

Costs of Maternal Health Care Services in Masaka District, Uganda

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Abstract

This study evaluates provider and consumer costs of six maternal health services, along with selected quality indicators, at four health facilities and among community practitioners in Masaka District of Uganda. The study examines costs of providing the services in order to examine the reasons behind cost differences, assess the efficiency of service delivery and determine whether management improvements might achieve cost savings without lowering service quality. Costs that consumers pay to obtain maternal health services are also determined, along with the percent of total costs recovered by providers from fees for services.

The Partnerships for Health Reform together with the Makerere University Institute of Public Health collected data in May 1998 on costs of maternal health services at a public and mission hospital, a public and mission health center, 17 private midwives, and 20 traditional birth attendants.

The total costs of routine maternal health services in the four facilities were found to be less than \$7.00 for antenatal care and less than \$35.00 for vaginal delivery. Obstetrical complications were more costly due to the use of more and higher-level personnel and materials. Cost for cesarean sections and post-abortion complications ranged from \$19.97 to \$86.48; postpartum hemorrhage and eclampsia were higher and ranged from \$50.63 to \$159.66, respectively. The most costly input for maternal health care was materials, unlike many other health services where labor costs are more prominent. Material costs made up more than half of direct costs for four out of six services.

The results of the costs in the four facilities surveyed indicate that differentials exist between unit costs of maternal health services between hospitals and health centers as well as among mission and public facilities. These differentials can be explained through differences in use and availability of materials and equipment, number and level of personnel delivering services, and utilization levels of services.

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Acronyms

ANC	Antenatal Care
GDP	Gross National Product
IPH	Institute of Public Health
MOH	Ministry of Health
NGO	Non-governmental Organization
PAC	Post-abortion Complication
PHR	Partnerships for Health Reform
PPH	Postpartum Hemorrhage
STD	Sexually Transmitted Disease
TBA	Traditional Birth Attendant

Exchange Rate

At the time of this study, 1,150 Ugandan Schillings = 1 U.S. dollar

Acknowledgments

This study is part of a three-country effort supported by the Office of Sustainable Development, Bureau for Africa and Office of Health and Nutrition, USAID and coordinated by Partnerships for Health Reform (PHR) and Makerere University Institute of Public Health to compare costs of maternal health services in Ghana, Malawi, and Uganda. Discussions with the Ministry of Health, as well as with USAID, World Bank, the World Health Organization, and MotherCare Project representatives in Uganda, informed the focus and design of the study.

Implementation of the cost study in Uganda would not have been possible without the hard work and dedication of the study team's data collectors and observers: Elizabeth Katende, Robinah Nassiwa, Edward Galiwango, and Martin Mbonye. The study team would also like to acknowledge the support of the Institute of Public Health and its Director, Dr. Fred Wabwire; the Uganda Private Midwives Association–Masaka; Dr. J. Nyanzi, the District Director of Health Services–Masaka, Dr. Musiitwa, the Acting Medical Superintendent of Masaka Hospital, and Dr. Mary Simmons, the Medical Superintendent of Kitovu Hospital. In addition, we would like to thank all the hospital and health center staff, private midwives, traditional birth attendants, and clients who participated in and contributed to the study.

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Executive Summary

Introduction

This study evaluates provider and consumer costs, along with selected quality indicators, for six maternal health services provided at public and private hospitals, health centers, and community practitioner sites in Uganda. The study examines costs of providing the services in order to examine the reasons behind cost differences encountered, assess the efficiency of service delivery, and determine whether management improvements might achieve cost savings without hurting quality. This assessment is important to Uganda and many other African countries with ambitious goals for improving maternal health, but scarce public health resources and limited government budgets. It is also important for Ugandan considerations about contracting options for private providers and related performance incentives.

The study also evaluates the costs that consumers pay to use the maternal health services, along with the contribution that revenues from fees for services make to recovering health facility costs. This assessment is important to the efforts of many Ugandan health facilities to introduce user fees as a cost recovery mechanism, to help pay for quality maternal care and to do so in a way that consumers, especially the poor, can afford.

Methodology

The Partnerships for Health Reform (PHR) conducted this study in collaboration with the Makerere University Institute of Public Health (IPH). The PHR and IPH team collected data on the costs of delivering six maternal health services—antenatal care, normal deliveries, cesarean deliveries, post-abortion care, postpartum hemorrhage complications, and eclampsia complications—during 1998 at a public and a mission hospital, a public and a mission health center, and by 17 midwives and 20 traditional birth attendants in Masaka District of Uganda. The field team collected data during one week at each of the four health facilities and spent several other weeks collecting data from the independent community-based practitioners.

At these sites, the field team collected data on total operating costs (e.g., personnel, drugs, supplies, material, utilities, overhead expenses) directly associated with providing the maternal health services (direct costs), as well as related support costs (indirect costs). For a variety of reasons, the study does not include capital and investment costs. It does include several measures of structural quality and a few measures of process aspects of quality. Data collection techniques included personnel observation studies to obtain data on time allocation of personnel, facility quality checklists, provider interviews to determine lines of treatments and time use, facility record reviews, and client exit interviews on expenditures and client satisfaction.

The Ministry of Health (MOH) and PHR-IPH team jointly planned the field study and selected the study sites. The four public and private health facilities included in the sample are among the best in Uganda and have received substantial amounts of MOH and donor assistance. Data from these well-managed and well-stocked facilities are thus not representative of public or of private facilities in Uganda. The rationale for this choice was that there is little point in costing poor quality services. Therefore, the data and conclusions from this analysis are best understood as case studies of four health facilities and of a small sample of independent community practitioners. The case study data can, however, be used to illustrate financing and efficiency issues that the Ministry of Health could address in its efforts to strengthen maternal health services in Masaka and elsewhere in the country.

Provider Costs

Estimated total (direct plus indirect) operating costs of routine maternal health services in the four health facilities in Masaka District were less than \$7.00 for antenatal care (ranging from \$2.21 at the public health center to \$6.43 at the mission health center) and under \$35.00 for normal delivery (ranging from \$2.68 at the public health center to \$33.90 at the public hospital). Costs were higher for obstetrical complications due to the use of more and higher-level personnel and materials. For example, costs of a cesarean section ranged from \$73.10 (public hospital) to \$86.48 (mission hospital) and from \$19.97 (mission health center) to \$57.60 (mission hospital) for post-abortion complications. The estimates compare with other estimates of maternal health care costs such as the World Bank estimate of \$90.00 per case for antenatal and delivery services (World Bank 1993).

As expected, total costs per service were generally highest at hospitals, reflecting greater use of drugs and higher employment of skilled personnel. The mission health center, however, had higher costs for antenatal care (\$6.43) than either the public hospital (\$4.18) or the mission hospital (\$5.20), because a physician rather than nurse midwife conducts antenatal clinics at that facility.

With respect to the composition of costs, study findings show that while personnel time costs were the most important component for normal deliveries and eclampsia, material costs made up more than half of direct costs for the other four maternal health services. Indirect costs of support staff time, non-patient contact time that personnel spend, and pro-rated shares of maintenance and utilities ranged from 20 percent to 60 percent of total costs of delivering the maternal health services included in the study. Indirect costs for both hospitals are similar for all of the six services; hospital indirect costs are higher than the two public health centers' indirect costs for all services, but the mission health center has higher indirect costs than either hospital for two of the four relevant services.

Provider Efficiency

These case studies provide several indications of the relative efficiency of the various providers in the sample. Health provider costs in the sample reflect different mixes of staff and medications and other material, as well as different staffing patterns. The two mission health facilities had higher material costs than the two public health facilities, while the public hospital has higher personnel costs for four of the six services. In contrast, the mission health center had higher labor costs than the public health center for all three services the center provided.

Reflecting differences in utilization levels in relation to staffing, midwives at the mission hospital delivered more babies per year on average (68 deliveries per year) than at the public hospital (39 per year). Public health center midwives delivered the most babies per year (116 per year per midwife) followed by private midwives (108 per year). Most international standards suggest that a nurse midwife could perform 15 to 20 births per month, or 180 to 240 births per year, though an additional midwife would be needed in a facility setting to cover for leave time and women needing services at the same time.

Provider Quality

When quality considerations are taken into account, the study shows that the public hospital has laboratory equipment, but does not always conduct lab tests when needed. The two mission health facilities have more drugs available and perform more lab tests than the public health facilities in the case study. Only about half of the clients at the public facilities said that they had received prescribed drugs at the public facilities, while all mission clients said they had received the drugs prescribed for them.

The study did not include observation of drug prescribing practices to be able to determine if overprescribing might be occurring by providers with access to greater supplies. Anecdotal evidence, however, suggests that inappropriate prescribing practices may exist at these facilities. On the other hand, percentages found for prescription of sexually transmitted disease drugs match the prevalence of these diseases in Uganda.

Client Costs

According to patient exit interviews at the four health facilities, total costs that patients paid for maternal health services ranged from \$3.00 or less for an antenatal care visit, from \$2.26 (public health center) to \$22.75 (mission hospital) for a normal delivery, and from \$13.22 (public hospital) to \$59.24 (mission hospital) for a cesarean section.

User fees are often lower than other costs paid by the patient. In the case of antenatal care, user fees are less than typical transport (\$0.56 to \$1.26) and other costs combined at all facilities but the mission health center. User fees at the public hospital are also less than transport (\$3.83) and other costs (\$3.03) combined that are associated with a normal delivery or a cesarean. At the mission hospital, however, the high fees do exceed the other costs (\$4.49) associated with a normal delivery or complicated obstetrical care. It should be noted that clients using the public health facilities in these case studies often incurred additional costs to fill prescriptions they received at the facility.

Cost Recovery

Because patients generally paid much higher fees, the mission facilities studied usually recovered a higher proportion of their costs than did public facilities. For example, the mission hospital recovered 55 percent of normal delivery costs, against recovery rates of 23 percent at the public health center and 13 percent at the hospital.

As expected, cost recovery rates are higher when compared with the costs of material and medication directly related to the maternal health service—the cost component that user fees are most often designed to cover.

Conclusions

Findings from these case studies suggest that no simple conclusion can be drawn about relative costs of care, efficiency, or quality at different levels of care (hospital vs. health center vs. community practitioner) or at public and private providers. Higher total costs are not necessarily associated with higher quality or with a higher level of health facility. Variations in staffing patterns and use of medicines, laboratory tests, and other supplies suggest that no single model of efficient or cost-effective maternal health care exists.

Higher material costs in the two mission facilities than at the public ones were associated with relatively higher structural quality, however.

Facilities do not appear to have set their fees systematically in relation to costs or to have set specific objectives related to cost recovery rates for particular services or particular costs. Consumers face a confusing array of fees—sometimes covering part, all, or more than the costs of medications and other supplies—and do not know what they are paying for or, perhaps, what they will be charged for any given maternal health service.

Both public and private health providers have inefficiencies and could make better use of their resources. Evidence collected for this study suggests that changes in (1) drug supply, (2) staffing patterns, and (3) efforts to increase utilization might produce the greatest efficiency gains. Higher utilization rates are likely to be needed to absorb the time of a core number of midwives who must be on staff to provide 24-hour coverage at the hospitals and health centers. In all four facilities maternal

health services represent less than 10 percent of total patient days; specifically in the mission health center, the figure is less than 5 percent. Midwives are delivering many fewer babies than they could and all staff appear to have large amounts of time spent on administrative duties (11–41 percent) or unoccupied (6–13 percent).

