a.	n.a.
Preschool	n.a.	n.a.
Deliveries	29.5	24.3
Family Planning	n.a.	n.a.
Hospitalization	36.9	n.a.
Laboratory Exams	4.1	13.8
X-ray Exams	16.3	17.3
Total	100.0	100.0

n.a. Not available
[1]Data not available for Tambacounde Hospital

Health Centers

A summary of the sources and uses of funds by health centers is presented in *Exhibit 3-21*. As shown in the bottom row, the government was the principal source of recurrent cost funding for health centers. For the typical facility, government funding accounted for 86 percent of recurrent expenditures; cost recovery accounted for 10 percent; community financing for 3 percent; and other sources of funds for the remaining 2 percent.

As with hospitals, an overwhelming part (88 percent) of government's funding for health centers went to personnel, with only 4 percent going to medicines and 7 percent to other cost categories. In contrast, about one-half (49 percent) of the revenue generated from user fees was devoted to the purchase of medicines. User fee proceeds were used also to pay for salaries in health centers, rather atypical for the region, where cost recovery is used almost exclusively for drug purchases (e.g., The Gambia and Niger). It is also atypical that about 23 percent of cost recovery revenue was devoted to recurrent costs other than drugs and to personnel. Funds from both the community and other sources were devoted almost exclusively to the payment of salaries.

EXHIBIT 3-21 HEALTH CENTERS: FUNDING SOURCES BY BUDGET CATEGORY					
BUDGET CATEGORY	FUNDING SOURCE				
	Government	Community	User Fees	Other	Total
Amount (1000s of FCFA)					
Personnel	35,419	1,195	1,341	732	38,688
Medicines	1,796	39	2,284	0	4,119
Other	2,952	55	1,073	0	4,080
Total	40,166	1,289	4,699	732	46,886
Percent					
Personnel	88	93	29	100	83
Medicines	4	3	49	0	9
Other	7	4	23	0	9
Total	100	100	100	100	100
Total Funding	86	3	10	2	100

For a representative facility, total cost recovery revenue (4.70 million FCFA) exceeded total drug expenditures (4.12 million FCFA) although, as explained in the preceding paragraph, only about half of user fee proceeds was used for drug purchases. Notwithstanding any price cross-subsidization across services—deliveries generally do not consume any medicines yet are offered at the highest price—and sometimes more. This implies that health centers were able to recover the full cost of drugs dispensed to patients.

A regional breakdown of health center costs paid by the government and by user fees is shown in *Exhibit 3-22*. Possibly the most salient finding is the regional disparity of government budgetary support to health centers. In FY91, an average facility in Dakar received 54.34 million FCFA from the government, compared with only 24.30 million FCFA in St. Louis-Louga. Whether or not the disparity reveals inequitable allocation patterns depends on local demand at health centers. If by allocating proportionately more to facilities in Dakar and less to those in other regions the government limits the ability of regional facilities to meet demand levels that are equal on a per capita basis to those in Dakar, then the disparity in allocation is inequitable. (The issue of equity in government resource allocation is addressed later in this section, albeit only superficially.)

EXHIBIT 3-22
HEALTH CENTERS:
COSTS PAID BY GOVERNMENT AND BY USER FEES BY REGION

	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Thies-Diourbel	Total	Weighted Average
Sample	3	6	3	6	18	—
Total Costs of Average Facility in Region (1000s FCFA) (from Exhibit 3-10)						
Personnel	58,608	33,704	20,993	42,560	155,865	38,688
Medicines	10,642	1,640	1,335	4,728	18,345	4,119
Other	6,102	3,714	3,440	3,754	17,010	4,080
Total	75,352	39,058	25,768	51,042	191,220	46,887
Costs Paid by Government in Average Regional Facility (1000s FCFA)						
Personnel	49,879	32,899	20,348	38,245	141,371	35,419
Medicines	1,685	767	917	3,319	6,688	1,796
Other	2,774	3,142	3,036	2,807	11,759	2,951
Total	54,338	36,808	24,301	44,371	159,818	40,166
% of Dakar	100	68	45	82	—	—
Costs Paid by Government (percent)						
Personnel	85	98	97	90	91	92
Medicines	16	47	69	70	36	44
Other	45	85	88	75	69	72
Total (percent)	72	94	94	87	84	86
Costs Paid through User Fees in Average Regional Facility (1000s FCFA)						
Personnel	3,683	761	443	1,201	6,088	1,342
Medicines	8,725	873	418	1,409	11,425	2,285
Other	2,997	571	404	947	4,919	1,073
Total	15,405	2,205	1,265	3,557	22,432	4,699
Costs Paid through User Fees (percent)						
Personnel	6	2	2	3	4	3
Medicines	82	53	31	30	62	55
Other	49	15	12	25	29	26
Total	20	6	5	7	12	10

— Not applicable

Although in absolute terms the average facility in Dakar obtained more money from the government, regional facilities were much more dependent on government financial support than those in Dakar. The typical health center in Dakar paid for only 72 percent of its costs from government budgetary allocations. This is stark contrast with the typical facility in Fatick-Kaolack, which drew 94 percent of its funding from the government.

The cost recovery revenue generated by individual services in health centers is explored in *Exhibit 3-23.* Preventive care, immunizations, and family planning contributed only modestly to overall revenue, together accounting for 19 percent of total user fee proceeds. As noted above, the minimal amount of revenue generated by these services may not justify the fees being charged for them.

Hospitalizations contributed with 10 percent of cost recovery revenue. This stands in stark contrast with the presumed cost of hospitalizations. Indeed, the calculations made in Section 3.3 indicated that hospitalizations could have accounted for as much as 81 percent of recurrent costs in the average health center. Assuming no change in demand for inpatient care, the price of a hospitalization would have to be raised substantially to bring the ratio of hospitalization revenue in line with total revenue to the same level as hospitalization costs to total costs.

EXHIBIT 3-23
HEALTH CENTERS:
CONTRIBUTION TO COST RECOVERY BY TYPE OF SERVICE REGION
(percent)

	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Tambacoun-de-Kolda	Thies-Diourbel	Total
Curative Care	22.3	44.0	33.8	59.3	44.5	41.1
Preventive Care	7.9	5.8	7.8	6.9	16.9	9.6
Deliveries	51.9	25.8	25.7	22.1	21.6	28.5
Vaccinations	4.0	5.1	14.1	0.0	4.2	5.1
Family Planning	2.8	6.5	0.0	0.5	5.8	4.3
Hospitalizations	10.5	12.0	15.8	10.8	4.7	10.0
Laboratory Exams	0.8	0.8	3.0	0.5	2.4	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Health Posts

The sources and uses of funds for the average health post is shown in *Exhibit 3-24.* A comparison of costs and funding between centers and posts reveals several important differences. First, while the government was the main source of funding in health posts, it was not nearly as important to health centers. In fact, only 60 percent of health post expenditures were paid by the government, with user fees accounting for 28 percent. Community financing also played a bigger role for health posts, accounting for 11 percent of expenditures. Like health centers, other sources of funding represented a negligible part (1 percent) of total health post revenues.

EXHIBIT 3-24 HEALTH POSTS: FUNDING SOURCES BY BUDGET CATEGORY					
BUDGET CATEGORY	FUNDING SOURCE				
	Government	Community	User Fees	Other	Total
Amount (1000s of FCFA)					
Personnel	2,365	354	238	0	2,957
Medicines	5	25	589	4	624
Other	16	44	289	20	369
Total	2,386	423	1,116	24	3,949
Percent					
Personnel	99	84	21	0	75
Medicines	0	6	53	18	16
Other	1	10	26	82	9
Total	100	100	100	100	100
Total Funding	60	11	28	1	100

A second important difference between centers and posts is the relationship between user fee revenues and drug costs. The posts in the sample generated 1.12 million FCFA from user fees in 1991, yet spent only 0.62 million FCFA on medicines, or about 56 percent of the amount raised from users. Unlike health centers, health posts were able to use 44 percent of their cost recovery revenue to pay for other recurrent costs. Like health centers, posts used revenue generated in excess of drug costs to pay for personnel and other costs in about equal parts (21 percent for personnel and 26 percent for “other”).

Information on government and user-fee funding of health post recurrent expenditure is presented in by region *Exhibit 3-25*. Regional disparities in government financial support are present for health posts just as they were for health centers. The typical post in Dakar received 4.74 million FCFA from the government, whereas the average facility in Thies-Diourbel received only 1.77 million FCFA, or 35 percent of the amount allocated to the average post in Dakar. This disparity in government subsidization of facilities reflects differences in facility size.

EXHIBIT 3-25
HEALTH POSTS:
COSTS PAID BY GOVERNMENT AND BY USER FEES
BY REGION FOR AVERAGE FACILITY

	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Thies-Diourbel	Total	Weighted Average
Sample	7	12	6	11	36	36
Total Costs of Average Facility in Region (1000s FCFA) (from Exhibit 3-11)						
Personnel	6,721	2,113	1,887	2,065	12,786	2,957
Medicines	1,636	356	243	479	2,714	624
Other	868	202	151	326	1,547	361
Total	9,225	2,671	2,281	2,870	17,047	3,941
Costs Paid by Government in Average Regional Facility (1000s FCFA)						
Personnel	4,737	1,957	1,758	1,632	10,084	2,365
Medicines	0	7	5	6	18	5
Other	0	47	2	0	49	16
Total	4,737	2,011	1,765	1,638	10,151	2,386
% of Dakar	100	43	37	35	—	—
Costs Paid by Government (percent)						
Personnel	70	93	93	79	79	80
Medicines	0	2	2	1	1	1
Other	0	23	1	0	3	4
Total ()	51	75	77	57	60	61
Costs Paid through User Fees in Average Regional Facility (1000s FCFA)						
Personnel	429	156	121	270	976	238
Medicines	1,563	316	212	473	2,564	589
Other	783	177	52	225	1,237	289
Total	2,775	649	385	968	4,777	1,116
Costs Paid through User Fees (percent)						
Personnel	6	7	6	13	8	8
Medicines	96	89	87	99	94	94
Other	90	88	34	69	80	80
Total	30	24	17	34	28	28

EXHIBIT 3-26
HEALTH POSTS:
CONTRIBUTION TO COST RECOVERY REVENUE BY SERVICE
(percent)

SERVICE	REGION					
	Dakar	Fatick-Kaolack	St.Louis-Louga	Tambacounde-Kolda	Thies-Diourbel	Total
Curative Care	72.2	44.2	76.9	56.0	50.0	56.7
Preventive Care	9.9	8.5	2.1	5.8	6.8	7.2
Deliveries	0.0	25.2	16.1	21.8	28.0	19.4
Vaccinations	17.9	22.1	4.9	16.4	15.2	16.7
Family Planning	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total	100.0	100.0	100.0	100.0	100.0	100.0

n.a. Not available

EXHIBIT 3-27
HEALTH HUTS:
FUNDING SOURCES BY BUDGET CATEGORY

BUDGET CATEGORY	FUNDING SOURCE		
	User Fees	Other	Total
Amount (1000s of	43,453	0	43,453
Medicines	28,846	1,850	30,696
Other	8,820	10,000	18,820
Total	81,119	11,850	92,969
Percent			
Personnel	54	0	47
Medicines	36	16	33
Other	11	84	20
Total	100	100	100
Total Funding	87	13	100

EXHIBIT 3-28 HEALTH HUTS: CONTRIBUTION TO COST RECOVERY REVENUE BY SERVICE			
	REGION		
	Fatick-Kaolack	Thies-Diourbel	Total
Sample Size	4	4	8
Amount (1000s of FCFA)			
Consultations	7	34	20
Deliveries	9	51	30
Total	16	85	50
Percent			
Consultations	44	40	40
Deliveries	56	60	60
Total	100	100	100

Like health centers, health posts in Dakar appeared to be significantly less dependent on government financial support than those in the regions. In 1991 the typical facility in Dakar drew only 51 percent of its revenue from the government, while the rest was raised mostly through user fees and community financing. In contrast, a representative facility in St.Louis-Louga drew over 77 percent of its revenue from the government.

Health Huts

Health huts financed their recurrent costs primarily through user fees and secondarily with external, nongovernmental subsidies. Eighty-seven percent of health hut revenue came from user fees and only 13 percent came from other sources. Huts received no governmental support to pay for their recurrent expenditures. Cost recovery revenue came from curative visits and deliveries. The former contributed 40 percent of user fee revenue, while the latter contributed 60 percent (*Exhibit 3-28*).

Financing of Pharmaceutical Products

As already noted, user fee revenue in government facilities was used to pay not only for drugs but also for salaries and other recurrent costs. In light of the current debate about pharmaceutical product financing, stirred in part by the Bamako Initiative and in part by the under-funding of such products in government facilities throughout SSA, this section summarizes the relevant results of this study. *Exhibit 3-29* compares user fee revenue with pharmaceutical products costs for the four types of facilities.

With the exception of hospitals, all facilities types of an amount more than the costs of their pharmaceutical products. Nevertheless, not all revenue was applied against such products, as already explained. The following section, which explores quality of care, suggests that there were severe shortages of pharmaceutical products in government facilities and that these shortages may have been caused by a lack

of revenue. Inadequate supply is another possible explanation. Both are discussed in greater detail in Section 3.8.

EXHIBIT 3-29 PHARMACEUTICAL PRODUCT COST RECOVERY TYPE OF FACILITY			
Facility Type	Drug Costs (1000s FCFA)	Cost Recovery Revenue (1000s FCFA)	Cost Recovery (percent)
Hospitals	26,215	15,974	61
Health Centers	4,119	4,699	114
Health Posts	624	1,116	179
Health Huts	31	81	261

Equity of Government Resource Allocations to Facilities

To assess the equity of government resource allocations to the various facility types by region. Such a calculation was impossible for hospitals, since their assigned catchment areas were unknown at the facility level. For huts, the exercise is not possible since they received no recurrent cost subsidies from the government in FY91. Therefore, *Exhibit 3-30* presents information available for health centers and posts only.

On a per capita basis, Dakar health centers received the smallest amount of money from the government in FY91, or 290 FCFA. The average center in Fatick-Kaolack, in contrast, received more than twice as much. If per capita allocation is to be trusted as an appropriate measure of equity, and if catchment area information is accepted as meaningful, then government allocations for health centers were inequitable. They favored regions over the capital city and some regions over others.

In the case of health posts, the opposite was true. On a per capita basis, Dakar health posts received more than twice as much as those in St. Louis-Louga, and about three times as much as the two other regions.

The rationale for this seemingly odd policy is not apparent from this analysis and should be explained by decision-makers in charge of allocating government health budgets.

Summary

An analysis of the sources and uses of funds was done to assess recurrent cost financing in government health facilities. This inquiry revealed that in FY91 hospitals were highly dependent on government support to finance their operations. On average, the government paid for 84 percent of hospitals' recurrent costs. User fees and other nongovernmental sources each accounted for 8 percent of recurrent expenditures. Sixty-three percent of government funding and 87 percent of other nongovernmental funding were devoted to personnel expenses. A small fraction of these funds (11 and 13 percent, respectively) was allocated to pay for pharmaceutical products.

Like government facilities at all levels, hospitals charged user fees for all services, including preventive care and family planning. In St. Louis Hospital, hospitalizations and deliveries together accounted

for two-thirds of the revenue from cost recovery. Unlike other funding, user fee revenue was more evenly spread across budget categories. Forty percent of hospital fee revenue went to pay for salaries, 36 percent for pharmaceutical products, and 24 percent for other recurrent costs. On average, user fees paid for 5 percent of total personnel expenditures, for 22 percent of the cost of pharmaceuticals, and for 8 percent of other recurrent costs.

EXHIBIT 3-30
HEALTH CENTERS AND HEALTH POSTS:
GOVERNMENT RECURRENT COST SUBSIDIES
PER CAPITA, BY REGION

	REGIONS				
	Dakar	Fatick-Kaolack	St.Louis -Louga	Thies-Diourbel	Weighted Average
Health Centers					
Catchment Area Population	187,063	56,188	77,705	89,147	92,573
Government Subsidy (1000s FCFA)	54,338	36,808	24,301	44,371	40,166
Per Capita Government Subsidy (FCFA)	290	655	313	498	434
Health Posts					
Catchment Area Population	12,867	15,934	10,940	12,406	13,427
Government Subsidy (1000s FCFA)	4,737	2,011	1,765	1,638	2,386
Per Capita Government Subsidy (FCFA)	368	126	161	132	178

The profile of hospitals' recurrent cost financing varied among the three facilities in the sample. Tambacounde Hospital was the most dependent on government support, with 92 percent of its expenses paid for by public funds. St. Louis Hospital was the least dependent and had only 81 percent of its recurrent costs financed by the government. Cost recovery revenue accounted for 11 percent of recurrent costs in Thies Hospital, which was the inpatient facility with the best cost recovery performance. From a cost recovery viewpoint, the weakest performer was St. Louis Hospital which paid for only 5 percent of its recurrent costs through user fees.

Like hospitals, health centers in the sample relied heavily on government support to pay their recurrent costs. On average, 87 percent of health center recurrent costs were paid for by the government. Other sources of funding were the community, user fees, and other nongovernmental support; these accounted for 3, 10, and 2 percent of total revenue, respectively. As in hospitals, on average most of the government's financial support went to personnel (88 percent); only 4 percent went to medicines and 7 percent to other cost categories.

For the entire sample of health centers, cost recovery revenue was used as follows: 29 percent for personnel, 49 percent for pharmaceutical products, and 23 percent for other recurrent costs. Curative care, obstetric care, and hospitalizations were the largest contributors to cost recovery: curative care accounted for 41.1 percent of cost recovery revenue, deliveries for 28.5 percent, and hospitalizations for 10.0 percent. The modest cost recovery revenue from hospitalizations is in stark contrast with the finding that inpatient care may account for as much as 80 percent of health center recurrent costs. Overall, cost recovery revenue paid for 3 percent of personnel expenses, 55 percent of medicines, and 26 percent of other recurrent expenditures.

Government support of recurrent expenditures health centers varied widely within the and across regions. In FY91, the average facility in Dakar received 54.3 thousand FCFA, or over twice as much as the

average facility in St. Louis-Louga. As is shown below, however, a different picture emerged when government recurrent cost support was expressed on a per capita basis. Although on average Dakar facilities received the largest budgetary allocations from the government, financially they were the least dependent on government budgetary support.

Cost recovery performance varied among health centers in an important way. The best performers by far were health centers in Dakar, recovering an average of 20 percent of their recurrent costs through user fees. This performance exceeded by the average results of regional health centers by three to four times.

Government funding was the most important source of revenue for health posts as well, accounting on average for 60 percent of total revenue. Nevertheless, relative dependence on government financial support was less important in these smaller facilities than in hospitals and health centers. Indeed, cost recovery revenue in the average health post accounted for 28 percent of total revenue.

As in hospitals and health centers, the bulk of government funding (75 percent on average) was devoted to personnel expenses, while only 16 percent went for pharmaceutical products.

Health posts allocated their cost recovery revenue among all budget categories, and in proportions similar to the allocations of health centers. Twenty-one percent of user fee revenue went to personnel, 53 percent to medicines, and 26 percent to other expenses. Contrary to hospitals and health centers, cost recovery revenue was the chief source of funding for pharmaceutical products, accounting for 94 percent of their recurrent costs. Also, user fee proceeds helped pay 80 percent of other recurrent expenditures. Therefore health posts depended on the government primarily for support of personnel expenses but were largely independent for the financing of medicines and other recurrent costs . The three largest contributors to cost recovery revenue were curative care (56.7 percent), deliveries (19.4 percent), and vaccinations (16.7 percent).

Government support of health posts also varied among facilities. As with health centers, Dakar posts received the largest amount of budgetary support. The revenue from public funds more than doubled the total revenue of the posts in Fatick-Kaolack, the second largest recipients of government funds. Proportionally, however, Dakar health posts exhibited the least dependence on government funding and the greatest capacity for cost recovery. Government financial support of posts in Dakar represented 55 percent of recurrent costs while user fees totaled 30 percent. The health posts of St. Louis-Louga, on the other hand, were the most dependent on government funding. There, the government paid for over three-fourths of recurrent costs.

Health huts received no money from the government to finance recurrent expenditures. They paid for their operations with user fees (which accounted for 87 percent of total revenue) and external support (13 percent). Revenue from curative care represented 40 present of cost recovery funding, and deliveries contributed the remaining 60 percent.

All four types of facilities not only used cost recovery revenue to pay for drugs, but depended on it to finance personnel and other costs as well. In light of the difficulties that government facilities are experiencing in Sub-Saharan Africa in financing purchase of pharmaceutical products, it is relevant to ask whether cost recovery revenue, if applied fully to medicines, would have sufficed to cover the entire costs. An analysis revealed that hospitals raised an amount of revenue equal to only 61 percent of their drug costs. Health centers, posts, and huts, in contrast, all generated from users amounts of money sufficient to cover the entire recurrent costs for pharmaceutical products. The revenue from cost recovery represented 114 percent of drug costs in health centers, 179 percent in health posts, and 261 percent in health huts.

To assess equity of government budgetary allocations to health facilities, public support of recurrent expenditures was expressed on a per capita basis. The denominator used in this exercise was the population in the facilities' catchment areas. This analysis revealed that Dakar health centers received 260 FCFA in FY91, the smallest per capita support from the government. On the other extreme, health centers in Fatick-Kaolack received 655 FCFA per capita from public funds. Regarding health posts, a contrary picture emerged. On a per capita basis, health posts in Dakar were the largest recipients of government support: in FY91, the average facility in the capital city received 368 FCFA per person. The average support to a post in Fatick-Kaolack, in contrast, was about 30 percent of that amount, or 126 FCFA per capita. The reader should interpret these results with caution, however, because their reliability depends on the rather questionable validity of theoretical catchment areas. Notwithstanding errors in such population data, the uneven nature, on a per capita basis, of the support given by the government appears to be sufficient to warrant an inquiry.

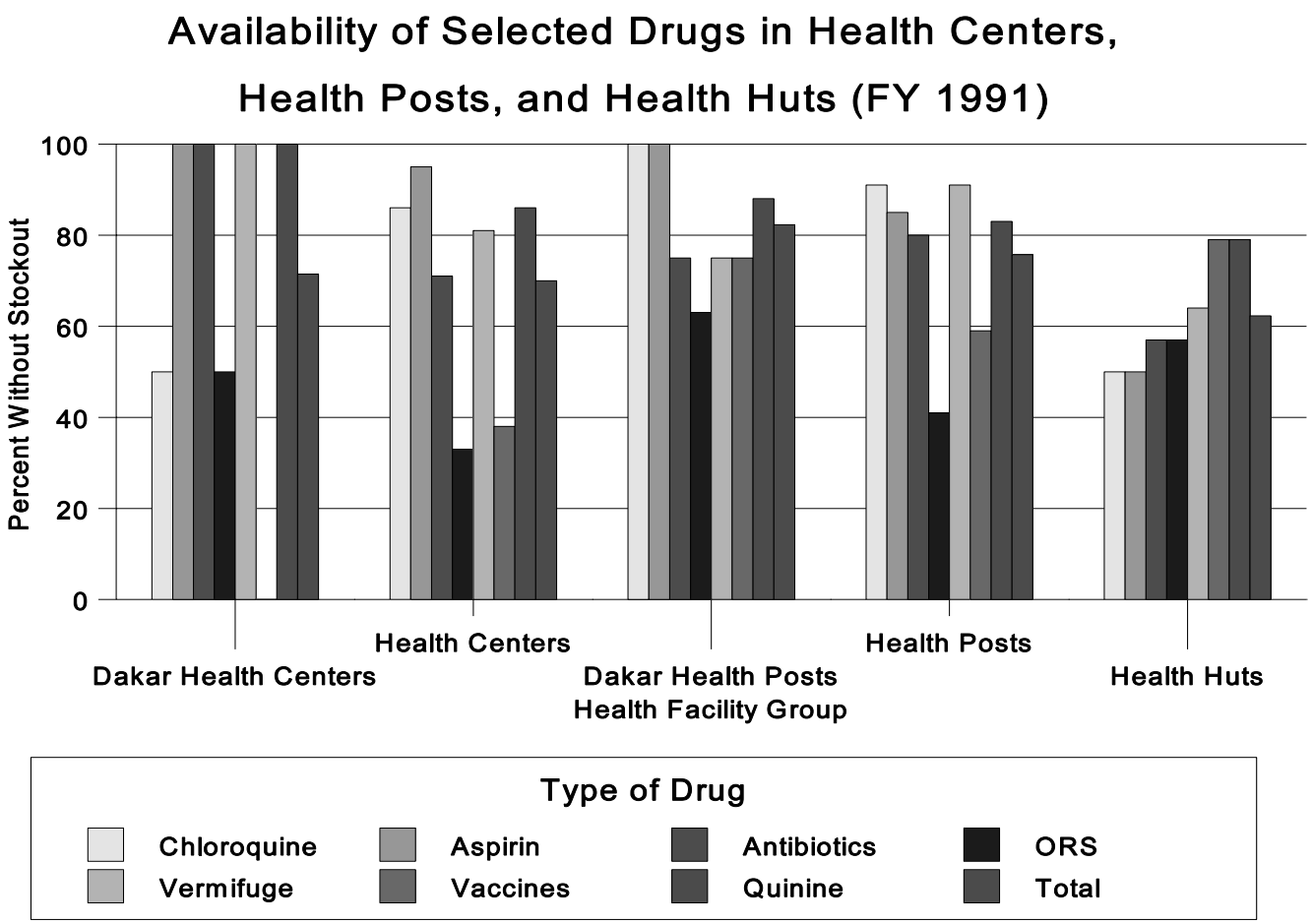
3.8 QUALITY OF CARE

This section presents the main findings arising from an analysis of the study quality of care. The research team sought the following information (see *Exhibit 2-5* for further detail):

- Staff size, composition, and staff training over the two years preceding the survey;
- Availability of drugs and other medical supplies at the time of the survey and throughout the reference study period (FY91);
- Medical staff compliance with clinical standards of treatment;
- Patient quality perceptions; and
- Staff quality perceptions.

Staff Size, Composition, and Training

Staff size varied widely by facility type. For the representative facility, staff sizes were as follows: hospital, 115; health center, 38; health post, 11; health hut, 2. There was also significant variation in staff size across facilities of the same kind. For example, Thies Hospital had 188 employees, while Tambacounde Hospital had a staff of only 46. Similarly, whereas the average health center in Dakar had 48 employees, the equivalent figure for Fatick-Kaolack was only 27.