Recommendations

Efficiency

- ▲ Since most of the facilities in these case studies do not appear to be functioning at capacity for maternal health services, these facilities should take steps to encourage higher utilization rates—with the goal of improving maternal health outcomes, as well as efficiency. Alternatively, the facilities, especially hospitals, should bring staff allocated to maternal care more in line with current utilization levels.
- ▲ Data across all providers in these case studies suggest that overall efficiency of resource use could be improved by encouraging mothers to use health centers rather than hospitals for antenatal care and for delivery. The MOH could encourage delivery in health centers, or with trained providers, for the 85 percent of uncomplicated cases, while strengthening early diagnosis of problems, communications, and referrals for the small but important percentage of obstetrical complications requiring more specialized care. However, it will be important to improve the availability as well as use of materials and equipment in these facilities.
- ▲ Specifically in the public hospital in this study, administrators should consider streamlining staffing. For example, if the public hospital cut the number of midwives from 25 to seven, each midwife would perform on average 142 deliveries per year (in contrast to 39 now) and costs per delivery would be reduced by 40 percent. Since these average patient care rates are well within quality standards, this cost saving could likely be made without sacrificing quality of midwife services at the hospital.
- ▲ The two public facilities should also improve their drug supplies and revise their fee structure to assure that fees cover the costs of medications and other material. Fees that cover the costs of medications will provide enough funds to keep drugs in stock, improve utilization, and save patients the additional cost of traveling to pharmacies to fill prescriptions at commercial market prices.
- ▲ At the mission health center, administrators should consider improving efficiency through posting midwives rather than medical officers to provide routine services and reserve care by physicians for obstetrical complications.

Quality

- ▲ An assessment would be useful at both mission providers and private midwives to assess whether overprescribing of drugs is taking place.
- ▲ A more thorough assessment of maternal health care quality in the four facilities would help greatly in the interpretation of these cost data and in making recommendations for increased efficiencies that would not hurt and might improve quality of care.
- ▲ To improve quality, cost-effectiveness, and efficiency of care, the four facilities should review time allocation of midwives and establish norms for time needed for antenatal visits, availability for deliveries, administrative activities, and personal time. The MOH may find it useful to conduct a similar review for its health facilities in general.

Financing Policy

- ▲ The MOH should consider helping districts establish fees that are more in line with needs to assure that at least an adequate stock of medicines and supplies exists and that the fees are also within the ability of its client population to pay. Availability of generic medicines at public health facilities would save people money compared with the extra transport costs and higher commercial pharmacy fees they now pay when drugs are out of stock at the public facility. Based on experience in other countries in the region, regular availability of basic medicines at reasonable prices at public health facilities should also improve utilization, especially for the poor.
- ▲ Variations in cost and efficiency found in this study suggest that, in its considerations of contracting mechanisms with mission health facilities or independent private midwives, the MOH should examine each private provider on a case-by-case basis to determine what a reasonable reimbursement rate would be. Other studies in Uganda of mission health provider costs support this recommendation.
- ▲ At the time of data collection for this study, the MOH was considering contracting arrangements with private health facilities. Costs in this study could be used as a starting point in negotiating contract rates for maternal health services with the specific mission health facilities in this sample. But several modifications should be made if this evidence is to be effective in helping the MOH extend access to quality, cost-effective maternal health services at prices the population can afford. For example:
 - △ The MOH would not want to "lock in" the inefficiencies in the mission provider staffing and medication practices that are evident in this study. The MOH should build in performance incentives that would encourage private mission or commercial health providers to operate more efficiently, as well as to maintain quality.
 - △ The MOH may not want to reimburse the mission providers fully for indirect costs, especially considering likely inefficiencies in these costs in general. It may also not be appropriate to allocate inefficiencies in other service delivery to maternal care.

- △ The MOH may wish to conduct a study of income levels of current users of mission maternal health services to see if special contractual arrangements and related costs need to be incorporated to assure extension of services to poorer mothers.
 - △ The MOH should assess the benefits and current costs of subsidies it provides to mission health facilities, in comparison with a new contracting arrangement and in comparison with the marginal costs and benefits of strengthening maternal health services at public health facilities.
- ▲ In considering premium, capitation, or other prepayment rates that the population would pay for maternal health services under any contractual arrangement, the MOH should take into account several factors other than the specific maternal health costs that this study provides. For example:
 - △ The MOH should review fees the facility charges for *all* health services and costs of delivering *all* health service to determine premiums and patient co-payments that would apply most effectively risk-spreading and cost-sharing principles among maternal and other health care services.
 - △ To encourage the most effective spreading of risks and costs, the MOH might consider eventually including maternal health services as part of a broader package of services under such schemes, rather than as a separate package with separate premiums or capitation rates.
 - △ Premium, capitation, or prepayment rates would need to include the costs of care at several facility or provider levels to cover the need for referral for obstetric complications or emergencies.
- ▲ In both public and mission facilities, more systematic price setting should take place to ensure that cost recovery goals are reached.
- ▲ Before establishing final guidelines on fees for maternal health services in the public sector, an in-depth study should be conducted of the population's willingness and ability to pay for maternal and other health care services, along with their current health spending and utilization patterns, reasons for choosing public and private providers, and dimensions of quality they consider important. These aspects of consumer demand should be analyzed by income group to see what differences exist between higher- and lower-income households.

1. Introduction

1.1 Overview

This study is part of a three-country effort supported by the United States Agency for International Development (USAID) and coordinated by Partnerships for Health Reform (PHR) and Makerere University Institute of Public Health (IPH) to compare costs of maternal health services in Ghana, Malawi, and Uganda. It aims to provide information to effect policy and program reforms towards optimal provision and utilization of maternal health services.

In order to contribute to the USAID Population, Health and Nutrition Center's strategic objective to reduce adverse health outcomes to women as a result of pregnancy, PHR has a Maternal and Reproductive Health Special Initiative to improve the management and sustainability of maternal and reproductive health programs. The three-country study came as part of a request from USAID/Bureau for Africa and is concurrent with a more qualitative assessment of Safe Motherhood interventions in Uganda, Malawi, and Ghana carried out by the USAID-sponsored MotherCare Project. This paper will focus on the results of the costing study PHR and IPH conducted in one district of Uganda.

1.2 Study Objectives

The main objective of the study is to estimate costs of key maternal health services and to compare differences among facility levels, including community providers, as well as between public and private (mission) providers in one district of Uganda. A second objective is to estimate the cost to consumers of attaining these maternal health services.

2. Background

Uganda is located in Eastern Africa and has a population of 21 million and a population growth rate of 2.5 percent. The majority of Ugandans live in rural areas (86 percent), and the national literacy rate stands at 54 percent. Following the economic and social upheavals of the 1970s and 1980s, Uganda has made steady progress since 1986. The government has pursued progressive economic policies and structural adjustments with donor support. Although still among the world's poorest countries, the annual economic growth rate has averaged 6.5 percent of gross domestic product (GDP) since 1990. Major increases in GDP have come from agro-based industries, manufacturing, construction, and transport sectors. Coffee, tea, and cotton are the major earners of foreign exchange.

While health status has improved in the last decade, levels of morbidity and mortality continue to be high. The life expectancy is 47 years, the infant mortality rate is 97/1,000 live births and the maternal mortality ratio is 504/100,000 (Macro International 1995). Largely preventable diseases (Ministry of Health [MOH] 1995a) account for over 75 percent of the life years lost to premature death. Perinatal and maternal conditions account for 20.4 percent of the life years lost due to premature death, malaria for 15.4 percent, pneumonia 10.5 percent, AIDS 9.1 percent and diarrhea 8.4 percent.

Uganda has a network of 1,505 health facilities of which 98 are hospitals and 714 are health centers (MOH 1996a). However, only about 49 percent of the population resides within five kilometers of a health facility. Even if a person has access to a facility, they do not necessarily have access to all types of services, however. For example, 33 percent of health facilities in the country do not provide maternity services, and only 57 percent of the hospitals are equipped to conduct general anesthesia (MOH 1996b).¹ Whereas nearly 90 percent of pregnant women make an antenatal care visit, over 64 percent of them do not benefit from a trained assistant during childbirth (Macro International 1995). As a consequence, the Ministry of Health intends to upgrade a selected health center at each constituency level to provide essential obstetric care, cesarean section, and basic emergency surgery. In addition, the Ministry of Health has encouraged the training of community level providers, such as traditional birth attendants (TBA) and contraceptive distribution agents, to improve on the services provided at the community level.

2.1 Financing of Health Care in Uganda

The most critical issue in the health sector is the overall lack of resources (Kiyonga 1997). Although the health sector share of total public expenditure has grown from 6 percent to 8 percent of the total government budget, this contribution is less than 1 percent of GDP. Government budget allocation to health is cast within a low tax and stringent fiscal policy framework. This limits what is possible for the public sector to do especially in terms of salaries, benefits, supplies, and drugs. Due

¹Consequently, many families rely on self-treatment or seek services of traditional healers and traditional midwives.

to largely small-scale peasant and informal sector activities, tax revenue is low (11.8 percent of GDP in 1996/7) and collection systems are inefficient.

While management of hospitals has been delegated to the district, the Ministry of Health has retained control of financing and staffing. Even though an estimated 80 percent of the health sector budget is spent on hospitals, these facilities are under-funded and have frequent shortages of supplies and a low morale of providers (Grant 1996). Because the government has a policy to hold hospital-level financing constant until primary health care services achieves a higher share of the public budget allocation, resources will not be increased in the medium-term for these hospitals. Instead, discussion is taking place to identify ways to promote managerial autonomy of public hospitals in order to improve their standard of service and efficiency. Other strategies that the government has identified to improve hospital services are to: (1) target expenditures on health to cost effective interventions aimed at the greatest reduction in the burden of disease; and (2) seek sustainable alternative methods of financing hospital services such as user fees, prepayment, and health insurance schemes.

Since the Bamako Initiative, Uganda has had a protracted debate regarding the policy of user fees at public health facilities. When the decentralization policy was implemented in 1993, the local governments were mandated to decide on financing options for the provision of health care in their districts. By 1997, user fees were implemented in public health facilities by the majority of districts. With guidelines on how to manage fees, health facilities with appointed community representatives were mandated to set fees for health care services in their locality and to use revenues generated to improve quality of services and staff morale. Non-governmental health facilities already were charging user fees and recovering higher percentages of their costs (MOH 1997).

2.2 Safe Motherhood

Prevailing high rates of fertility (6.8 births per woman) and limited access to quality maternal and neonatal care, have continued to expose Ugandan women to a high risk of mortality from pregnancy-related causes (MOH 1997). The main causes of maternal morbidity and mortality in Uganda include preventable/treatable causes such as abortion, hemorrhage, obstructed labor, sepsis, eclampsia, and anemia (MOH 1997).

In recognition of the magnitude of disease burden attributable to maternal and perinatal causes, the government has developed a safe motherhood program to spearhead the implementation of a mother-baby package (in the context of the overall national essential health package) that will respond most effectively to maternal and perinatal problems (MOH 1995b). The Ministry of Health has defined the essential safe motherhood package as the following: a) antenatal care; b) safe delivery; c) post-natal care including breastfeeding; d) emergency obstetric services such as cesarian section and post-abortion care services; e) prevention and treatment of infections in pregnancy including sexually transmitted infections; f) information and counseling on human sexuality and responsible parenthood; and g) prevention and treatment of infertility.

The main challenge to achieving safe motherhood goals still remains access to quality care. The number of trained service providers is insufficient and is concentrated at the tertiary level of care. Poor incentives for rural deployment of highly skilled human resources are largely responsible for the unfavorable staffing patterns in the primary health care network that serves the majority of the

population. The salary structure equivalent of the health care providers is one of the lowest in the region. The annual salary and benefits package for a doctor and midwife in the public sector are \$2400 and \$940 respectively. Although most providers are employed by the public sector, the majority operates *private-for-profit* clinical practice alongside their public roles to supplement their low salaries.