Graph 3-8 Availability of Selected Drugs

Concerning training, very few staff members in health centers had participated in any type of training during the two years preceding the survey. The staff categories that most often reported receiving training in health centers were medical technicians (22 percent), doctors (20 percent), and nurses (15 percent). In health posts, in contrast, a much larger share of the medical staff had engaged in training in that period. On average, 62 percent of nurses, 47 percent of medical assistants, and 31 percent of midwives had received training. Information for hospitals and health huts was not available.

Availability of Selected Drugs and Medical Supplies

The survey team inquired about the availability of the following list of selected essential pharmaceuticals:

- Chloroquine
- Aspirin
- Antibiotics
- Oral rehydration salts (ORS)
- Vaccines
- Vermifuges (worms medicine)
- Quinine

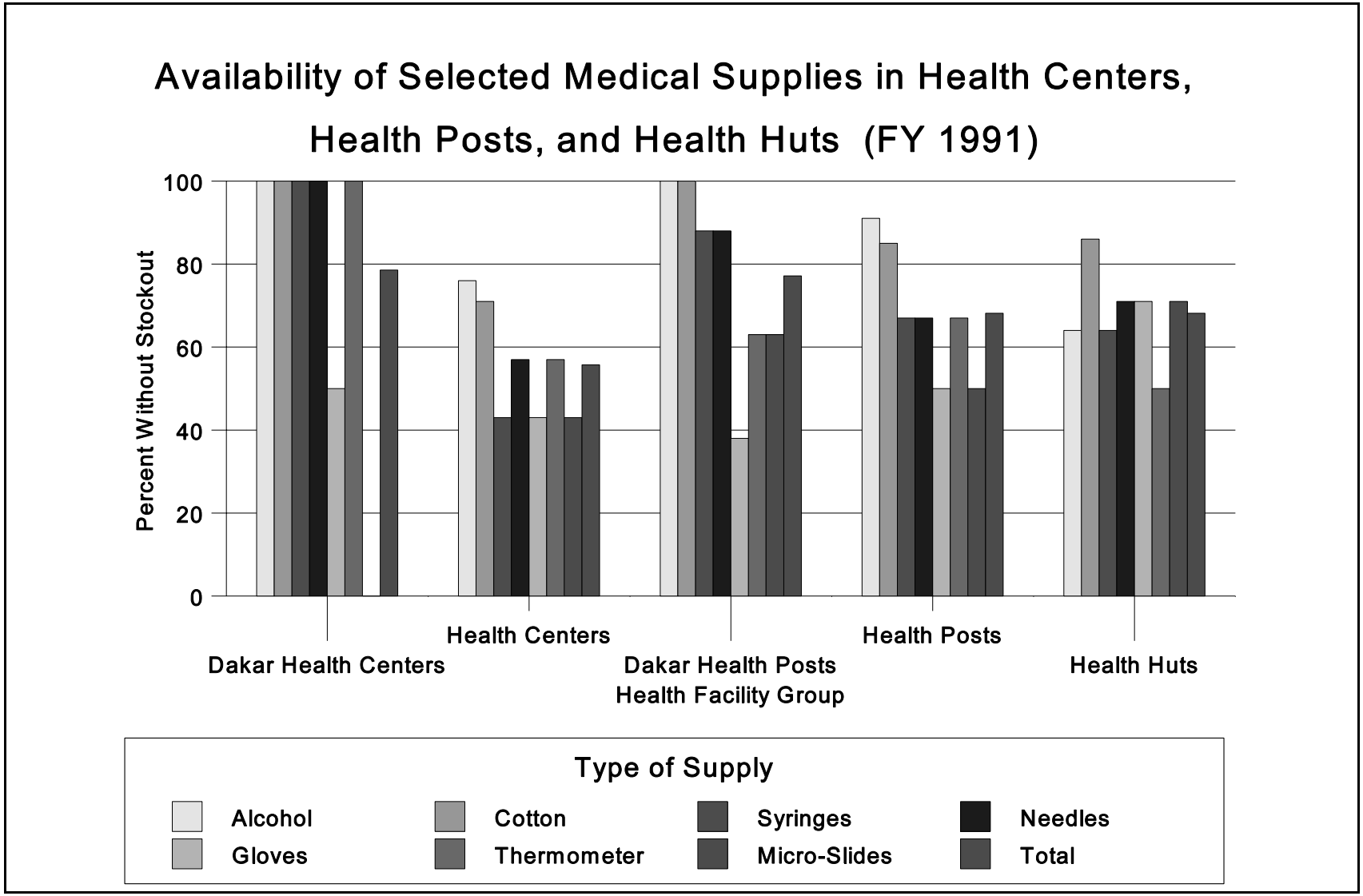
The majority of the facilities experienced inventory stockouts for most of these pharmaceutical products during FY91 (see *Graph 3-8*). Stockouts are represented by the distance between the top of the bars and the 100 percent mark; they represent the percentage of facilities that experienced one or more stockouts for the product in question in FY91.) Chloroquine, ORS, and vaccines were the products most often out of stock. In FY91, about 50 percent of the health centers in Dakar experienced shortages of chloroquine and ORS; over 60 percent of all health centers experienced stockouts of ORS and vaccines. The duration of stockouts varied from a few weeks to the entire year.

Dakar health facilities (centers and posts) were the least affected by stockouts. Health posts in Dakar showed the best overall performance in terms of drug availability for the selected list. Inventory stockouts in the regions were more pervasive.

For the selected list of products, health posts in general performed slightly better than health centers in terms of drug availability. Health huts had the poorest performance, with 30 to 50 percent of all facilities reporting stockouts for all selected products during the reference period.

Concerning the availability of basic medical supplies (see *Graph 3-9*), the research team found inventory stockouts were common in the majority of facilities, often for most of the products selected. As with drugs, health centers and posts in Dakar were the best endowed. Likewise, health posts exhibited fewer stockouts of supplies than health centers.

About one-half of the facilities had no thermometer at the time of the survey, or experienced stockouts during FY91. Similarly, supplies for laboratory exams, such as micro-slides and dyes lacked in half the facilities during the recall period.



Graph 3-9 Availability of Selected Medical Supplies

Health Process: Compliance with Standards of Diagnostic and Treatment

As already noted, treatment norms were defined by the survey team which included experienced university doctors and nurses. Medical personnel were observed while examining and treating patients whose chief complaint was fever or diarrhea. *Graph 3-10* displays information about compliance with standard diagnostic procedures for fever. *Graph 3-11* depicts medical personnel treatment practices for the same problem.

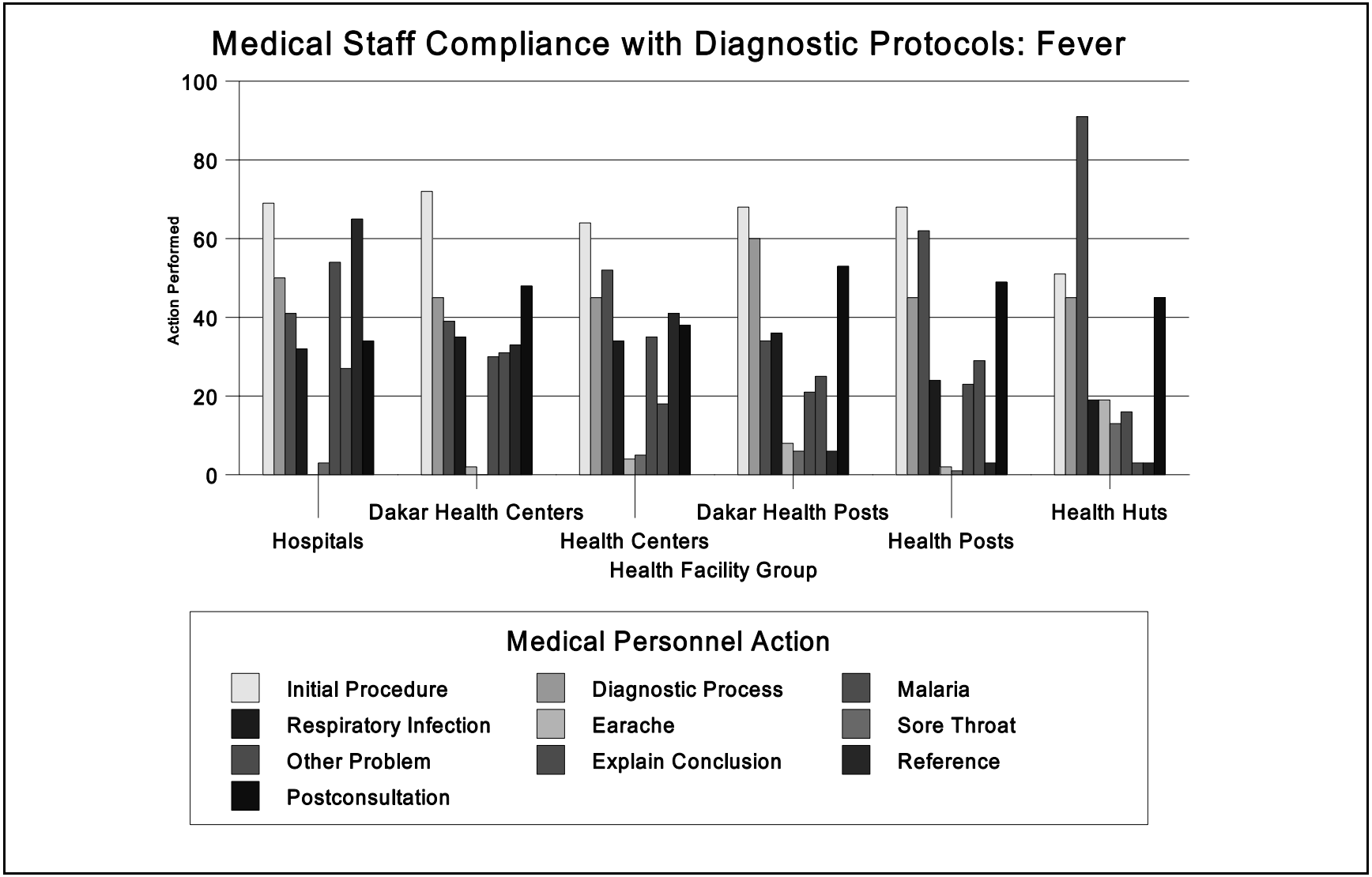
Medical staff did not communicate well with patients, generally failing to explain the procedures involved in the examination and the conclusions arising from it (*Graph 3-10*). For example, medical personnel in hospitals did not communicate adequately with patients in 75 percent of the instances (see "Explain Conclusion" in the graph). Tests, questions, and examinations commonly used to appropriately diagnose the condition were skipped routinely by most staff. For example, outside of hospitals fewer than 5 percent of patients with a fever were screened for respiratory, ear, or throat infections. With the exception of health huts, medical staff in other types of facility failed to performed formal blood tests for malaria about 60 percent of the time.

Contrary to expectations, a high proportion of patient referrals was observed at higher-level facilities (health centers and hospitals), while very few patients were referred from health huts and posts to higher facilities. For example, about 35 percent of all hospital patients with a fever were referred to higher-level hospitals (*Graph 3-10*), and 70 percent of those treated in Dakar health centers were referred to an upper-level facility. Similarly, about half of all hospital diarrhea patients were referred, as were 100 percent of all patients in Dakar health centers. In a well-functioning system, most referrals should have arisen from the lower to the upper levels, and fewer from centers and hospitals up. Presumably, centers referred patients to their regional hospitals while the regional hospitals themselves may have referred patients to larger referral hospitals.

Concerning the appropriateness of treatment, health huts rated lowest, followed by hospitals (*Graph 3-11*). Posts exhibited the best performance, with almost 90 percent of all patients being prescribed the appropriate treatment.

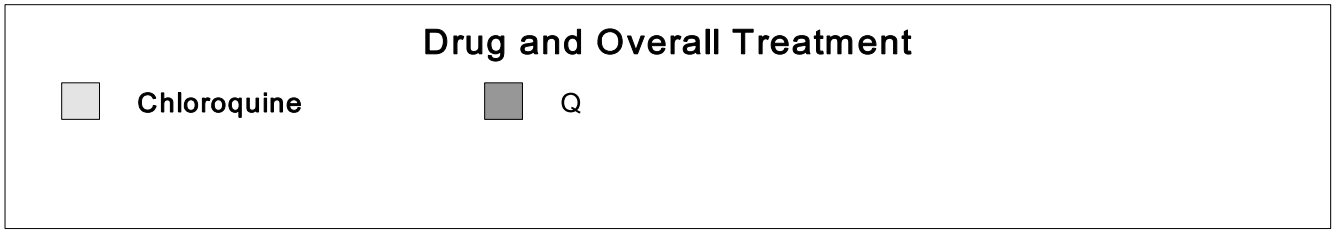
Use of drugs varied across facilities and regions, possibly reflecting different treatment practices, differences in patient case mix, and differences in the availability of drugs. For example, health centers in Dakar prescribed antibiotics to about 45 percent of all patients, while health huts did so to just over 20 percent of their patients. In contrast, whereas hospitals prescribed chloroquine to fewer than half of their patients, health huts did so in over 75 percent of the instances.