In regions of the country with relatively higher incomes, the private sector has established health services in the communities. Private midwives have set up maternity homes in their communities with the assistance of national and international donors who provide start-up capital and equipment. The government has also collaborated with the non-governmental sector in the planning and implementation of sectoral programs. Non-governmental organizations (NGO) providing services in underserved areas have been assisted with grants to help them make services available to the poor in an attempt to improve equity and alleviate poverty (MOH 1998). However due to the high disease burden on the poor families, the private sector has witnessed a stagnation of income due to non-payments of health care bills and have tended to avoid investments in essential but costly care options like equipment for cesarean sections.

3. Costing Issues

3.1 Justification for Costing Maternal Interventions

The overall purpose of this cost study of maternal health services is to provide information to policymakers on the actual costs of maternal health service delivery between facility levels and public and private providers in rural Uganda. This information serves a number of policy objectives. The poverty alleviation policy emphasizes the provision of high quality health services with a focus on the poor. Cost studies of maternal interventions assess how well resources are used in facilities and can provide policymakers with information on how to improve the efficiency of service delivery in its facilities.

The MOH is also pursuing a policy of working with and supporting the private sector through contracting/subsidizing some health services to encourage access to the poor. To work with the private sector effectively, it is important to assess its strengths and weaknesses through assessing cost differentials between public and private services across levels of the delivery system.

Other efforts to encourage alternative options for health financing, such as health insurance and other risk pooling schemes, will require well-costed maternal interventions. This information is also important to use to inform the public that the fees that they pay at present only cover a small percentage of the unit costs of the service.

3.2 Literature Review

Only a small number of studies have been conducted on the costs of maternal health services in developing countries, and very few have been done in sub-Saharan Africa. A wide range of methods have been employed in these studies to measure labor time inputs, use of drugs and supplies, and allocation of joint costs. Several studies (Rosenthal 1991, Family Health International [FHI] 1996, Levin 1997, Dmytraczenko 1998) have costed maternal health services in facilities through the “ingredient” approach. Using this approach, the costs of all of the inputs used in the delivery of a given service were added up and averaged to determine the unit cost of providing that service. In these studies, total cost per service ranges from \$3.35 to \$24.69 for antenatal care to \$55.83 to \$118.44 for cesarean delivery.

An important element in these studies is the measurement of personnel time and allocation methods for joint costs to services. Because the cost of labor is a key component of maternal health services and accurate measurement of both contact time and non-contact time is important to determine efficiencies in time use, studies in Ecuador (FHI 1996) and Bangladesh (Levin 1997) have conducted provider observation to determine their time allocation among activities. Studies in Bolivia (Rosenthal 1991, Dmytraczenko 1998) estimated personnel time use through methods such as recall from provider interviews. The disadvantage of the latter method is that the percent of non-contact

time (administrative and personal time as well as non-service days for meetings, training and vacation) for personnel cannot be accurately estimated.

Other studies have costed maternal health services through estimating aggregate costs based on assumptions of input requirements and unit costs (Maine 1991; World Bank 1993; WHO 1998). These studies estimate costs of inputs based on projected needs rather than actual practices and often calculate the costs of providing services at an “optimal” level.

The advantage to costing actual rather than “optimal” services is that recommendations can be made within a developing country context of financial constraints and mixed levels of utilization. The findings can be used to recommend efficiency improvements and to set prices for cost recovery and other financing schemes maternal health services.

As can be concluded from this short review, relatively few studies of the cost of maternal health care have been conducted in developing countries, and they have used a variety of methodologies. This study in a district of Uganda will attempt to fill part of this gap in cost studies of maternal health services in African countries through a careful investigation of costs of a package of maternal health services using provider observation methods.

4. Conceptual Framework

The costs of maternal health care can be divided into two types²: cost of supplying services and cost to the consumer.

The first type, supply costs, can be measured as the addition of all inputs used in the provision of a given service (total costs) or as the unit costs of delivering a single service (average cost). Total costs are useful to planners for budgeting purposes. Average costs allow comparisons to be made among services and among types of health facilities. Yet a third measure is marginal costs, the additional cost associated with delivering one more unit of service. This measure takes into account varying costs at different levels of output.³

The components, or inputs, that are used to provide health care services and that need to be costed are the following: personnel time spent providing the service, drugs and supplies, utilities, maintenance and repair, the cost of equipment, and other capital expenses. Some factors that affect provider costs include utilization or scale of service delivery and severity of illnesses. Other factors, which affect the costs of providing care primarily in a health facility, are case mix and treatment protocols for interventions.

Provider costs, whether total, average, or marginal, can be disaggregated into direct and indirect. Direct costs are those that are attributed to health service provision such as employee contact time spent on service delivery, costs of medicines, and costs of supplies. Indirect costs are the costs of inputs that support service provision and are often jointly involved in the provision of several services, such as utilities and maintenance. Joint costs are divided among services using one of several types of allocation methods.

The second set of maternal health costs are those incurred by the consumer. These costs include travel and waiting time, transport fees, service user fees,⁴ and other expenditures such as purchase of drugs and supplies by the consumer.⁵

² Even though these two types of costs are part of total costs, they are separated because of their different implications on financing.

³ Marginal costs cannot be calculated in this study because data were only collected at one point in time.

⁴ It should be noted that the user fees may contain costs that are already included in costs to the provider.

⁵ This cost refers to those drugs and supplies that are purchased by clients outside of the facilities and are not part of the user fees.

5. Study Methodology

Six maternal health clinical interventions are costed in this study. Two are routine, high volume services: antenatal care and vaginal delivery. Four are interventions that address complications and emergencies that may arise during pregnancy, childbirth, and the postpartum period: cesarean section, post-abortion care, postpartum hemorrhage, and eclampsia. They were selected for the study due to their contribution to maternal mortality and morbidity and high costs of care. The six comprise most of those services in the Safe Motherhood Package of the Ministry of Health.

The study involved the collection of data on direct costs of providing maternal services such as personnel time, drugs, laboratory tests, and other supplies used in the intervention as well as indirect costs of service delivery such as administration overhead, utilities, transport maintenance, and supervision.⁶ Other data were collected on service quality in the facilities and of community providers in order to control for differences in costs. It should be noted, however, that because the study's main intention was to collect data on costs, only limited data were collected on quality.

5.1 Direct Costs

Direct costs include those of labor and materials (drugs and supplies).

5.1.1 Labor Costs

In order to obtain information on costs of labor within health facilities, time allocation studies were conducted. Personnel were observed for one week in each facility to determine contact time on maternal services of interest and related non-contact time, such as preparation, recordkeeping, and administration. The observation technique that was used to determine the distribution of employees' time among activities is known as randomized intermittent instantaneous observation. It involves observing an employee at three-minute intervals, and recording on prestructured forms the employee's activity at the instant of observation. The function categories included types of health services. Activities, on the other hand, specified procedures that were performed during services (e.g., taking client history, treatment, and counseling) as well as non-contact time such as administrative and personal activities. Using the total number of observations of an employee, the percent of observations doing a specific activity or function is calculated and multiplied by the employee's salary to obtain the labor costs for the specific activity or function.

Observations of different workers are randomized, taking into account the desired frequency of observation. The employees that perform the most diverse and complex activities are observed more frequently so that less common events are more likely to be recorded. For example, a midwife might

⁶Because insufficient data were available on capital costs, these were not calculated in the study.

be observed more often than a nursing aide. Personnel interviews were also conducted to determine estimates of non-contact time such as vacation, sick leave, and public holidays.

In order to obtain information from community providers, interviews were conducted with the providers about the amount of time they spent delivering maternal health services, including both contact and related administrative time. Recall data was considered to be preferable than observation because of the small likelihood of observing an event.

Recurrent costs include drugs and supplies routinely used by the TBA or midwife to provide each service. Equipment and other capital costs were negligible and are not included in these estimates.

When activities were not observed because they rarely occurred, such as in the case of obstetrical emergencies, recall data on time use was used to estimate time costs.

5.1.2 Drug and Supply Costs

After reviewing alternative methodologies for the estimation of direct costs for drugs and supplies, the investigators adapted the Mother-Baby Package Costing approach (WHO 1998) for calculating these costs.

The methodology for estimating direct material costs involves interviewing health providers to ascertain which lines of treatments are followed in the course of a given intervention, and the percentage of clients who receive each line of treatment. To obtain an estimate of the total cost of delivering an average intervention, such as an antenatal visit, the costs of individual lines of treatment, such as a tetanus toxoid vaccine or folic acid supplements, are aggregated using the percentage of clients receiving that treatment as the weighting factor. Table 1 provides an illustrative example.

Table 1. Modified Form for Collecting Data on Drugs and Supplies

Code*	Description of Treatment Line	Threat of Miscarriage	Abortion in Course	Sepsis
L	Blood group test	0%	50%	100%
L	Hemoglobin test	0%	80%	100%
M	Blood, one unit	0%	15%	67%
M	Aspirin, tablets 300 mg	0%	0%	0%
M	Gentamicin 40 mg/ml, injection 2ml	0%	0%	33%
M	Ampicillin, injection 1g	0%	0%	67%
M	Ampicillin, tablets 500mg	40%	100%	100%
M	Crystalline penicillin 1MIU	0%	50%	100%
M	Ergometrine maleate, 0.5mg/ml	0%	100%	100%
M	Oxytocin 5 IU/ml	0%	50%	33%

*L=laboratory test M=medicine

The cost of each line of treatment was calculated by multiplying the cost of a single dosage by the number of dosages prescribed in a day and then again by the number of days required to treat a given ailment. Uganda-specific protocols were used in determining dosages. Prices were obtained

from the National Medical Store or the Joint Medical Store, respectively, depending on whether the facility in case was public or non-governmental.

The protocol was modified to gather information more effectively in the field. When an intervention was subdivided into the various diagnoses it encompasses (e.g., in the case of abortion complications: threat of miscarriage, abortion in course, and sepsis), providers were better able to quantify the number of clients receiving a given line of treatment for the clinical condition specified. The data collection instrument was, therefore, redesigned to reflect the clinicians' diagnostic approach. This meant that each institution ended up with its own spreadsheet that differed from that of other institutions not only by the percentage of clients receiving various lines of treatment but also by the actual treatments being prescribed. A simplified version of the questionnaire is shown in Table 1.

Unit costs for each diagnostic subcategory were then aggregated at the analysis stage of the work to generate an average unit cost for the intervention as a whole. The percentage of clients admitted under each subcategory was used to weigh that diagnosis's contribution to the intervention's total cost.

5.2 Indirect Costs

Indirect costs include costs of labor and other inputs that support the maternal health service, such as utilities and maintenance, but were not directly involved in service provision. Indirect labor costs are divided into those of personnel directly involved in maternal health care, and other personnel that provide support services for maternal health care. The costs of personnel directly involved in maternal health care were divided into non-contact time (e.g., administrative and personal activities) and non-working days (e.g., meetings, training, and vacation). The costs of other administrative and support personnel such as clerks, administrators, accountants, lab technicians, and cleaners were also calculated by allocating the percentage of their time spent on maternal health care services to specific maternal services.

Non-labor indirect costs that were considered include recurrent costs such as expenditures on maintenance, utilities, rent, and food. Information on recurrent indirect costs was abstracted from facility records.

While some data on equipment and capital investments were collected, this information was insufficient to calculate actual costs. In order to generate annualized capital costs, a more detailed inventory of existing equipment would be required. Nonetheless, this data is useful as an indicator of structural differences between facilities. Therefore, a qualitative description of the data is presented in the section on service quality.

5.2.1 Methods of Allocation of Indirect Costs

Distinct methods were used to allocate the following indirect costs to individual services: (1) non-contact time of maternal health personnel; (2) time of support personnel that only work on maternal health care services, but were not observed during the time allocation study; and (3) general administrative and support personnel and other types of indirect costs.

The cost of non-contact time and non-working days of maternal health personnel was allocated to each service according to the percentage of service time spent on each maternal health activity. For example, if a third of a midwife's contact time was spent on antenatal care, then that portion of her non-contact time would be allocated to this activity.

The cost of support personnel that provide maternal health care services full-time but whose time use was not observed was allocated to each service by taking the volume of that service as a percentage of the total number of maternal health services, weighted by the length of time required to provide each maternal health activity. The rationale for applying this allocation method is that resource use is positively associated with the average length of time required to deliver care. For example, if cesarean section patients spend an average of eight days at the facility and there are 100 patients (i.e., 800 patient-days), then the percentage of a nurse aide's time that will be allocated to cesarean section will be 800 patient-days divided by the total number of maternal health patient-days. This method avoids the pitfall of allocating a disproportionate amount of indirect cost to high volume, non-resource intensive activities such as antenatal care.

The percent of total patient-days spent on each type of activity provided at the facility (including non-maternal health services) was also used to allocate the cost of general administrative and support personnel as well as other indirect costs such as maintenance activities to individual service.

5.3 Measures of Quality

Measures of service quality are included in the study so that cost differences between facilities could be explained. However, since this study was not designed to examine issues of quality in a comprehensive way, and information on process indicators of quality is incomplete, the assessment of service quality is limited. Measures of quality in the study include a combination of structural and process indicators.⁷

Structural service quality is a measure of the extent to which a provider has sufficient equipment and material as well as training to carry out responsibilities adequately. Process service quality in this study measures the extent to which the provider follows standard guidelines, given that the structure is in place. Structural indicators for health facilities included availability of drugs, equipment, and personnel. This information was collected through walk-throughs of facilities with a structured checklist and included the following variables: facility size and space, general cleanliness, availability of key supplies and medicines, availability of standard equipment, and existence and use of systems such as standard treatment protocols, partographs, and recordkeeping.

⁷ Outcome indicators of quality were not assessed because this information was not collected.

Process indicators include measures of compliance to guidelines in treatment protocols and client satisfaction. The former is measured through determining the procedures that were adhered to in maternal health interventions when materials were available at the facility. Another measure of process is client satisfaction, which was captured through exit interviews with clients.

5.4 Client Costs

Using facility-based client exit interviews administered over the course of one week, the average cost to the client for maternal health services is estimated. In addition to questions about direct costs to the patient, such as user fees, drugs, supplies, and food related to the visit, questions were asked about travel and waiting time as these can be significant indirect “costs” to the patient. In order to compare client costs to satisfaction, clients were asked to rate the service they had just received in terms of privacy/confidentiality, attitude of health workers, and overall impression with the visit. They were also asked to provide an opinion on services at the facility could be improved. Cost recovery rates were calculated using the average user fees paid per service compared to the average cost of the service in each facility.

5.5 Service Volume Data

Information on service volume in each facility was available for the 12 months of 1997. The data was collected by type of service and included maternal health services as well as other health services provided at the facility.

6. Data Collection

Costing of maternal interventions was undertaken in one of Uganda's 45 administrative districts. Masaka, located approximately 60 miles southwest of Kampala, has a total population of 839,000 people. The population is 90 percent rural, with peasant farming employing 72 percent of the total work force. Health services are considered of acceptable quality and sufficient demand exists for them. However, access to health facilities is limited, with only about 49 percent of the district population living within five kilometers of a facility. In addition, only about 30 percent of childbirths are attended by trained health providers.

In recognition of the various levels of care that deliver safe motherhood interventions, the study focused on health centers, hospitals, and community providers. Masaka District has one public hospital, one mission hospital, several health centers, and community practitioners. The selection criteria for health facilities included high volume service, acceptable quality of maternal services offered, and availability of good financial records (see Table 2). Kinoni and Kyamulibwa health centers and Masaka and Kitovu hospitals were selected to represent, respectively, public and non-governmental facilities. Community-level costing included 17 private midwives and 20 TBAs.

Data collection instruments were developed to collect the relevant data as outlined above. A multi-disciplinary team of social scientists, economists, and clinicians was constituted and trained for data collection. A pre-test of the instruments was conducted at Rubaga Hospital, an NGO hospital in Kampala, before implementing the study in Masaka District. The data were collected during May-June 1998.

The two hospitals provide all maternal health services, including care for common conditions (antenatal care, vaginal delivery, cesarean section, and post-abortion care) as well as treatment of less common, life-threatening obstetrical complications (postpartum hemorrhage and eclampsia). Services provided in the health centers include antenatal care, vaginal delivery, and limited treatment of post-abortion complications and postpartum hemorrhage. Community practitioners provide only routine services, i.e., antenatal care and vaginal delivery.

The data collection on time allocation of health providers in health centers was relatively simple since all maternal health services took place in one location, and only involved determining which health personnel were most essential in the provision of services. In the hospitals, however, maternal health services were provided from three separate locations: antenatal care from a public health unit or clinic area; vaginal delivery, post-abortion, and obstetrical complication services at maternity wards; and cesarean sections at operating theaters.

Table 2. Sample Size of Facilities for Data Collection

Facility/Service	Services Observed	Average Number of Services per Month (Based on Service Records)	% Total Patient-days for Maternal Health
Public Hospital			
Antenatal Care	2 sess. w/ 20+ clients	458.00	8.7 %
Vaginal Delivery	10	83.00	
Cesarean Section	3	46.00	
Post-abortion Complication	4	20.50	
Postpartum Hemorrhage	0	4.40	
Eclampsia	0	0.40	
Mission Hospital			
Antenatal Care	2 sess. w/18 clients	138.5	9.4%
Vaginal Delivery	8	40.0	
Cesarean Section	1	17.0	
Post-abortion Complications	4	13.0	
Postpartum Hemorrhage	0	1.2	
Eclampsia	0	0.1	
Public Health Center			
Antenatal Care	4 days w/27 clients	136.0	7.4%
Vaginal Delivery	1	14.7	
Post-abortion Complications	0	0.0	
Mission Health Center			
Antenatal Care	3 days w/10 women	19.0	4.5%
Vaginal Delivery	0	7.5	
Post-abortion Complications	1	1.0	
Private Midwives (17)			
Antenatal Care	NA	49.0	NA
Vaginal Delivery	NA	17.0	NA
Traditional Birth Attendants (20)			
Antenatal Care	NA	16.2	NA
Vaginal Delivery	NA	5.4	NA

* Patient-days are calculated by multiplying total number of services provided by average length of stay.

The setup for antenatal care services were somewhat different in the two hospitals. In the public hospital, the services were provided from a public health unit that had its own midwives and provided services five days a week. The majority of services provided from this unit were antenatal care but also included postnatal care, family planning services, and sexually transmitted diseases (STD)/HIV counseling. In the mission hospital, on the other hand, antenatal care services were provided from clinics two days a week with staff from the maternity ward providing services.

Observation of health providers in hospitals included four eight-hour periods during daytime shifts and two four-hour periods during evening shifts in the maternity ward as well as two antenatal clinic sessions. At least one cesarean section was observed in the operating theater as well. In the health centers, four eight-hour shifts were observed.

Health facility providers were also interviewed on their time use inside and outside of the facilities. Indirect costs were obtained through abstracting the expenditure records for utilities, maintenance, and other overhead costs, including support supervision and administrative personnel.

Data on community providers, private midwives operating the private maternity homes, and trained TBAs, were also collected. Some 17 private midwives and 20 TBAs were interviewed to determine the average number of services provided each month and their costs of providing services (e.g., drugs, supplies, rent, license, etc.).

Table 3. Data Sources

I. Cost Component	Data Collection Technique	# of Providers
Labor	Randomized intermittent instantaneous observation (Provider Interviews)	Four facilities Four facilities and 37 community practitioners
Salaries and Benefits	Record review	Four facilities
Drugs and Supplies (materials)	Provider interviews	Four facilities and 17 private midwives
Maternal Health Service Utilization	Service record review Provider interviews	Four facilities 20 TBAs and 17 private midwives
Maintenance and Utility Costs	Record review	Four facilities
Supervisory Costs	Interviews with supervisors	Four facilities
II. Measures of Service Quality	Data Collection Technique	# of Providers
Availability of Equipment and Supplies	Facility walkthrough	Four facilities and 17 private midwives
Treatment Protocols	Intervention observation	Four facilities
Client Satisfaction	Client exit interviews	Four facilities

Exit interviews were conducted with outpatient and inpatient clients at the hospitals and health centers. Forty outpatients and nine inpatients were interviewed in the public hospital, while 36 outpatients and eight inpatients were interviewed in the mission one. At the health center level, 20 outpatients and one inpatient were interviewed at the public facility, while 13 outpatients and one inpatient were interviewed at the mission health center.

7. Limitations of the Study

This study is part of a three-country cost comparison. Due to the funding constraints of this widespread project, the Uganda sample was taken from only one district, Masaka. It should be noted that Masaka District differs somewhat from other districts in Uganda, since the health facilities receive funding from the USAID/Delivery of Improved Services for Health Project.

In addition, the sample size of the study is small: two hospitals, two health centers, 37 community providers and 128 clients. Because the facility sample size is small, no statistical tests of the costs of providing services were conducted. It is a case study rather than a representative sample.

Finally, since observation of health personnel only occurred during one week in each facility, few obstetrical complications were observed. While some cesarean sections and post-abortion complications took place in the hospitals, no cases of postpartum hemorrhages and eclampsia were observed. Consequently, the cost of personnel time for these complications is estimated from recall data.

8. Results of the Study

This section presents the results of the cost analysis, including the results of the estimation of costs of frequently provided services, of selected obstetrical complications, and of costs of private midwives and TBAs; and the results of the quality assessment of service provision. It also discusses the results of estimation of costs to the clients of obtaining maternal health care, as well as findings on their satisfaction.

8.1 Direct Costs of Services in Facilities

This section discusses the results of the estimation of direct costs for commonly provided maternal health services selected for this study. The calculation of labor costs for these services is based on observation techniques rather than recall techniques.⁸

Total direct costs of the four maternal health care services range from \$1.56 for antenatal care in the public health center to \$63.83 for a cesarean section in the mission hospital (Table 4). The variation in costs is explained by differences in the use of personnel and materials (drugs and supplies) in the provision of services. Direct costs are lower for routine services such as antenatal care and vaginal delivery services (\$1.56 to \$17.56), where the use of drugs is low, and higher for cesarean and abortion services (\$24.55 to \$63.83), where considerable use of drugs is required.

Table 4. Unit Direct Costs by Type of Service and Facility (U.S. dollars)

Service	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Antenatal Care				
Labor	0.82	0.20	0.53	2.03
Materials	1.48	4.10	1.03	1.60
TOTAL	\$2.30	\$4.30	\$1.56	\$3.63
Vaginal Delivery				
Labor	13.25	9.55	0.56	4.82
Materials	4.31	5.28	1.18	4.48
TOTAL	\$17.56	\$14.83	\$1.74	\$9.30
Cesarean Section				
Labor	12.12	10.68	NA	NA
Materials	38.39	53.15		
TOTAL	\$50.51	\$63.83		
Post-abortion				
Labor	8.60	10.65	NA	6.51
Materials	19.43	36.72		6.18
TOTAL	\$28.03	\$47.37		\$12.69

Note: The costs of care to the newborn was included in the cost of vaginal and cesarean deliveries.

The variation in the cost of personnel time for services is considerable and reflects the amount of time spent on specific services, levels of personnel that provide services, staffing patterns of

⁸See Annex A for a comparison of labor costs based on observation and recall methods.

maternal health providers, and wage rate differentials. As noted above, labor costs are higher for services that require large labor inputs such as vaginal delivery and obstetrical complications, which require the time of specialists and doctors.