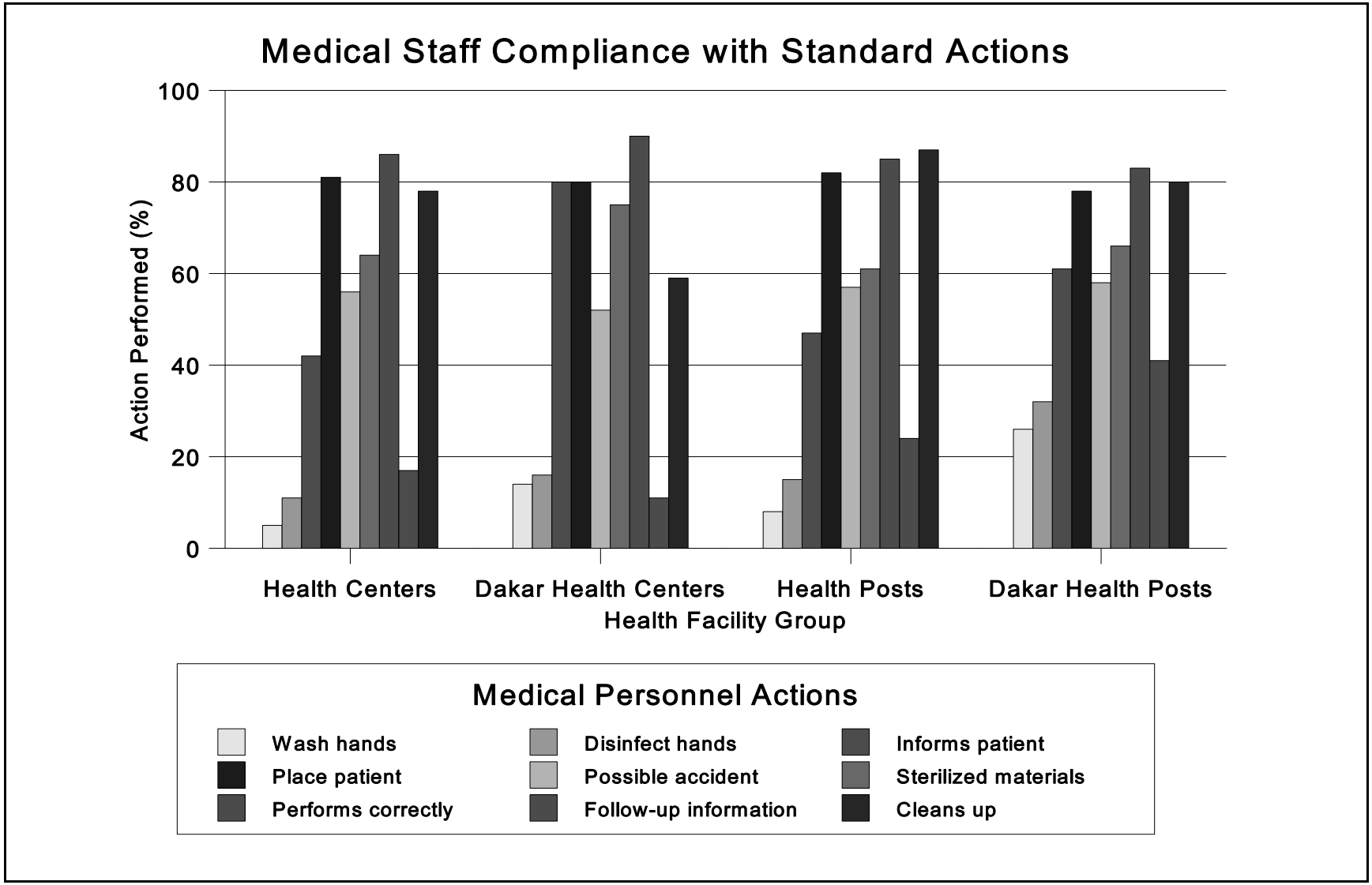
An analysis of health staff compliance with medical procedures for patients with diarrhea produced similar results as those for fever.



Graph 3-10 Medical Staff Compliance with Diagnostic Protocols

Medical Staff Treatment Practices: Fever





Graph 3-12 Medical Staff Compliance with Standard Actions

Compliance with treatment norms was also assessed for several categories of medical personnel as well as for various routine medical procedures (baby weighing, vaccinating, curing a wound, etc.; *Graphs 3-12 and 3-13*).

In general, there were small differences in compliance with standard medical actions across facility types (*Graph 3-12*). No significant differences were observed in the appropriateness of treatment among health centers and posts and across regions, with over 80 percent of all acts performed correctly.

The practice of washing and disinfecting hands between patients was rarely followed. For example, only about 5 percent of health center staff washed their hands with each new patient and less than 15 percent disinfected their hands.

The provision of information to patients was generally weak. For example, in health centers fewer than 20 percent of all health center patients were given follow-up information about their condition, and only about 40 percent were informed about the actions involved in the procedures. However, staff performance in providing information to patients was better than staff compliance with standard practice when treating patients whose chief complaint was fever or diarrhea.

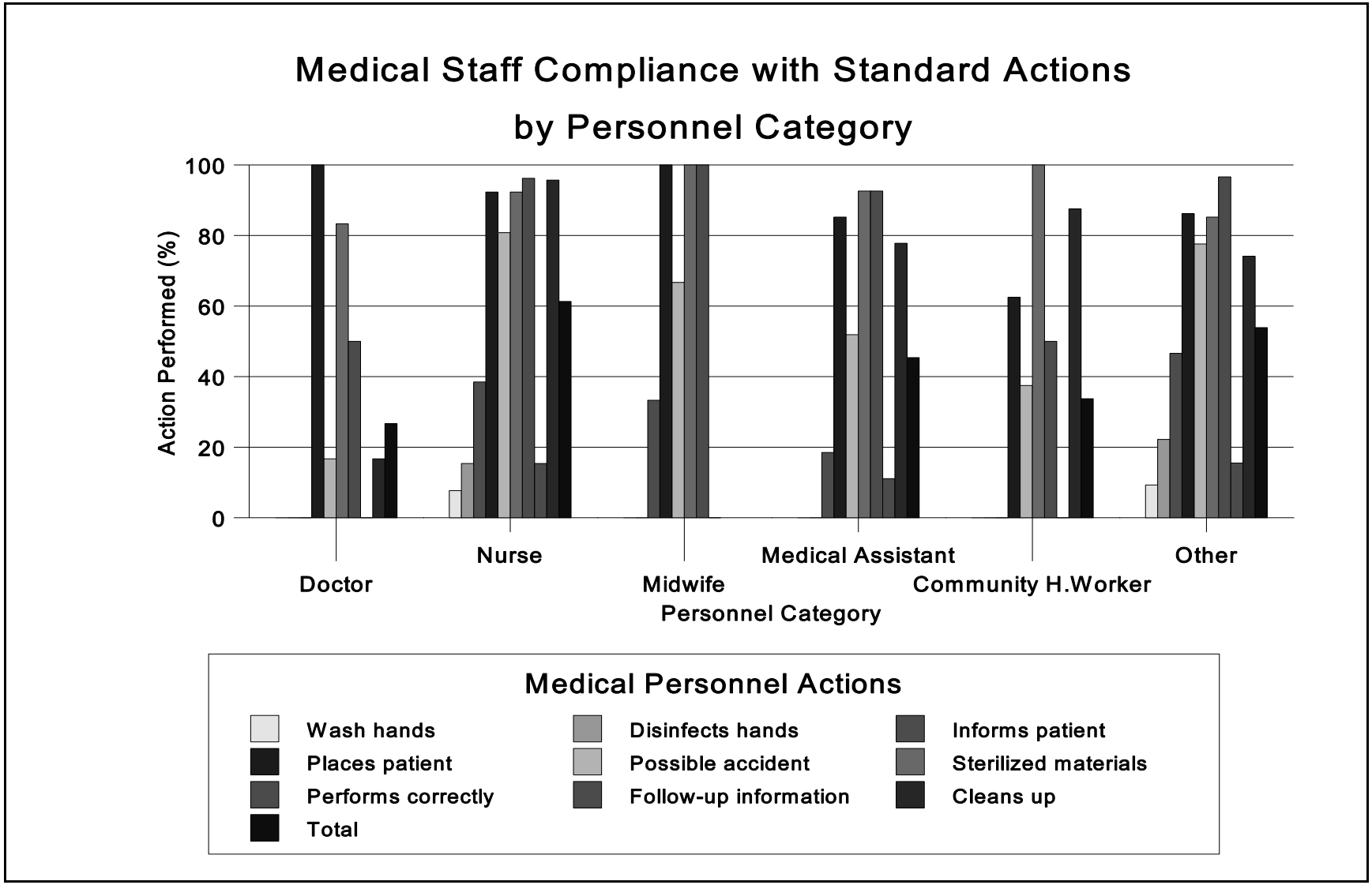
Compliance with standard procedures varied across medical personnel categories (*Graph 3-13*). Nurses exhibited the highest levels of compliance while doctors had the lowest.

Patient Perceptions

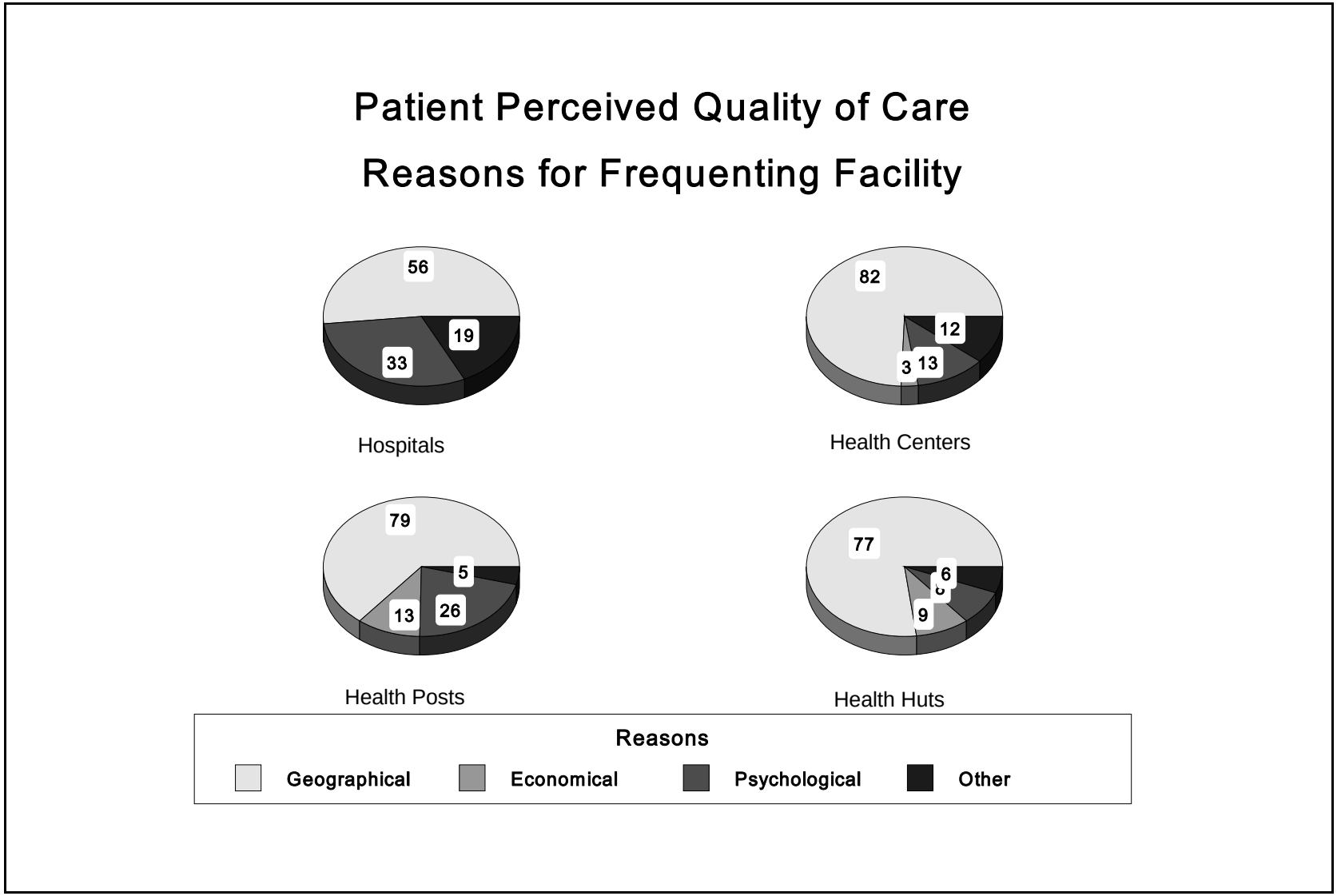
Patients exiting the premises of government facilities were asked about the primary reason they chose the facility (*Graph 3-14*). The most common answer was geographical convenience (over 50 percent of patients in hospitals and over 75 percent in health huts). The second most important reason was psychological, and the third was economic.