Staffing patterns also affect labor costs. Labor costs are relatively high in the public hospital where the number of midwives (25) who provide maternal health services is large, given the number of services that were provided at the facility. (See Table 2 for a comparison of service volume among facilities and Table 12 for a description of staffing patterns.) Labor costs are also relatively high in the mission health center where a doctor provides routine services, rather than midwives as in the case of the other providers. On the other hand, labor costs are low at the public health center because of its small staff—only two midwives to provide antenatal care and one to provide delivery services.

Wage and benefit differentials also have a small effect on labor costs, since they vary by level of facility and public and private facilities. The study found that the public hospital pays the highest differential, followed by the mission hospital, public health center, and mission health center.

Because of the costly nature of drugs in maternal health care, material costs comprise a larger percentage of direct costs than do labor costs for most services. In fact, material costs are as much as three to four times greater than labor costs for some services. A general exception to this is the provision of services such as vaginal delivery where, however, labor costs were greater than those of materials, because fewer drugs are required. A specific exception found by the study was the mission health center, where labor costs are higher than drug costs because of the use of a physician to provide routine services.

Material costs range from \$1.03 to \$53.15 for the maternal health services. The differences can be attributed to two factors: specific treatments prescribed within each intervention and variations in input prices. The percentage of clients receiving a given line of treatment is a stronger explanatory variable for differences in the cost of materials. For obstetrical complications, treatments often are more comprehensive at the hospital level than at the health center level and material costs are higher.⁹ For example, for treatment of postpartum hemorrhage, the hospitals give blood transfusions to patients in some cases while the health centers would not.

While input prices of materials affect costs, they explain less than 10 percent of overall material cost differentials. The differentials occur because the prices at the Joint Medical Stores, which are used by the NGOs in the sample, are generally higher than at the National Medical Stores that supply public facilities.¹⁰

When looking at direct costs by facility type, the study found that labor costs are higher for hospitals than for health centers for all services except antenatal care at the mission health center. One explanation is that more personnel are involved in providing services in hospitals than at health centers. (See section 9.6.1, on staffing patterns of health providers.) In addition, hospitals have more

⁹For this reason, it is important that efficiency comparisons should not be made between hospitals and health centers for treatment of obstetrical complications.

¹⁰The notable exceptions was cesarean section. In the cesarean sections, variations in input price were significant, accounting for 75% of the cost differential for drugs and supplies between public and private hospitals.

higher-level personnel, who receive higher salaries and benefits, than do health centers. For antenatal care services, hospitals' lower labor costs probably reflect efficiency differences in service delivery. For example, because the hospitals have a large clientele that attends antenatal clinics at scheduled times, they can provide services more efficiently than can health centers.

Higher material costs at hospitals vis-a-vis health centers can be explained by the higher percentage of clients receiving laboratory exams and drugs at hospitals. Costs at the mission hospital exceed those at the public hospital because of the mission hospital's more extensive treatments for antenatal morbidities and delivery complications, and heavy use of laboratory examinations. For example, the study shows that the costs for drugs and supplies for the treatment of post-abortion complications and cesarean delivery are, respectively, 47 percent and 39 percent higher at the mission hospital than at the public hospital.

When looking at public vis-a-vis private providers, the study found no consistent pattern in labor costs of maternal health services. Although a smaller—but adequate—number of personnel provided services in private than in public facilities, many are of a higher salary level, driving up the costs, as in the case of the private health center. However, while medical officers are paid 34 percent more in the private (not-for-profit) sector, nurses and nursing aides are paid 40 percent less (Table 5).

Table 5. Comparison of Salaries in the Government and Private Not-for-Profit Sectors (Ugandan schillings with U.S. dollar equivalents)

	Government Sector	Private Not-for-Profit
Medical Officer	366,000 (\$318)	489,000 (\$425)
Register Nurse	196,000 (\$170)	122,000 (\$106)
Enrolled Nurse	166,000 (\$144)	92,000 (\$80)
Nursing Aide	93,000 (\$81)	55,000 (\$48)

Source: MOH Health Planning Unit

8.2 Costs of Selected Obstetrical Complications in Facilities

The study also calculated the direct costs of the obstetrical complications of postpartum hemorrhage and eclampsia (Table 6). These complications were not observed due to the low frequency of cases treated at the hospitals. Because treatment was not observed, the labor costs were calculated based on recall data of the amount of time spent on provision of this service.

**Table 6. Costs of Selected Obstetrical Complications in Four Facilities
(in U.S. dollars)**

Services	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Postpartum Hemorrhage				
Labor	10.18	46.25	2.35	4.41
Materials	25.76	52.26	10.81	13.08
TOTAL	35.91	98.51	13.16	17.49
Eclampsia				
Labor	38.58	111.15	NA	NA
Materials	13.33	19.50		
TOTAL	51.91	130.07		

The direct costs of treatment of postpartum hemorrhage range from \$13.16 in the public health center to \$98.51 in the mission hospital. Costs are two to four times higher in the hospitals than the health centers due to a more comprehensive line of treatment for this condition. In addition, both labor and material costs are higher in the mission hospital than in the public hospital due to the use of a different line of treatment as well as more time of specialized labor.¹¹

The treatment of eclampsia is the most costly intervention, due to high labor costs. Direct costs of treating this condition range from \$51.91 to \$130.07. The higher costs in the mission facility are due to higher costs of labor inputs of skilled personnel.

The composition of the costs differs between the two obstetrical complications. For postpartum hemorrhage, the material costs comprise the largest percentage of total costs—from 53 percent in the mission hospital to 82 percent in the mission health center. This is due partially to the more costly drugs required to control this complication, partially to its shorter length of stay. Eclampsia, on the other hand, requires a significant time input of skilled personnel as well as a long length of stay (10–14 days); consequently, direct labor makes up the greatest percentage of total. In addition, the percentage of total maintenance and utilities associated with the long length of stay also increase its total cost.

It should be noted that these complications are rarely seen because many cases never reach the hospital. This problem of inadequate access is attributable to lack of emergency transport and poor roads, and to economic barriers. If transport and other barriers could be improved/mitigated, it is likely that the number of cases with complications would increase. This more cost-intensive case mix would raise the total costs of providing maternal health services at hospitals. The extent to which the hospitals would be adversely affected would depend on cost recovery ratios and cross-subsidization from other services. In addition, it would have some implications on the provision of services from health centers and hospitals.

¹¹The time spent on postpartum hemorrhage and eclampsia by specialists may have been overestimated since they were based on recall.

8.3 Indirect Costs

Indirect costs (Table 7) include the costs of non-contact time of health personnel, including time spent on administration and personal activities, as well as days spent outside of the facility for meetings, based on the percent of total patient-days for each activity. Other indirect costs include the cost of supervisory and support personnel and the cost of maintenance and utilities. These costs are an indicator of the service mix and size of facility. These costs tend to be larger for higher-level facilities.

Table 7. Unit Indirect Costs of Commonly Provided Maternal Health Services in Four Facilities (U.S. dollars)

Services	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Antenatal Care				
Labor Non-Contact Time*	1.39	0.40	0.55	2.34
Other Personnel**	0.03	0.05	0.01	0.08
Maintenance and Utilities	0.46	0.45	0.08	0.38
TOTAL	\$1.88	\$0.90	\$0.64	\$2.80
Vaginal Delivery				
Labor Non-Contact Time	13.84	13.00	0.49	3.67
Other Personnel	0.17	0.53	0.04	0.42
Maintenance and Utilities	2.33	4.53	0.41	1.92
TOTAL	\$16.34	\$18.06	\$0.97	\$6.01
Cesarean Section				
Labor Non-Contact Time	2.64	2.39	NA	NA
Other Personnel	1.35	2.12		
Maintenance and Utilities	18.61	18.13		
TOTAL	22.60	\$22.64		
Post-abortion				
Labor Non-Contact Time	5.59	8.63	NA	4.97
Other Personnel	0.12	0.17		0.41
Maintenance and Utilities	1.69	1.43		1.90
TOTAL	\$7.40	\$10.23		\$7.28
Postpartum Hemorrhage				
Labor Non-Contact Time	2.22	3.66	3.80	8.02
Other Personnel	0.84	1.33	2.87	2.08
Maintenance and Utilities	11.63	11.33	2.06	9.52
TOTAL	14.69	16.32	8.73	19.62
Eclampsia				
Labor Non-Contact Time	5.74	3.69	NA	NA
Other Personnel	0.86	2.66		
Maintenance and Utilities	23.86	22.66		
TOTAL	30.46	29.01		

Note: The costs of care to the newborn was included in the cost of vaginal and cesarean deliveries.

* The non-contact time is likely to be an underestimate since it does not include non-contact time of specialists and doctors.

**Support and shared staff (e.g., lab personnel, guards)

Indirect costs in general were higher at hospitals than at health centers.¹² This is associated with the level and number of medical personnel providing services as well as a more complex service mix.

While indirect costs are absolutely higher in hospitals, the proportion of indirect costs to direct costs is lower at hospitals. Indirect costs are, on average, one-third of direct costs of hospitals and two-thirds of direct costs of health centers. This is because more materials are used at these facilities, i.e., their direct costs are relatively higher. Other reasons are the high cost of the non-contact time of the medical officer at the mission health center and the relatively lower utilization at the health centers.

The type of service provided affects the composition of the indirect costs. For services that require a short stay in the facility (e.g., antenatal care and vaginal delivery), the bulk of the indirect costs are costs of non-contact time of labor and other personnel. For services that require a longer stay (e.g., cesarean section) maintenance and utilities comprise a higher percentage.

While the cost of personnel other than medical staff is a small proportion of total indirect costs for routine services, it is more substantial for cesarean sections, due to clients' longer length of stay at the facilities. The proportion of total indirect costs for "other" personnel ranged from 1 percent to 33 percent and 1 percent to 10 percent for health centers and hospitals, respectively.

The differences between indirect costs in public and mission facilities are relatively small at the hospital level, more substantial at the health center level. This reflects staffing differentials as well as higher maintenance and utility costs in the mission health center.

8.4 Total Costs of Providing Services in Facilities

When the total costs of delivering commonly provided services are examined, the interpretation of the results does not change significantly. The total cost of services (Table 8) ranges from a low of \$2.21 for antenatal care at the public health center to a high of \$159.66 for treatment of eclampsia at the mission hospital. The costs are relatively low for routine services and range from \$2.21 to \$33.90, but are more costly for obstetrical emergencies that are conducted in most cases at the hospitals. In general, maternal health services cost less at the health centers than at the hospitals. However, the differences in cost of antenatal services between levels is not large.

The differences between the costs of public and mission facilities were more striking. The costs were on average 69 percent greater for the mission hospital than the public, and 30 percent greater in the mission health center than the public.

¹²As explained earlier in the section, antenatal care in health centers is due to the use of a doctor to provide these services in the mission health center.

Table 8. Total Costs by Type of Service and Facility (in US dollars)

Services	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Antenatal Care	\$4.18	\$5.20	\$2.21	\$6.43
Vaginal Delivery	\$33.90	\$32.89	\$2.71	\$15.31
Cesarean Section	\$73.10	\$86.48	NA	NA
Post-abortion complication	\$35.43	\$57.60	NA	\$19.97
Postpartum Hemorrhage	\$50.63	\$114.83	\$21.89	\$37.11
Eclampsia	\$82.37	\$159.66	NA	NA

8.5 Costs of Community Practitioners

The costs of community practitioners were estimated for both 17 private midwives and 20 traditional birth attendants. The findings on the costs of private midwives were limited to the costs of materials, rent and additional personnel. Labor costs were not calculated for private midwives because the information for calculation of net profit for these solo practitioners was incomplete. Although information on the use of drugs was collected for these workers and information on unit costs of drugs was available, the percent mark-up added to the drug fees could not be determined.