Patients were asked several questions about their level of satisfaction with the services provided in the facility (*Graph 3-15*). For all four types of facilities, the vast majority of patients reported being satisfied overall with the visit and being likely to return to the same facility for future care. Nevertheless, there were some differences in patient satisfaction: generally, hospitals were rated lowest, followed by health centers, and health posts; health huts, followed by health centers, received the highest ranking for most questions.

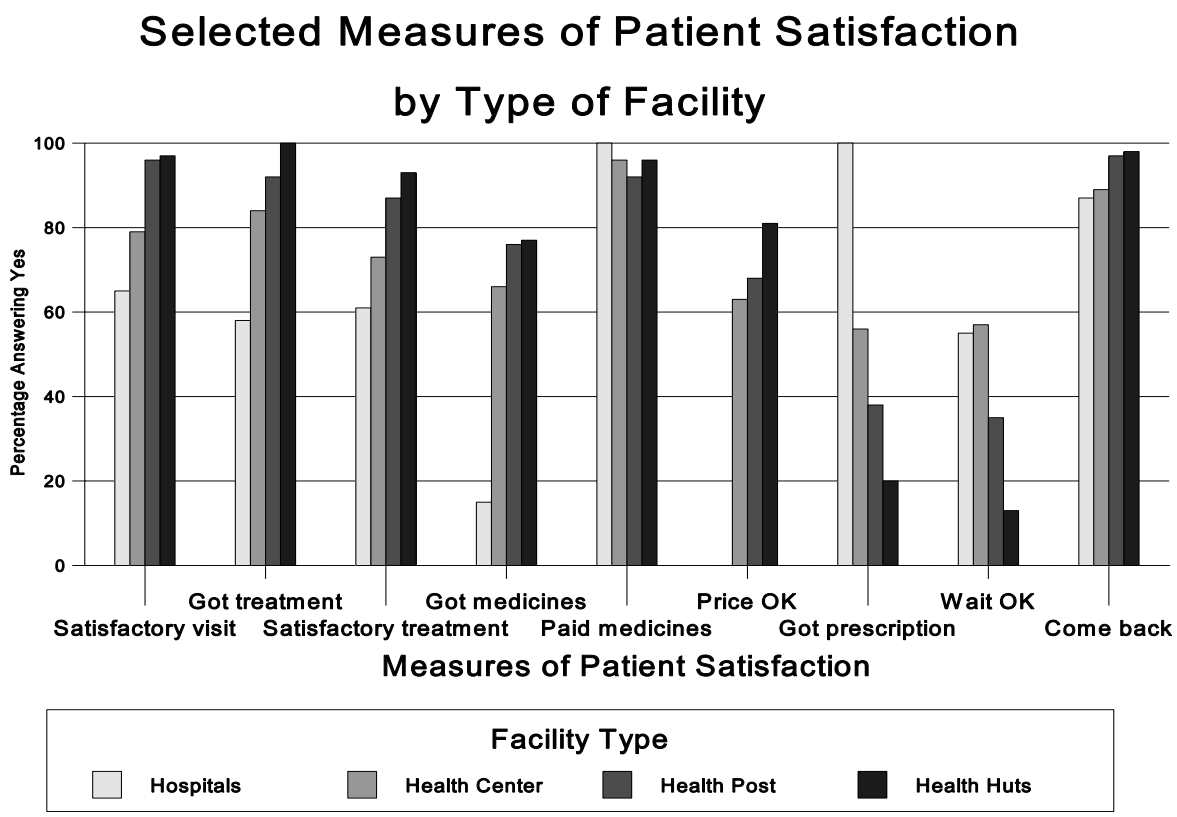
The provision of drugs to patients appeared to be closely linked with utilization levels. Facilities with the highest proportion of patients who received drugs belonged to the highest utilization group, while those with lowest proportion of drug-receiving patients fell in the lowest utilization group. Accordingly, those facilities giving the highest proportion of prescriptions, rather than the drugs themselves, fell in the lowest utilization groups and vice versa. Information for health centers and health posts is presented in *Graphs 3-16 and 3-17*, respectively.



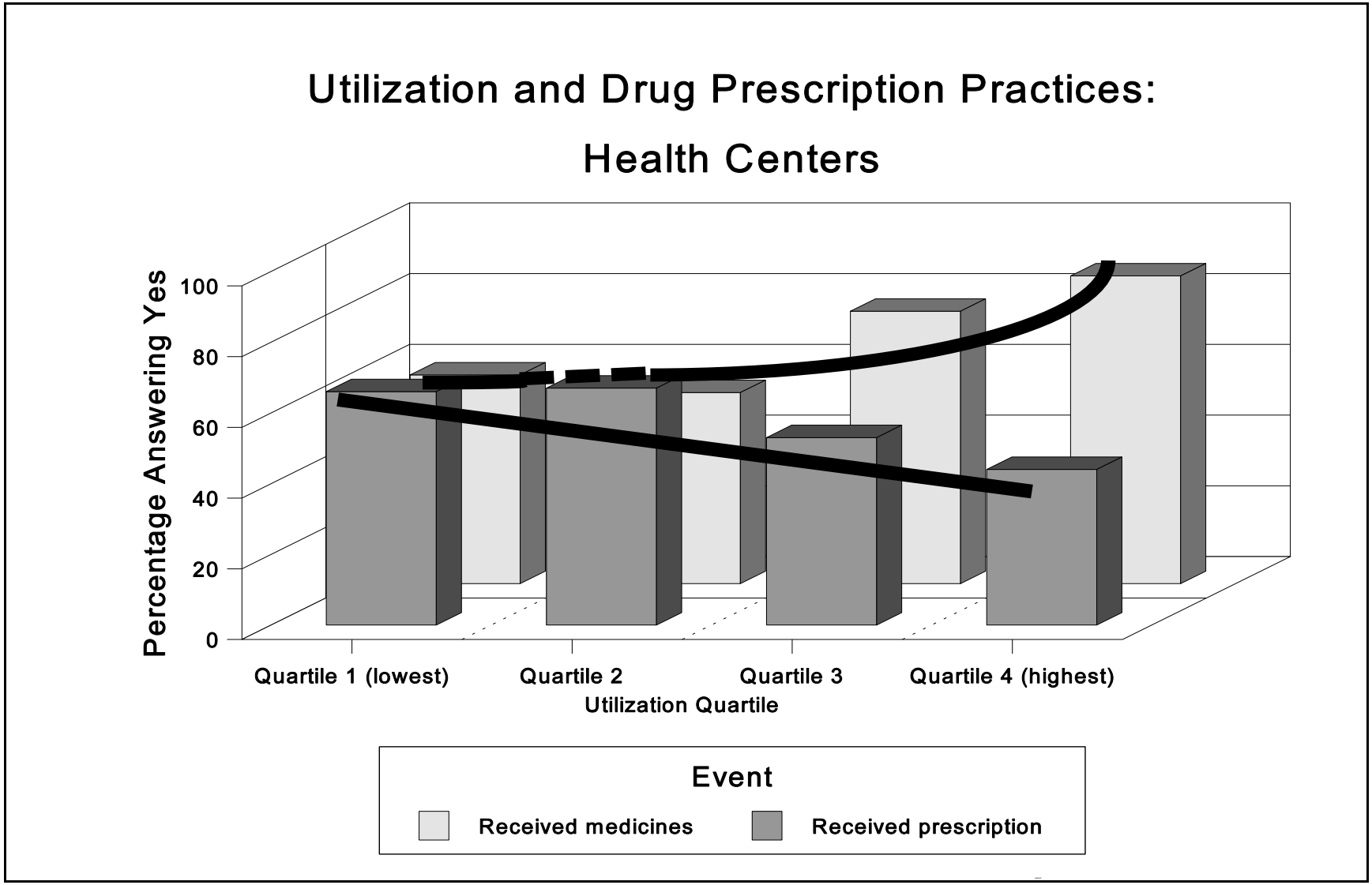
Graph 3-13 Medical Staff Compliance with Standard Actions by Personnel Category



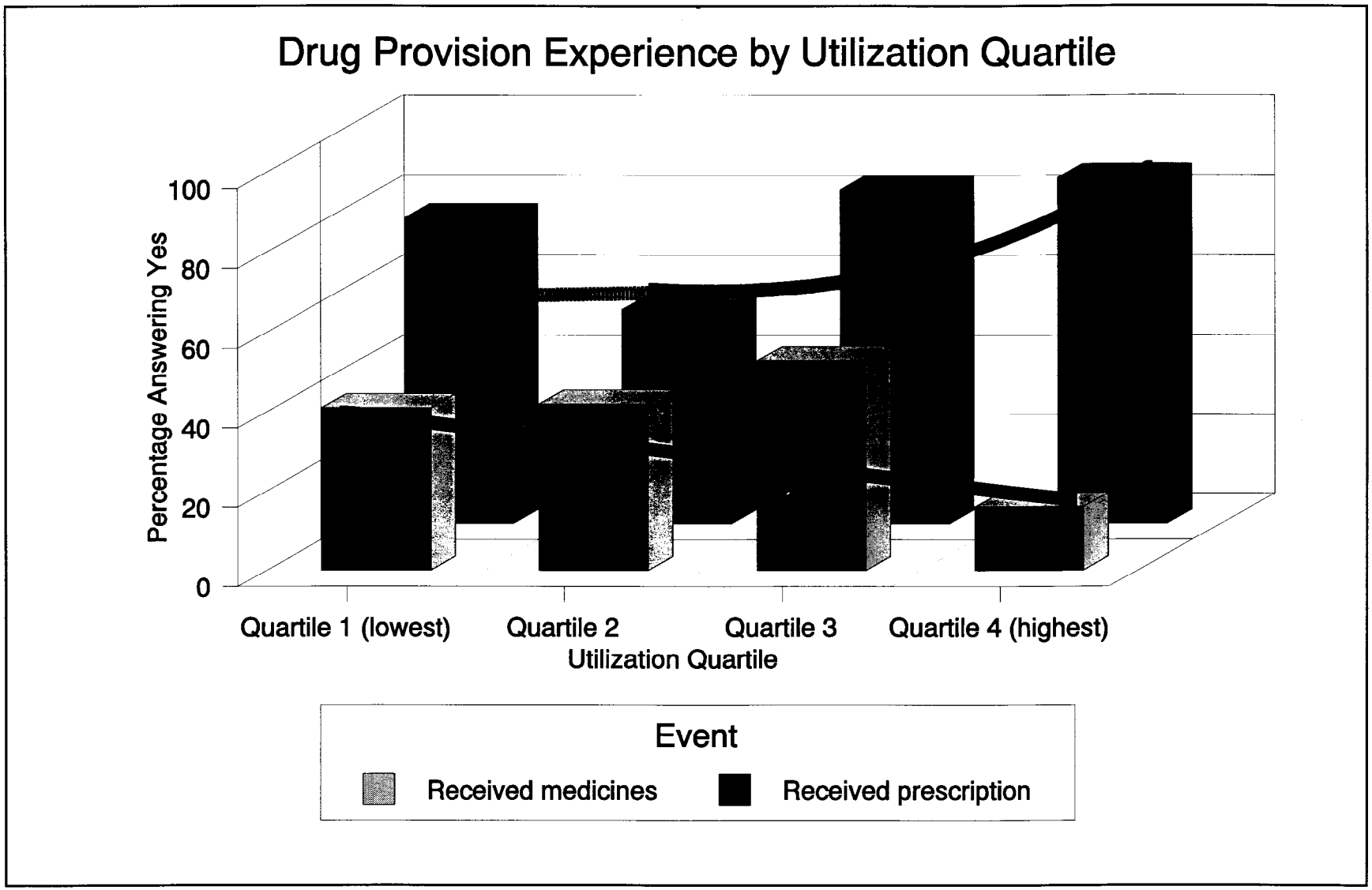
Graph 3-14 Patients' Reasons for Frequenting a Given Facility