8.5.1 The Costs of Service Provision by Private Midwives

Table 9 shows the unit cost of inputs used by the private midwives for antenatal care and vaginal delivery. Because it is possible that private midwives overreported their use of syndromic management of STDs during antenatal care, the costs of materials are presented both with and without use of this treatment. Without adding in own-labor costs, the most costly input of service provision for private midwives is materials (over 50 percent of non-labor costs). The next most costly input is other personnel costs, which comprise 9 percent to 22 percent of the costs of providing antenatal care and 20 percent of the costs of providing care for vaginal deliveries.

The extent to which syndromic management of STDs takes place has an important effect on costs since material costs were found to quadruple if these treatment costs were added.¹³ When the unit costs of non-own-labor inputs of service provision (these costs include the time of other personnel but not of the private midwife) are compared to those of facilities, assuming no syndromic management of STDs, they fall between those of the public health center and the mission health center. However, if syndromic management of STDs is assumed, the unit costs for antenatal care would be higher than the unit cost at any facility. Considering the high costs of this treatment as well as recent literature that indicates the limited efficacy of this type of syndromic management, it may make sense to limit its use (Mayaud 1998, Behets 1998).

The limited findings of the study on the unit costs of provision of maternal health services by private midwives suggest that a different methodology should be applied in the future to obtain

¹³ At the time of the study, private midwives were participating in a pilot project to improve the management of STDs and were probably providing more syndromic management than usual.

information to reflect the for-profit nature of this type of service provision. In addition, some observation of midwives should take place in order to determine actual drug protocols used.

Table 9. Cost of Services Provided by Private Midwives and TBAs

Services	Private Midwives	TBAs
Antenatal Care		
Labor	NA	0.96
Materials	0.71-3.01*	0.0
Other Personnel	0.31	0.04
Rent	0.07	0.0
License/Dues	0.03	0.0
TOTAL	1.39/3.42	1.00
Vaginal Delivery		
Labor	NA	3.02
Materials	3.10	0.82
Other Personnel	0.87	0.13
Rent	0.21	0.00
License/Dues	0.09	0.00
TOTAL	4.27	3.97

*Since it is possible that private midwives overreport their use of syndromic management of STDs, the material costs were estimated with and without this treatment.

8.5.2 Costs of Service Provision of Traditional Birth Attendants

The costs of the traditional birth attendants are low for antenatal care and reflect the fact that TBAs do not dispense drugs for this service. The TBAs have relatively few costs since only a few have assistants and their other expenses are minimal. The most costly input for the TBAs, consequently, is their labor. The total costs of providing delivery services were almost four times as high as antenatal care due to the higher labor cost.

The unit costs of TBA service provision (even with the cost of own-labor inputs) are lower than those of private midwives and TBA non-labor costs are lower than those of non-labor costs of the health centers.¹⁴ However, as noted in the section below on quality of care of providers, the drawback to this type of service delivery is that key drugs and supplies are not available.

8.6 Quality of Care of Providers

In assessing the relationship between quality and cost, certain aspects of quality are considered likely to affect average recurrent costs of services: provision of materials, use and maintenance of equipment, and staffing patterns. An assessment of the first two aspects, availability of materials and equipment, was conducted in the four facilities and for the community practitioners and is shown in Table 10.¹⁵

Table 10. Availability of Drugs and Equipment in Health Facilities

¹⁴Because labor costs were calculated differently for the health facility workers and private midwives, only non-own-labor costs should be compared.

¹⁵Although TBAs are included in this table, there is little discussion of them due to their limited stocks of essential drugs and equipment.

	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center	Private Midwives	TBAs
Key Drugs						
Antenatal Care*	3/3	3/3	2/3	3/3	83%	NA
Vaginal Delivery**	3/3	3/3	1/3	3/3	90%	
Cesarean Section.***	3/4	4/4	NA	NA	NA	
Other ****	1/3	3/3	0/3	2/3	59%	
Prescribed drugs received at exit by clients						
All drugs	51%	100%	43%	100%	NA	NA
Some drugs	20%	0%	57%	0%		
None	4%	0%	0%	0%		
Equipment						
Antenatal Care:						
Fetoscope	Yes	Yes	Yes	Yes	100%	55%
Blood pressure cuff	Yes	Yes	Yes	Yes	100%	0%
Adult weighing scale	Yes	Yes	Yes	Yes	71%	0%
Obstetrics:						
Working autoclave	No	Yes	No	Yes	65%	0%
Needle holder	Yes	Yes	No	Yes	65%	NA
Stitch scissors	Yes	Yes	Yes	Yes	71%	0%
Forceps (dissecting)	Yes	Yes	No	Yes	94%	NA
Baby weighing scale	Yes	Yes	No	Yes	65%	NA

* Key drugs for antenatal care were considered to be tetanus toxoid, ferrous sulfate, and folic acid.

**Drugs for delivery include paracetamol, dextrose and lidocaine.

*** The drugs for cesarean section include antibiotics, dextrose, oxytocin and diazepam.

**** Drugs for other procedures include oxytocin, diazepam, and hydralazine.

The access to drugs is better at mission facilities than at public. All of the clients at mission facilities stated that they received the drugs that they had been prescribed while only about half of the clients at public facilities indicated that they had. In fact, some stockouts occur in the public facilities, particularly in the public health center. While the public hospital has all of the essential drugs for antenatal care and vaginal delivery and most of the drugs for cesarean section, the public health center does not have 100 percent of the essential drugs for any of the services.

The private midwives have most of the drugs required for antenatal care and delivery and are better stocked than the public health center. However, only about 60 percent have the drugs required for obstetrical emergencies, indicating the importance of timely referral for these practitioners.

Table 11. Process Indicators by Health Facility

Process Indicator	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Lab tests for antenatal care	No	Yes	No	Yes
Lab work during post-abortion complication	No	Yes	NA	No

All of the facilities have essential equipment for antenatal care, although only 71 percent of the private midwives have an adult weighing scale. The two hospitals and the mission health center also have most of the equipment required for deliveries. The public health center and approximately a third of the midwives lack some of the essential equipment for deliveries.

A few process indicators of use of procedures during maternal health services were assessed for the health facilities when trained staff, drugs, supplies, and equipment were available. For example, laboratory tests were found to occur during antenatal care only in the mission health facilities but not in the public facilities, even though equipment is available. The findings indicated that, in the small number of process indicators of service quality, process indicators are better in the two mission facilities than in the two public facilities. However, more information is required to fully assess compliance to guidelines.

In conclusion, mission facilities were found to have higher structural quality than do public facilities. They have more key drugs and equipment and dispense more drugs than do public facilities. This finding agrees with the findings on direct costs in Table 4, where costs of drugs and supplies were found to be higher in mission facilities than in public facilities. Also, since the majority of private midwives have better stocks than the public health center for services other than antenatal care, their material costs are likely to be higher than that of the public health center (Table 4).

It should be noted that while it is possible to make inferences about structural quality from the availability of drugs and equipment, it is not possible to make inferences about efficiency of drug use using this data. Since observation of use of drugs was not conducted in this study and no information is available on the severity of illness or complication of cases being treated, it was not possible to draw any conclusions on whether overprescribing was taking place in facilities.

8.6.1 Availability of Personnel

Another aspect of providers that indicates whether resources are being used efficiently as well as whether quality services are being provided is facility staffing patterns. If resources are not used efficiently, costs will be higher. For example, if a facility is overstaffed for the number of clients that it receives, then the labor costs will be high. In addition, if the minimum number of staff necessary to provide services is not available at the facility, the quality of service provision will be inadequate.

Table 12 shows the staffing patterns of providers in Masaka District. If the standard that a nurse/midwife should be able to provide approximately 1,000 antenatal cases per year and attend 150–200 deliveries per year in a hospital setting is applied, then the public hospital is overstaffed; the mission hospital is more in line but still somewhat overstaffed. This information agrees with the findings on the costs of labor since these were higher for the public hospital than at the mission hospital.

Table 12. Staffing Patterns by Facility

Facility	No. of Services Provided per Year (1997)	No. of Midwives	No. of Doctors/ Specialists	No. of Nursing Aides	No. of Lab Workers	No. of Midwives per 150 Deliveries
Public Hospital	5500 ANC 995 Vaginal deliveries 551 Cesarean sections	25	1 doctor 1 specialist	4	2 lab technicians	3.8
Mission Hospital	1662 ANC/year 471 Vaginal deliveries 205 Cesarean sections	7	2 specialists 1 doctor	2	5 lab assistants 2 lab technologists	2.2
Public Health Center	1634 ANC 232 Vaginal deliveries	2	0	0	0	1.3
Mission Health Center	232 ANC 91 Vaginal deliveries	1	1 doctor	1	1 lab assistant	1.7
Private Midwives (17)	300 ANC/year* 108 Vaginal deliveries*	1	NA	1**	NA	1.4
TBAs (20)		1 TBA	NA	0**	NA	

* Median service provision

** Fifteen of the 17 midwives had an assistant, while only three of the 20 TBAs had an assistant.

The health centers have lower service provision and correspondingly fewer staff. Given the lower service provision, the staffing at the public health center appears to be reasonable while the mission health center could probably employ a second midwife to deliver routine services when the other midwife is not available. It could more efficiently use its doctor for more complicated services.

Although the staffing patterns of community practitioners cannot be compared to those of facilities, the midwives provided a median annual volume of 300 antenatal services and 100 deliveries. Most private midwives (88 percent) had an assistant while most traditional birth attendants (85 percent) did not have an assistant, but had smaller case loads.

Another criterion is the availability of laboratory personnel to conduct tests for maternal health care. Most of the facilities have varying levels of laboratory personnel, depending on their service load and mix of services. However, the public health center does not have a lab assistant to conduct tests for maternal health care.

8.6.2 Amount of Time spent on Non-Service Activities

Another issue that reflects how efficiently personnel time is used is the percentage of administrative and unoccupied time spent by health personnel at facilities. Table 13 shows the percentage of time that personnel spend doing administrative tasks and unoccupied. The time spent on administrative activities was considerable and ranged from 20 percent to 41 percent for registered midwives, the supervisors of the enrolled midwives, and from 10 percent to 23 percent for enrolled

midwives. This should be investigated to see if it can be reduced, particularly for registered midwives in hospitals.

The time that personnel spend unoccupied or engaged in personal activities is not as large and did not appear to be unreasonable. It comprises about 10 percent of the time in all facilities. The percent is slightly larger in mission facilities than in public facilities, but the difference is not large.

Table 13. Percent of Time Midwives Spent on Administrative Tasks and Unoccupied, by Facility

	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Registered Midwife				
Administrative	37%	41%	20%	NA
Unoccupied	11%	13%	9%	
Enrolled Midwife				
Administrative	11%	17%	23%	10%
Unoccupied	6%	10%	8%	10%

8.7 Client Costs

Data on user fees and other direct costs were collected from patients who received antenatal care services, those who had a vaginal or a cesarean delivery, and those who received post-abortion care services at health facilities. No patient receiving care for eclampsia or postpartum hemorrhage was captured during the interview period. Because of time and resource constraints, no patient interviews were conducted for private midwives or TBAs.

Table 14 summarizes by facility the average user fees paid, travel costs, other costs (including food and outside drugs and supplies associated with the visit), as well as average total cost paid by the client for each type of service. Because clients were interviewed before they left the facility, travel costs were assumed to be double the cost paid by the client to reach the facility. No travel costs for companions who accompanied the client to the facility are included. The italicized numbers in parentheses (N) designate the number of cases in the sample in each facility.