Graph 3-15 Selected Measures of Patient Satisfaction by Type of Facility



Graph 3-16 Utilization and Drug Prescription Practices: Health Centers



Graph 3-17 Utilization and Drug Prescription Practices: Health Posts

Staff quality perceptions

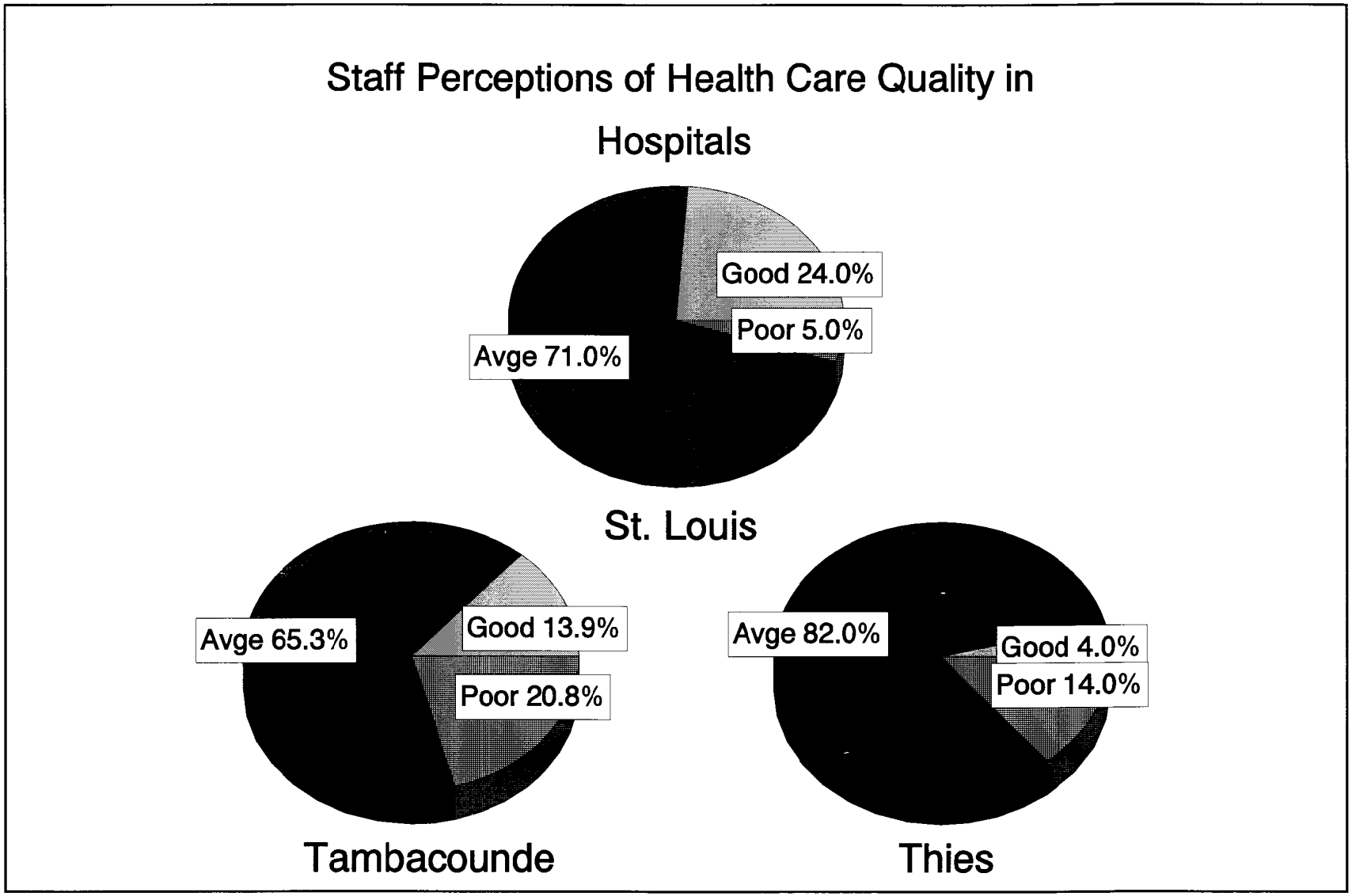
Medical staff members were requested to assess the quality of the care they received as well as the quality of care provided by the entire facility. They had to relate their self-assessment to the performance of their colleagues and their assessment of overall facility quality to that of other facilities providing the same types of medical services. Staff members were asked also to provide the most important factors interfering with care when their assessment of quality was "average" or "poor." Selected results from this inquiry are presented in *Graphs 3-18 — 3-21*.

In hospitals, medical staff tended to rate their quality as being "average" although there were differences in assessments among facilities. For example, while 20 percent of the staff in Tambacounde Hospital rated the facility's quality as being "poor" only five percent of the staff of St. Louis Hospital did so. In that facility, about 20 percent the respondents rated their quality as "good."

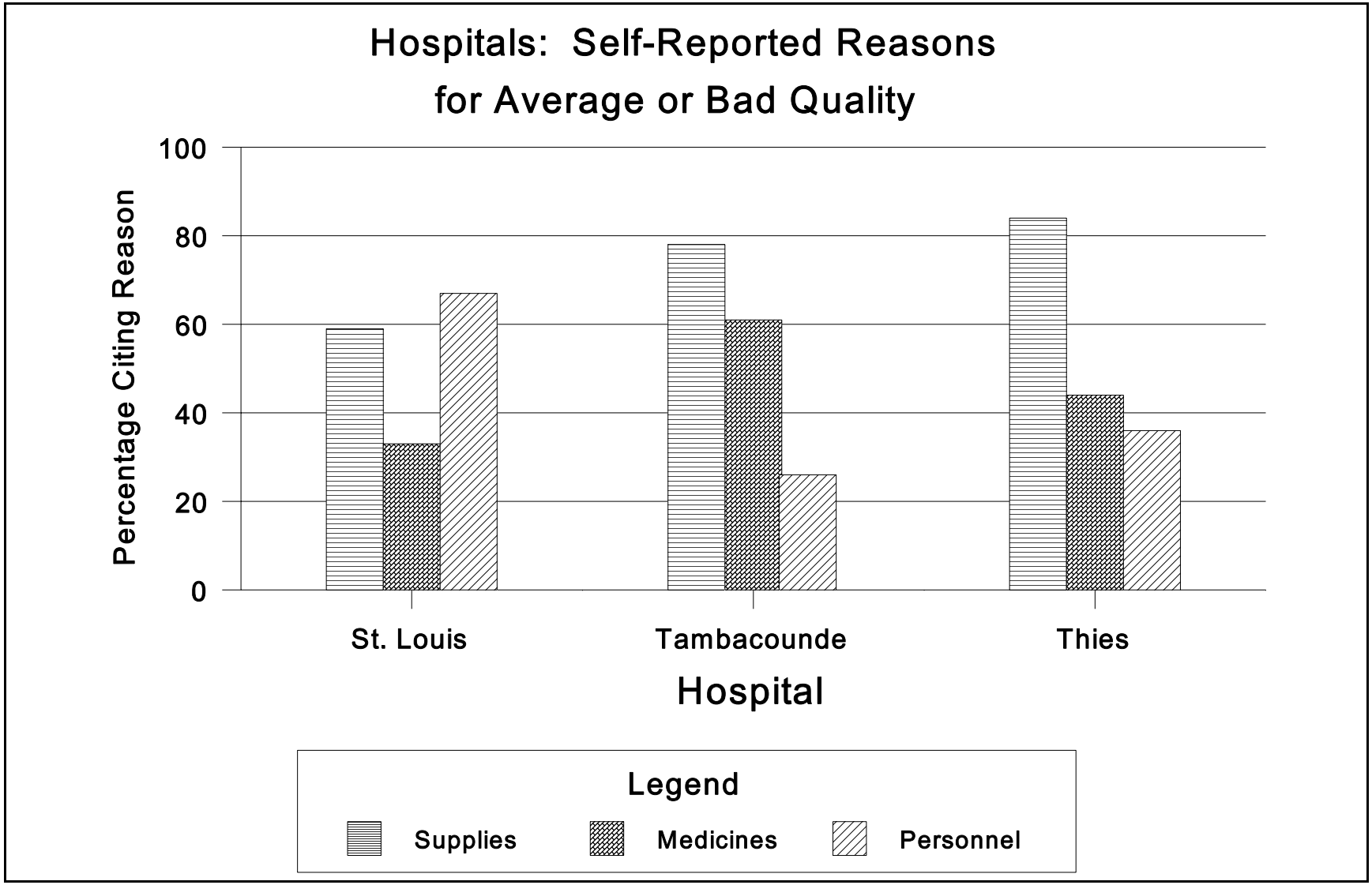
Concerning the self-evaluation of the quality of care in hospitals, doctors were the only staff category that rated their care as "poor." Other categories of personnel, such as nurses, medical technicians, and midwives rated their care as "average." The main reasons for "average" and "poor" self-perceptions of quality included lack of supplies, drugs, and personnel (*Graph 3-19*).

Quality assessments varied by facility type, as is depicted in *Graph 3-20*. The worst perceptions of facility quality were found in health huts, where approximately 24 percent of the staff rated facility care as "poor." In contrast, the most positive perceptions of quality were found among health post staff, one-third of which assessed quality in their facilities to be "good."

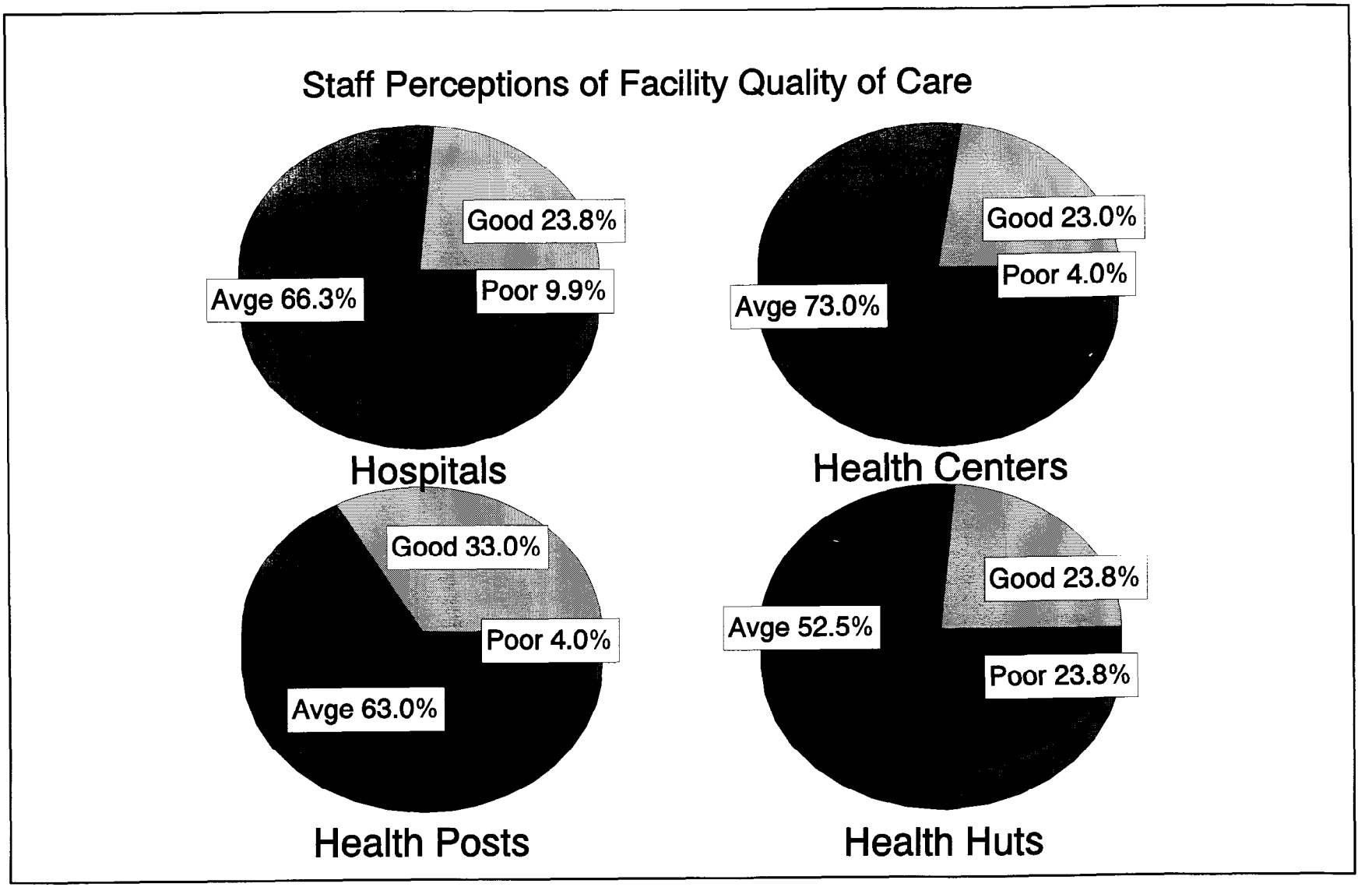
Finally, staff members were asked to indicate whether they had basic medical supplies and equipment at their disposal at the time of the interview. Such items included stethoscopes, scales, height gauges, thermometers, and tongue depressors. Answers are presented in *Graph 3-21* in the form of averages for the four types of facilities. Supply and equipment availability was best in health centers and in health posts. However, in those facilities about one-half of the medical staff did not have those key instruments available on a routine basis. Most of these items were unavailable in health huts. In hospitals, on average about 65 percent of the staff did not have access to these items.



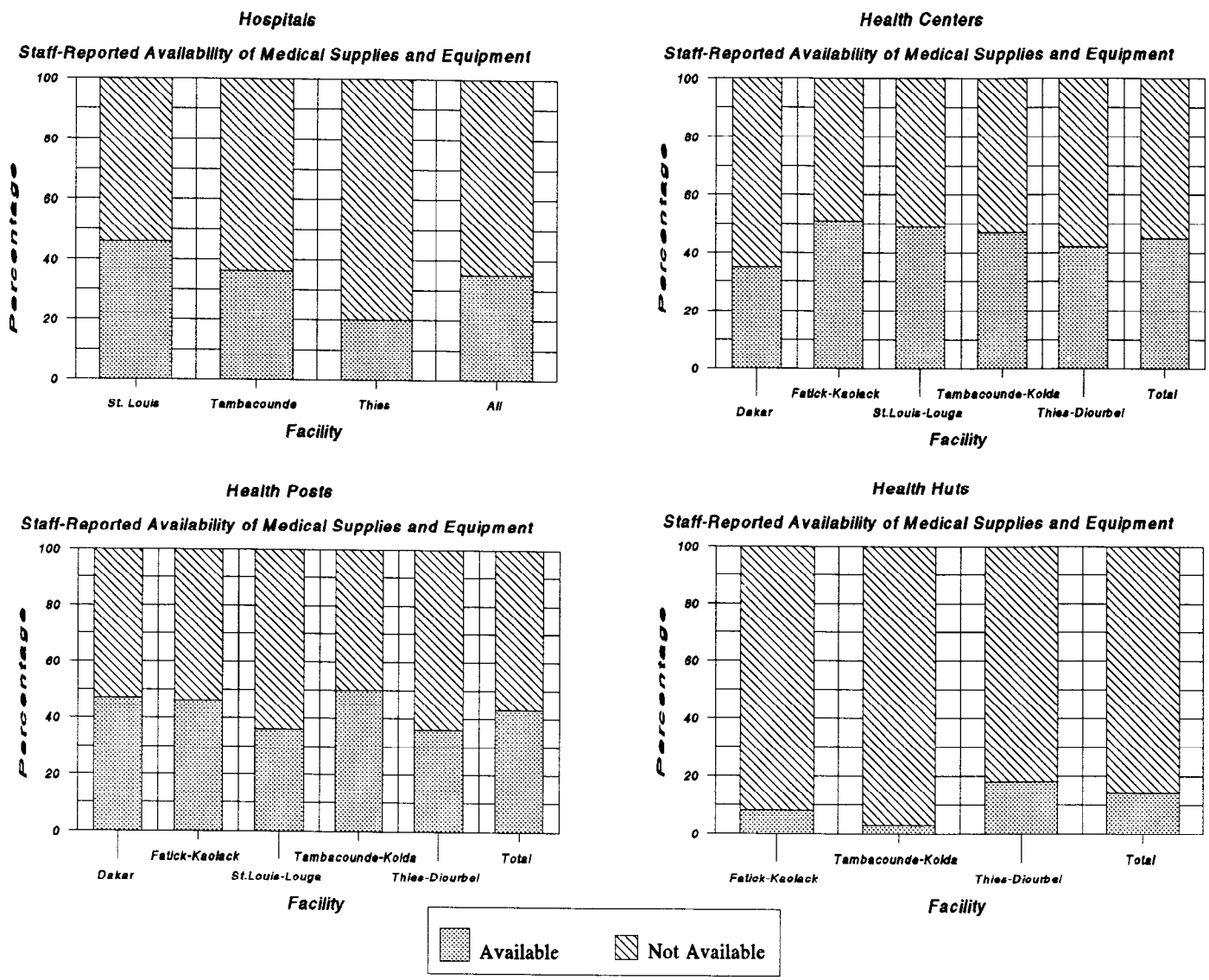
Graph 3-18 Staff Perceptions of Health Care Quality in Hospitals



Graph 3-19 Hospitals: Self-Reported Reasons for Average or Bad Quality Rating



Graph 3-20 Staff Perceptions of Facility Quality of Care



Graph 3-21 Staff-Reported Availability of Medical Supplies and Equipment

Summary

To study quality of care, the research team collected information about staff training, the availability of drugs and other medical supplies, medical staff compliance with clinical standards of treatment, patient quality perceptions, and staff quality perceptions.

Information on staff training was available only in health centers and health posts. In health centers, only about one-fifth of the medical staff, including doctors, nurses, and medical technicians, had received medical training during the two years preceding the survey. In contrast, in health posts a much larger proportion had received such training, including 62 percent of nurses, 47 percent of medical assistants, and 31 percent of midwives.

The investigation into the availability of selected drugs revealed that most of the facilities experienced inventory stockouts during FY91. These stockouts lasted anywhere from a few weeks to the entire year. Chloroquine, oral rehydration salts, and vaccines were the products most often out of stock. For both health centers and posts, stockouts were most severe in the regions and least severe in Dakar. Health huts had the poorest performance, with one-half of the facilities reporting stockouts of all selected products in FY91. Data for hospitals were not available.

Similar findings were obtained regarding the availability of medical supplies. Dakar health centers and posts were the best endowed. Health posts exhibited fewer stockouts than health centers. As a group, the worst performers were the regional health centers. Overall, one-half of the facilities did not have a thermometer at the time of the survey.

Medical staff members were observed while examining and treating patients whose chief complaints were a fever or diarrhea. Staff behavior was contrasted with norms agreed on by a team of Senegalese doctors and nurses. It was found that medical staff communicated poorly with patients. Most often they failed to explain the procedures involved in the examination, the conclusions arising from it, and the appropriate type of treatment. For example, medical personnel in hospitals failed to communicate adequately with patients in 75 percent of the time. Staff routinely skipped standard tests, questions, and exams. Concerning appropriateness of treatment, health huts and hospitals exhibited the poorest performance; health posts were the best, followed by health centers.

Hospitals and health centers referred most patients to higher-level facilities, while posts and huts referred only a few. For example, high referral rates were observed in Dakar health centers (70 percent) and in hospitals (35 percent). This practice was contrary to what would be expected from a well-functioning referral system.

The use of drugs varied across facilities and regions. In particular, differences were found in the use of antibiotics. For example, whereas Dakar health centers prescribed antibiotics to patients with a fever 45 percent of the times, health huts did so only 20 percent of the time. Hospitals prescribed chloroquine to fever patients with a 50 percent frequency, while health huts prescribed it over 75 percent of the time.

The team also explored the extent of compliance with treatment norms for routine medical procedures such as baby-weighing and vaccinations. No important differences in staff practices were found among facilities. The procedures were done correctly over 80 percent of the time, but certain deficiencies were pervasive throughout the system. For example, health center staff washed their hands between patients less than 5 percent of the time and disinfected their hands only 15 percent of the time. Compliance was studied

according to personnel categories. Nurses performed best, while doctors were least likely to comply with established norms for treatment.

When asked about their main reasons for choosing a government facility, patients most frequently cited geographic convenience. When asked about overall satisfaction and willingness to return to the facility in case of future illness, patient responses varied by facility type. The responses revealed that patients were least likely to return to hospitals and most likely to return to health huts.

Use of health care services was closely linked to drug provision practices. Use was greatest for facilities with the highest rate of provision, and lowest for facilities that prescribed, but did not actually provide drugs.

Staff members were asked to assess their own care as well as that provided by the entire facility. Assessment was to be made relative to colleagues and to facilities providing similar services. Answers varied in an important way among facilities of the same type and across different types of facility. For example, 20 percent of the staff of Tambacounde Hospital rated care in the facility as “poor” while only 5 percent of the staff did so for St. Louis Hospital. Across facilities, health hut staff was the least satisfied with the quality of care in their facilities, rating their quality as “poor” in 25 percent of the instances. At the other extreme, staff in health posts rated quality in their facility highest, with one-third claiming that their quality was “good” and only 4 percent calling it “poor.” Main reasons given by staff to explain poor quality perceptions were lack of supplies, medicines, and personnel.

4.0 SUMMARY AND CONCLUSIONS

HEALTH SYSTEM EFFICIENCY: IMPLICATIONS FOR POLICY AND MANAGEMENT

Senegal is experiencing economic difficulties that impose tight constraints on public and private health spending. At the same time, the health status of the Senegalese population remains low, while the need and demand for health services continue to expand.

Improving efficiency in the public health system would allow the government to do more with the same. This study has revealed several types of inefficiency. This concluding chapter explores the apparent causes of these inefficiencies, as well as possible solutions.

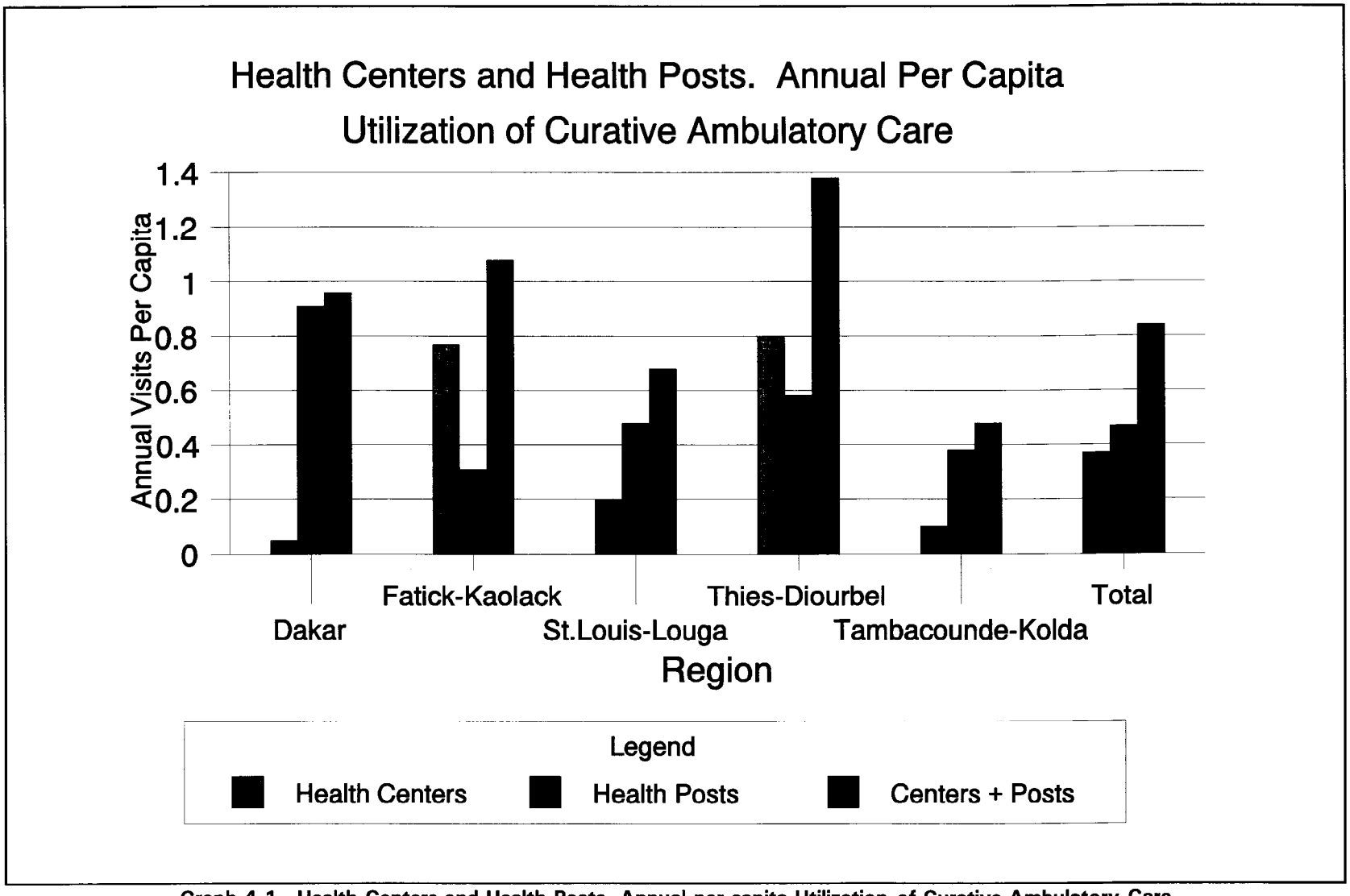
4.1 LOW PERSONNEL PRODUCTIVITY

The analysis of Section 3.3 showed that medical staff productivity was low in government facilities. In Dakar health centers the average doctor saw fewer than two ambulatory patients per day and assisted less than two hospitalized patients. In Thies-Diourbel the average nurse or medical technician cared for about two curative outpatients a day and provided virtually no preventive care and no care to inpatients. The average midwife in St. Louis-Louga assisted one delivery every other day and provided an almost negligible volume of preventive care and family planning services.

Low productivity implies technical and economic inefficiency, as government-paid personnel sit idle. The same volume of care could be delivered with fewer employees, reducing the total and unit costs of health services.

Not only was productivity low overall, but it was highly uneven as we;;. For example, an average nurse from a health post in the capital city saw 35 ambulatory patients per day. This is in stark contrast with the average health post nurse in Tambacounde-Kolda, who saw only ten patients daily. The contrast is even greater when compared with a nurse in Dakar who cared for only two daily patients.

It is useful to consider why productivity reached such low levels in places and why it was so uneven overall. As is shown in *Graph 4-1*, combined per capita use of health center and health post care just exceeded one visit per year in two regions and was less than one visit per year in three other regions. One first possible explanation is that the allocation of government facilities and staff did not reflect local demand. Local demand may vary as a function of epidemiological and socioeconomic differences among regions and populations, and as a function of local competition by nongovernmental providers.



Graph 4-1 Health Centers and Health Posts. Annual per capita Utilization of Curative Ambulatory Care

Productivity would increase if demand were greater. Demand for curative care may have been low in FY91 because of low quality perceptions among actual and potential users. The analysis of the preceding section suggests that utilization levels were linked to drug availability. It also shows that most facilities experienced stockouts of basic medicines such as chloroquine, oral rehydration salts, and antibiotics. Thus, improved drug availability could result in higher demand. Personnel productivity would go up as a result thus boosting technical and economic efficiency as well as higher health status. Evidence from several countries in the region, e.g., Niger, shows that demand for curative care can increase dramatically when medicines are made available.