Average user fees paid in health facilities are lowest for antenatal care (\$.35–\$2.15 per service) and highest for cesarean section services (\$6.09–\$48.80). Fees generally are higher at the mission facilities; they are were four to eight times higher for vaginal and cesarean deliveries. It should be noted, however, that more drugs are provided to clients at these facilities (Table 10); thus, their clients incur few costs to fill prescriptions outside the facilities.

Although exit interviews were not conducted with clients of community practitioners, the practitioners reported on the fees that they charge. A wide range of fees are charged by private midwives and TBAs, with the median fees for antenatal care 5 percent to 10 percent of those for delivery services (Table 15).

Private midwives charge three to four times as much as TBAs for antenatal care and twice as much for vaginal delivery, suggesting a disincentive to use their services for lower-income clients. However, midwives are also better equipped and willing to provide drugs.

Table 14: Average Cost to Client by Service and Facility

	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Average Cost of Antenatal Care (<i>N</i>)	(40)	(36)	(20)	(13)
User Fees Paid	\$0.84	\$0.64	\$0.35	\$2.15
Travel Costs	\$0.83	\$1.26	\$0.56	\$0.00
Other Costs	\$0.04	\$0.16	\$0.07	\$0.64
Average Total Cost/Client	\$1.72	\$2.06	\$0.97	\$2.79
Average Cost of Vaginal Delivery (<i>N</i>)	(9)	(3)	(1)	(0)
User Fees Paid	\$4.35	\$18.26	\$0.70	NA
Travel Costs	\$3.83	\$4.06	\$0.52	NA
Other Costs	\$3.03	\$0.43	\$1.04	NA
Average Total Cost/Client	\$11.20	\$22.75	\$2.26	NA
Average Cost of Cesarean Delivery (<i>N</i>)	(1)	(4)	(0)	(0)
User Fees Paid	\$6.09	\$48.80	NA	NA
Travel Costs	\$3.04	\$5.00	NA	NA
Other Costs	\$4.09	\$5.43	NA	NA
Average Total Cost/Client	\$13.22	\$59.24	NA	NA
Average Cost of Post-Abortion Care (<i>N</i>)	(0)	(1)	(0)	(1)
User Fees Paid	NA	\$48.70	NA	\$15.65
Travel Costs	NA	\$0.00	NA	\$0.00
Other Costs	NA	\$0.00	NA	\$0.00
Average Total Cost/Client	NA	\$48.70	NA	\$15.65

Note: The number in *italics* (*N*) designates the number of cases in the sample in each facility.

**Table 15. User Fees Charged by Community Practitioners
(Uganda schillings with U.S. dollar equivalents)**

	Private Midwives	TBAs
Antenatal Care		
Median	USH 1000 (\$0.87)	USH250 (\$0.22)
Mean	USH 1208 (\$1.05)	USH 395 (\$0.34)
Range	USH 50-3000 (\$0.04-\$2.61)	USH 0-2000 (\$0.0-\$1.74)
Vaginal Delivery		
Median	USH 10000 (\$8.70)	USH 4300 (\$3.74)
Mean	USH 8971 (\$7.80)	USH 4155 (\$3.61)
Range	USH 1000-15000 (\$0.87-\$13.04)	USH 500-10000 (\$0.43-\$8.70)

When the service fees reported by private midwives were compared to those at facilities, they were between those of the two health centers and similar to those of the public hospital for antenatal care, and greater than those at the public facilities but similar to those of the mission health center for delivery services.

8.7.1 Waiting Time for Antenatal Care Services

The study asked patients how long they had to wait before they obtained antenatal care. Reported waiting times are remarkably similar in all the facilities, ranging from 18 to 27 minutes. They are

lower in hospitals (21 minutes in the public hospital and 18 minutes in the mission hospital) than in health centers (25 minutes in public health center and 27 in the mission health center). There is no pattern in waiting time between public and mission facilities. Interestingly, in response to a later question regarding how patients would suggest making improvements, no patients at the mission health center (the facility with the longest reported waiting time) suggested less waiting time as a desired improvement in service quality, while patients at the other three facilities did.

8.7.2 Travel Time

Patients were asked how long it took them to travel one way to the facility from their home via the mode of transport they had used that day. Average round trip travel times for all services were reported to be 46 minutes at public health center and 72 minutes at the three other facilities. Table 16 provides a summary of round trip travel time by type of service.

Table 16: Average Round Trip Travel Time by Type of Service and Facility

	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Antenatal Care	37	34	21	39
Vaginal Delivery	25	17	60	NA
Cesarean Delivery	45	85	NA	NA
Post-abortion Complications	NA	0	NA	0
All Services	36	36	23	36

A shorter travel time to the public health center for antenatal care services may indicate that clients are only willing to travel to this health center if the distance was small. On the other hand, clients from all over the district are willing to travel to district and referral hospitals, because of the unique services they offer. The willingness to travel further to the mission health center for antenatal care services may be explained by the recent appointment of a doctor, assuming that clients would travel further for care by a qualified physician. The study did not consider the location of the facility relative to the general population.

Travel time is considered to be a cost to the consumer and affects their decision to choose a facility. However, the sample size in this study is too small to establish the relationship between use and distance. Further research beyond the scope of a client interview is necessary to fully explain the relationship between the time clients spend traveling to each facility and their choice of facility.

8.7.3 Client Satisfaction

The exit interview included several questions regarding client satisfaction. Clients were asked to rank privacy/confidentiality, attitude of health workers, and their overall impression of their visit as good, satisfactory, or poor. Clients were then asked how the services they received could be improved.

In general, on the three-point scale of good (3), satisfactory (2), and poor (1), the majority of patients in the four facilities reported that they are satisfied with the privacy/confidentiality received

during their visit and with the attitude of the health worker.¹⁵ Overall impressions are also satisfactory. However, client satisfaction is higher in the mission hospital and health center. Clients at the mission health center, in fact, rate all aspects of their visit in the highest category. This may be related to the presence of a doctor and client perceptions that care from a doctor and more availability of drugs, are preferable to care from a midwife or nurse.¹⁶

Quality improvements most frequently suggested by the clients were less waiting time, greater availability of drugs, and better health worker attitude. Other suggested improvements were more staff, cleaner facility, more beds, and reduced costs. In three facilities (the two hospitals and the mission health center), over 60 percent of patients interviewed reported that no improvements are needed, compared with 29 percent in the public health center. Figure 1 shows the improvements most frequently mentioned, by facility. It should be noted that these results may reflect a self-selection bias among the clients. Clients who choose to go to a facility are likely to be relatively more satisfied with the quality of care than the population as a whole, since those who are not satisfied are more likely to seek services elsewhere or not at all.

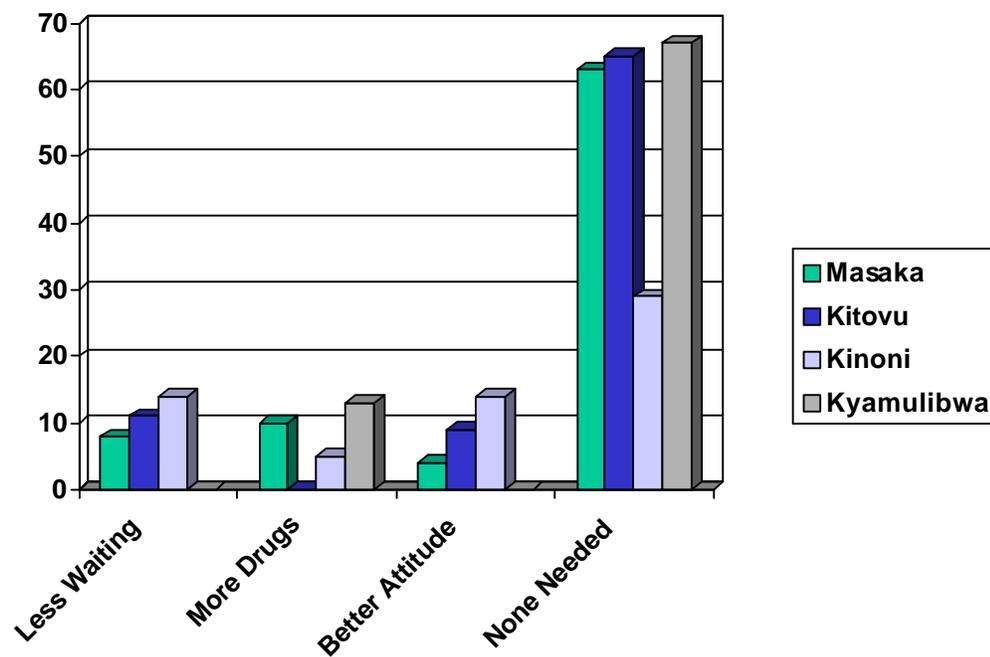


Figure 1: Suggested Quality Improvements

¹⁵It should be acknowledged, however, that asking general questions about satisfaction was not very effective in eliciting responses. Asking specific questions about quality improvements was more successful.

¹⁶This finding may also be related to the fact that clients paid higher fees and may accorded higher value to the services that they received.

8.8 Cost Recovery

Prompted by public perceptions that user fees cover the total cost of the service, cost recovery rates were calculated, using the average user fees paid divided by the average total cost per service. (Cost estimates do not include capital costs¹⁷). Cost recovery rates for each type of service at each facility are provided in Table 17.

Table 17: Cost Recovery Rates by Service and Facility

	Public Hospital		Mission Hospital		Public Health Center		Mission Health Center	
	Total Costs	Materials	Total Costs	Materials	Total Costs	Materials	Total Costs	Materials
Antenatal Care	20%	56%	12%	16%	16%	34%	33%	134%
Vaginal Delivery	13%	101%	55%	346%	23%	59%	—	—
Cesarean Section	8%	16%	56%	92%			—	—
Post-abortion Complications	—		81%	133%			72%	53%

With the exception of antenatal care, cost recovery is higher in the two mission facilities than in the two public facilities. This is because user fees are higher in mission facilities, which recover most of their material costs and over 50 percent of total costs.¹⁸

The cost recovery rates are lower for public facilities, which recover less than 25 percent of total costs of services and 25 percent to 50 percent of direct costs (although only 16 percent of material costs of cesarean section are recovered).

The results in all of the facilities studied provide empirical evidence to both policymakers and clients that the costs of providing maternal health services are only being partially covered by client user fees.

¹⁷ If the facilities or districts are going to finance capital costs in the future, then these costs will need to be included in the calculation of cost recovery rates.

¹⁸ Cost recovery at the mission hospital for antenatal care services is low relative to cost recovery rates for other services at the same facility because the hospital fee policy for antenatal care was set to encourage utilization of these services.

9. Discussion

This study found considerable variation in the costs of service provision at the four facilities, both between levels and among public and mission facilities. While it is difficult to draw inferences from total costs of services on relative costs, efficiency and quality, some conclusions can be drawn from a comparison of the direct costs of labor and materials in the four facilities.

Direct costs differed between hospitals and health centers. They are higher for hospitals, reflecting greater use of drugs and personnel. Although direct costs are lower in the two health centers (except for antenatal care in the mission health center), the centers are only equipped to provide basic treatment for routine services.

Differences in material costs were found between the two public and two mission facilities. The findings suggest that, while unit costs are higher at mission facilities, more drugs and supplies are available and dispensed to customers at those facilities. (In fact, drugs and equipment are not only less available, but inadequate at public centers.) In other words, the structural quality of their service provision is higher. If the availability of drugs and supplies in the public health center were to improve, the cost differences between the public and private health centers would decrease.