The demand for preventive and family planning services was also low. For example, well-baby patients in health posts represented only 41 percent of target children aged 0-5 years. Contraceptive prevalence was four percent in health posts and 13 percent in health centers.

The demand for preventive care can and should be boosted to improve health status. More health education should be provided in health facilities as well as through community channels such as health committees.

Personnel output was so low in some places, however, that it is unlikely that demand increases alone can bring about more acceptable productivity at current staff levels. It is apparent, then, that the government should consider eliminating facilities, staff, or both. Closing facilities may lead to inequitable access for some segments of the population, however, and this may be politically unacceptable. Staff of some facilities should be reduced or reassigned to higher-demand locations. While such a measure may have high private costs to the employees themselves, it may result in greater system efficiency and higher social welfare.

Low demand is only a hypothesis for explaining low output in government facilities. An alternative hypothesis is that demand may have been higher than utilization because of supply constraints. One possible constraint, seen elsewhere in the world, is that government medical staff work fewer hours in their public jobs than required. They spend a few hours a day in their government facilities, working elsewhere, usually in their private practice during the rest of the day. The government should explore carefully whether poor employee compliance with work hours is a pervasive problem. Efficiency would improve if the government retained fewer employees, who effectively worked full time, instead of keeping a larger staff, that worked only sporadically in the health facility.

The social cost of low staff productivity is great. Not only is the money devoted to salaries wasted, but so are other resources that are underused such as physical infrastructure. The social opportunity cost of low output is high when there is unsatisfied demand. Resources are pilfered in one place and sorely lacking in another. Poor countries like Senegal, where resources are constrained and health problems major, cannot afford the inefficiency that appears to exist in government facilities, as manifest in low medical output.

4.2 POOR HEALTH CARE QUALITY

The analysis of *Section 3.8* shows that government health facilities had problems with the quality of care. Stockouts of essential medicines were common in all facilities; basic medical supplies and equipment, such as thermometers, syringes, scales, and supplies were lacking; quality perceptions among the medical staff were low; diagnostic and treatment protocols did not exist; basic norms of diagnostic, treatment, and hygiene were not followed routinely; and communication with patients was poor.

Poor quality of care, especially the lack of medicines, can result in low demand, as demonstrated repeatedly through empirical analyses. Infectious and parasitic diseases such as malaria, dysentery, and certain upper respiratory illnesses, are highly prevalent in Senegal. It is evident that the lack of malaria medicine, oral rehydration salts, antibiotics and other medicines had perverse health consequences.

Lack of essential medicines and supplies translate into inefficient use of labor and capital. Doctors who cannot provide patients with drugs or who are unable to examine them adequately are resources poorly used. So are the premises where such doctors work. This inefficiency occurs even if demand is not hampered by poor quality. The effectiveness of the medical system suffers when essential inputs are lacking, and thus the number of deaths and illnesses averted per FCFA spent is low.

Inadequate training for medical personnel results in inefficiency. For example, the lack of diagnostic and treatment protocols means that problems may be wrongly diagnosed or missed altogether, and treatments may be inappropriate. The inefficiency arising from poor treatment practices, such as the overprescription of often expensive drugs, or poly-pharmacy, has been documented in The Gambia (Tilney et al., 1993). In addition to the high cost of such practices, there are negative health consequences which further reduce the effectiveness and efficiency of the health system.

The government should consider the benefits of providing more training to its health personnel. It should also address the lack of diagnostic and treatment standards.

Low quality of care in FY91 meant that government resources were inefficient. They supported a delivery system that was not entirely meeting the medical demands and needs of the population. These scarce resources could better spent elsewhere in the health sector or outside of it. Or measures could be taken to improve health care quality in government facilities and thus boost efficiency.

Over the past two years, steps have been taken to improve the performance of the government's drug importing and procurement agency, the National Pharmacy (PNA). It is possible that such changes have resulted in improvements in the pharmaceutical supply system. If so, quality of care may have improved along with the system's efficiency. However, it is necessary to go beyond mere conjecture and verify empirically the effects of the new measures in the PNA.

It is likely that the presence of a large public monopoly for the importation of key health care inputs has and will continue to have negative consequences for the efficiency of the health system. While larger procurement entities benefit from bulk purchase discounts and other economies of scale, they also suffer from the rigidities inherent to large organizations. The lack of competitive pressures along with the stability of government employment means that there are few forces leading toward an efficient operation. The structure of the pharmaceutical sector in Senegal should be studied carefully and, if necessary, modified to improve the efficiency of the entire health sector. A more competitive market for the importation and distribution of pharmaceutical products, if appropriately regulated, may bring large benefits to the health system.

4.3 ESSENTIAL DRUGS POLICY

To estimate the cost of pharmaceutical products consumed in FY91, the research team collected information from facilities about products consumed and their prices. This exercise proved overwhelming as the lists of products carried by facilities, including health centers and posts, usually comprised several hundred items. It is unclear to the authors whether Senegal has adopted an essential drugs policy, but it is apparent that such policy did not exist, or was not respected in FY91.

The efficiency gains from having such a policy can be great. Generic products can be as medically effective as brand products yet cost only a fraction as much. Also, medical staff can become more familiar with each item from a reduced list of products and thus can use them in a more appropriate medical fashion. Medical experts can include in the list those products that most effectively treat the local health problems. Greater bulk discounts can be achieved if more units are purchased of fewer products.

If not yet in place, Senegal should consider adopting such a policy. If already in place, the government should enforce compliance.

4.4 REFERRAL SYSTEM

As noted in *Section 3.8*, hospitals and health centers exhibited unexpectedly high referral rates. Those referrals result in unnecessarily high system costs. The secondary or tertiary facilities to which patients are referred have higher operating costs because they have more specialized, and therefore more costly, staffs and equipment. By having to provide care to patients who should have been treated at lower levels of the delivery system, the secondary and tertiary facilities fail to serve their main mission—the treatment of more complex medical problems. The factors that cause such high referral rates should be examined and measures should be taken to ensure that only those cases that warrant higher-level care are referred.

Poorly performing referral systems have been observed elsewhere in the region. For example, poor functioning of the primary care system in Niger has meant that for years the major government hospital has become congested with primary-level patients (see Becker et al., 1992). As a result, Niamey National Hospital is not fulfilling its mission appropriately, which is provide secondary and tertiary care. It also means that expensive government resources are wasted treating simple medical problems. The analysts who studied the problem in Niger concluded that improvement in the quality of care at the primary level of the government system was a key ingredient in solving the problems in the referral system.

Increasing the costs of referrals both to patients and to lower-level facilities can also be part of the solution, as discussed below. However, pricing should be only a secondary mechanism to solve the problem. First, the performance of primary care facilities should be improved. As discussed above, those facilities face many problems, such as poor quality and lack of resources. Solving those problems first will help reduce the problem of inappropriate referrals.

4.5 PRICING SYSTEM AND COST RECOVERY

Pricing can help improve efficiency in government facilities. However, prices also ration services on the basis of ability and willingness to pay and thus can have adverse effects on access and equity.

Prices can boost efficiency in several ways. First, if demand is inelastic, higher prices can bring in much needed revenue to health facilities. As Section 3.7 demonstrates, cost recovery proceeds represented only a modest fraction of total facility revenue in FY91: 8 percent in hospitals, 10 percent in health centers, and 28 percent in health posts. More revenue from higher fees could help pay for needed improvements in quality, particularly for pharmaceutical products and other medical supplies. As already noted, greater availability of supplies, and the associated quality gains, can improve system efficiency.

Fees in Senegal government facilities were low relative to those in other countries in the region. Elsewhere, particularly in places where the Bamako Initiative is in place, fees for curative care are equal to the marginal cost of medicines. That was not the case in Senegal in FY91. Calculations from neighboring nations indicated that, to cover marginal cost of drugs in primary level facilities, fees should range from one to two dollars per curative ambulatory visit.[11] At the 1991 exchange rate (US$1=270 FCFA), that means that fees should have been between 270 and 540 FCFA per visit. In hospitals, the fee for a visit was about 250 FCFA (see *Section 3.6*), but in centers and posts it was only about 115 FCFA for adults and 65 FCFA for children.

Whether or not prices are raised is a political decision that depends on values and resource availability in each country. Some countries, both developing and industrialized, choose to provide health care to all citizens for little or no direct fee. The system's cost are paid for with public funds. Other countries, from lack of resources or as a result of a conscious political decisions, choose to share, in varying proportions, the costs of health care between the government and users. In still other nations, the government largely disengages itself from financing or providing health care to some sectors of the population.

Which policy is most appropriate for Senegal is a decision that rests with its government. In light of poor economic performance and highly constrained government revenue, it is likely that part of the solution to the poor performance of Senegal's health system will be the adoption of higher user fees.

As already noted, user fees impose an economic barrier to access. While such a barrier can be negligible to some, it can impede access to others. A system of differential fees is desirable to reduce the negative equity implications of prices. Designing and implementing such systems is a major challenge, although there is evidence that it is possible to do so.[12]

The pricing structure can improve system efficiency also by more appropriately channelling demand. In particular, prices could help solve the problem of inefficient referrals. If users had to face significantly higher prices in upper-level facilities, they would not bypass lower-level facilities or accept being referred. Although hospital fees for deliveries and consultations were about twice as high as in health centers and posts, that price difference did not appear to be sufficient to discourage inappropriate referrals.

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[11] See Willis 1992 for Niger and Tilney et al. 1993, for The Gambia.

[12] Evidence of differential pricing according to ability to pay is available from Zaire (Bitran et al. 1987).

Charging higher referral costs to users is only a partial solution. As long as primary facilities do not have to bear the cost of excessive referrals, they will have few incentives to change their behavior. Referral fees to providers, whereby lower-level facilities have to pay a fee to upper-level providers each time they refer a patient, would help also reduce excessive or unnecessary referrals.

Cost recovery does not necessarily have to be in the form of user fees. Social financing or health insurance is also an option. During an interim policy workshop at which preliminary study results were presented, some public officials expressed an interest in exploring social financing for government care. Health insurance offers great revenue raising potential while partially avoiding the equity problems of user fees. Unfortunately, administering a health insurance system calls for sophisticated management systems. While managerial talent is not in short supply in Senegal, important steps need to be taken to improve the management of government services. Only then will the alternative of setting up insurance mechanisms become a real option.

A final aspect of the pricing policies having a bearing on system efficiency is the pricing of preventive and family planning services. The consumption of preventive care is cost effective. Boosting demand for such services thus results in greater sectoral efficiency.

In FY91, the fees for prenatal and preschool care in hospitals, health centers, and posts were almost as high as those for curative care. Such a policy should be reexamined in light of the finding that demand for preventive and family planning services is low.

Price is not the only variable affecting demand for prevention. Time costs of consumption also affect demand, as does consumer appreciation of the benefits of preventive services and birth spacing. When benefits are ignored or perceived as low, demand will be low notwithstanding the cost. When the benefits are appreciated, demand can be high in spite of the cost.

Low demand for certain preventive and birth control services in Senegal may be caused by low consumer appreciation of benefits. A major education effort should be undertaken, in addition to whatever is already being done. At the same time, the policy of charging above-nominal prices for preventive and family planning services should be reassessed. It is possible that appreciation of benefits is sufficiently low to warrant a reduction of fees, or their removal altogether. Doing so would not have an important effect on facility revenue since the revenue contribution of such services is minor.

4.6 HEALTH PLANNING AND INFORMATION SYSTEMS

The research team had severe difficulties in obtaining the data necessary for this study. It found that management and health information systems were weak on nonexistent. Most facilities were unable to provide information about drug expenditures or about any expenses. To obtain such data, the study team often had to infer them from information about physical use of resources and their unit prices.

Improving management and financial information systems is absolutely essential to enhance system efficiency. Further, the government should not consider making any changes in health care financing policies, such as revising fees or setting up insurance systems, unless a previous or simultaneous effort was made to improve management.

Government health facilities require accounting systems. The administrative staff also needs to be trained in management, accounting, and finance techniques. Before this is done, however, central policy questions need to be answered. Senegal is attempting to decentralize its public administration. As part of this effort, the government should decide what type of autonomy it wants to grant to public services, such as health, and what type of control and accountability it wants to demand.

Under a decentralized health care system, it is likely that central funds will continue to be channelled to the regional health services to pay for investment, personnel, and other costs. Therefore, the central government should expect to receive periodic reports from the regions indicating how funds were spent. It should also require health performance reports (health output delivered and health status gains), from which it can assess how efficiently public funds are spent in the regions. Such reporting should be uniform across all regions to allow comparability. Finally, regions should have health and financial planning systems to inform the government about future resource needs as well as to allow performance assessment.

Having such information and planning systems would allow the government to allocate its resources in a more efficient and equitable way. Such systems would allow the government to answer such questions as: What is the health status of the population? What health gains have been made per dollar spent? What are priority areas for health programs? What resources are necessary to achieve objectives? Who is benefiting from government subsidies?

To develop such systems, or to modify existing systems, requires a major investment, and one that should no longer be postponed. To keep costs low and to avoid mistakes, the systems could first be developed on a pilot test basis, as is being done in Niger. This would produce systems that suit the specific needs of the facilities, the regions, and the government. Then, the tested and refined products could be applied more generally throughout the country.

APPENDIX

STUDIES BY THE HEALTH FINANCING AND SUSTAINABILITY PROJECT IN SENEGAL

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