While full cost information is not available for private midwives, the non-own-labor costs are similar to those of health centers, assuming limited syndromic management of sexually transmitted diseases. They have more key drugs and equipment than the public health center, but less than that of the mission health center. In addition, their fee structure is similar to that of the mission health center. While the costs and drug protocols of service delivery of private midwives need to be investigated more thoroughly, it is likely that they provide a reasonably priced alternative for clients seeking routine maternal health services in Masaka District.

The direct costs of traditional birth attendants are lower than other providers for routine services. However, it should not be concluded that they are a cost-effective alternative to other services since they lack key drugs and equipment. Instead, they should be used when other options are not available.

9.1 Efficient Use of Resources

No clear pattern of differences in labor costs was found among the public and mission facilities because of variations in staffing patterns. In some of the facilities, inefficient use of labor resources was observed. For example, in the public and possibly the mission hospital, the number of midwives is higher than required, given the number of deliveries that took place. Overstaffing, combined with the higher salaries of health personnel at hospitals, make the services unnecessarily expensive. Scarce resources could be saved and allocated to fulfill other gaps in resource use by reducing the number of personnel providing maternity services.

Because of the problem of overstaffing of midwives at Masaka Hospital, a simulation was conducted to determine the effect of reducing the number of midwives in Masaka Hospital on the unit costs of services. Table 18 presents the results. The reduction in costs are highest for routine services where midwives are the main caregiver, such as antenatal care and vaginal deliveries. Reductions in the unit cost per services would have significant impact on total expenditures due to their high volume. However, a reduction in the number of midwives should only be considered if service quality will not be adversely affected.

A second inefficiency that was observed is the use of a physician to provide routine services at the mission health center. Because the physician's wages are significantly more than other personnel, the unit costs of routine services are driven up. By reserving the time of the physician for more complicated services, the unit costs of routine services would be comparable to those of other facilities and scarce resources would be used more appropriately. Some of those resources, however, would be needed to hire a second midwife to assist with routine service delivery.

Table 18. Reductions in Cost per Service with Changes in Personnel at Public Hospital

Service	Cost per Service	Cost per Service with 7 Midwives Rather than 25	Percent Change
Antenatal Care	\$ 4.10	\$ 2.95	- 28%
Vaginal Delivery	\$33.89	\$19.90	- 41%
Cesarean Section	\$73.10	\$67.68	- 7%
Post-abortion Complication	\$35.43	\$32.63	- 8%

A simulation of cost savings from providing services with a midwife instead of a medical officer at the mission health center is shown in Table 19. The reductions in cost per service are large and range from 20 percent to 62 percent. However, because having a physician may be an attraction for clients, the substitution of one with a midwife could lower demand for services at the clinic, and the reduction in cost per service may not be as high as was found in the simulation.

Table 19. Reductions in Cost per Service with Substitution of a Midwife for a Medical Officer at Mission Health Center

Service	Cost per Service	Cost per Service If Have Midwife Rather than Medical Officer	Percent Change
Antenatal Care	\$ 6.52	\$ 5.24	- 20%
Vaginal Delivery	\$15.33	\$ 5.77	- 62%
Post-abortion Complication	\$21.88	\$10.54	- 52%

Another factor affecting costs of services observed among the health centers was low service volume. Volume was particularly low in the mission health center, e.g., only 20 to 25 antenatal care

services were provided per month, resulting in higher unit costs since indirect costs were spread among fewer services.

It should be noted that this study did not investigate whether another type of inefficiency, overprescribing of medications, takes place at any of the facilities.

9.2 Client Costs

The results on costs to the client indicate that, for the most part, clients in the sample paid more at the two mission facilities studied than at the two public sector facilities. On the other hand, as noted earlier, many of the clients at public facilities were not given all the drugs they needed and therefore had to pay fees elsewhere to fill their prescriptions. Not surprisingly, the perception of clients that used mission facilities was that service quality was higher in those facilities than in the public facilities, reinforcing the perception that clients are willing to pay for higher quality.

Because clients generally pay substantially more at the mission facilities, those facilities recover a higher percentage of costs (15–73 percent). Cost recovery in the public sector is low (6–21 percent), despite client perceptions to the contrary.

Facilities do not appear to have established their fees with cost recovery goals in mind since rates vary widely, from 16 percent for antenatal care and cesarean section at the public facilities to 346 percent for vaginal delivery services at the mission hospital. There is, however, appropriate differentiation of lowering fees for antenatal care to encourage use in three of the four facilities.

9.3 Issues in Methods of Data Collection

Another finding of the study was that the methods of data collection for costing maternal health services could be further refined, particularly in regard to use of drugs and supplies. Since the actual lines of treatment were not observed in the four facilities and among community practitioners, the estimation of costs were instead based on interviews with health personnel. Because material costs of maternal health services comprise a large part of the cost of services, some different approaches may need to be considered in future studies: the first would be to conduct observation of use of drugs and supplies rather than rely on information from provider interviews. This would be costly; however, it could serve additional purposes, such as assessment of service quality. Another long-term approach to improve the flow of information on the use of drugs would be to introduce or enhance the cost accounting systems currently used in the larger facilities.

A second way to refine data collection would be to develop in-depth methods—the use of focus groups, observation of actual protocols used, etc.—to solicit information on costs of services and fees charged by community practitioners.

10. Recommendations

The findings of the study yield some policy implications/recommendations regarding the allocation of scarce resources and financing options.

Efficiency

- ▲ One recommendation to improve the allocation of resources is to encourage more use of routine maternal health care at lower levels of the health care system.

That is, clients should be encouraged to pursue services at health centers through offering them incentives to use these facilities because their costs are lower than those of hospitals. At the same time, incentives could also be developed for health center and community midwives to attract clients for routine care, as well as make more effective referral of complications to hospitals.

By increasing maternal health service volume in these facilities, their costs per service should decrease further. This would also free up hospital resources for more complicated obstetrical cases. Before implementing such a strategy, however, it will be important to assess the capacity of lower-level facilities to increase their service volume.

In promoting use of a public health center such as the one surveyed, the availability as well as use of key materials and equipment in such centers will need to be improved. Consequently, while the unit cost of services costs may decrease with increased volume, the material costs will increase somewhat with higher availability of drugs.

- ▲ Other recommendations can be made regarding use of resources to improve efficiency of service delivery in public and private (mission) facilities.

The costs of maternal health care services in the public hospital could be reduced through streamlining staffing patterns at hospitals. As shown in the simulation in Table 18, costs could be reduced through a decrease in the number of midwives providing maternal health services. Staffing patterns can also be streamlined by the use of midwives rather than physicians to provide routine maternal health care services.

In addition, in facilities where service volume is low, increasing demand for maternal health services through promotional activities would also be likely to lower unit cost. Since the Ministry of Health is considering upgrading a health center in each sub-district to a mini-hospital to provide a theater for cesarean section, it should explore whether use of obstetrical services will be sufficient to justify the costs of having a physician at this level.

Financing Options

- ▲ Facilities should consider establishing goals of cost recovery for maternal health services.

The analysis of unit costs and percentage of costs that are recovered from user fees indicates that considerable variation exists in costs that are being recovered for the various services. A more systematic method of price setting would assist facilities to reach their goals of financial sustainability. A facility may decide, for example, that at a minimum, it wants to recover a certain percentage of the costs of drugs for a given service; fees can then be set to achieve this goal.

Because of the large differentials between user fees in the public and private sectors, the public sector may want to consider raising its fees in order to cover more of its costs. Before doing so, however, it should investigate how to improve its supply of essential drugs so that it can assure a minimum level of quality.

Also before increasing user fees, the public sector should ensure that the population would continue to be able to utilize its services if fees were increased. An assessment of client willingness and ability to pay is important both in terms of evaluating the impact of higher fees on clients' overall demand for services and their choice between public and private providers.

Another factor that needs to be researched before setting fees for maternal health services is the relative importance of consumer costs on the decision to seek emergency maternal health services and the extent to which fees are a barrier to use of these services. While emergency maternal health care services are costly to provide, high fees could deter use.¹⁹ Information on the determinants of emergency service use and the relative importance of fees could be used by facility managers/administrators in considering rates of cross-subsidization for emergency services from other ones. Also, this information may help a facility determine its policies on the application of fee exemptions for low-income clients.

- ▲ One approach that could be considered when evaluating possible cost recovery options is the introduction of financing schemes such as insurance schemes for maternal health care based on actual costs so that there can be risk-sharing among clients.²⁰

Since clients are already paying for maternal health services, they will be more likely to take advantage of financing schemes at facilities of their choice. The costs of referral for obstetric complications should be considered in these calculations.

- ▲ The Ministry of Health should consider contracting out arrangements with the mission facilities that provide efficient care.

¹⁹Other factors such as transport costs, access to transport, and cultural factors are also likely to affect use of services.

²⁰An insurance pilot at the mission hospital where the study was conducted is now being considered.

Because access to public health services is limited in Uganda, contracting out with mission facilities will provide maternal health care services to a larger percent of the population. However, because inefficiencies were found in service delivery in mission facilities, these institutions should be encouraged to improve their use of resources such as staffing placements. The Ministry of Health may want to consider performance-based contracts to encourage more efficient production of services in these facilities.

In considering premium, capitation, or other prepayment rates of payments, the Ministry of Health or private facilities should consider the fees for all health services at the institutions and of other ones as well as the costs of other health services.

Additional Research Questions

- ▲ To have a fuller picture of drug use, assessments of whether drugs are overprescribed should take place in these facilities.
- ▲ A more thorough assessment of service quality should take place.

Annex A. Comparison of Observation and Recall Time Allocation Methods

Considerable effort was made to observe worker’s time use rather than to rely on their recall of their time use. In order to determine whether the differences in labor costs are significant, the labor costs estimated from both methods were compared. Table A1 indicates that, except for a few cases, the two methods do not produce similar estimates. For example, for antenatal care, the difference in estimates ranges from -76 percent for the mission health center to 358 percent for the public health center. For vaginal delivery, the difference ranges from -74 percent for the public hospital to 1864 percent for the public health center. There is little difference (4.6 percent) between observation and recall estimates for the mission hospital for vaginal delivery.

Table A1. Comparison of Labor Costs based on Personnel Observation vs. Recall

Service	Public hospital			Mission hospital			Public health center			Mission health center		
	Obs.	Rec	%ch	Obs.	Rec	%ch	Obs.	Rec	%ch	Obs.	Rec	%ch
ANC	\$0.82	\$0.99	+21	\$0.2	\$0.69	245	\$0.53	\$2.43	358	\$2.00	\$0.47	-76
Vaginal Delivery	\$13.25	\$3.49	-74	\$9.6	\$10.04	4.6	\$0.56	\$11.00	1864	NA	NA	NA
Cesarean Section	\$12.12	\$15.6	+29	\$10.7	\$44.29	314	NA	NA	NA	NA	NA	NA
Post-abortion Complication	\$8.60	\$7.25	-16	\$10.6	\$39.14	270	NA	NA	NA	\$6.50	\$8.44	+30

The differences between the observation and recall estimates for the public hospital for obstetrical complications were relatively small (29 percent and 16 percent) but considerably larger for the mission hospital for cesarean section and post-abortion complication, 314 percent and 270 percent, respectively.

If recall methods had been used, the labor costs would have been higher for antenatal care (an additional \$1,393.70 or \$0.15/service), cesarean section (an additional \$8,777.40 or \$11.27/service), and post-abortion care (an additional \$5,000 or \$12.05/service), and lower for vaginal delivery (less \$12,463.35 or \$7.54/service).

These results demonstrate that estimates derived from recall often differ from estimates derived from observation techniques. In most cases, the recall estimates were larger than observation estimates. The two exceptions when observation estimates were higher than recall estimates occurred in cases of likely overstaffing or use of high-level personnel for routine services.

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