

Special Initiatives
Report 22

**Costs of Maternal
Health Care Services
in Three
Anglophone African
Countries**

March 2000

Prepared by:

Ann Levin, M.P.H., Ph.D.
University Research Co., LLC

Mark McEuen, M.A.
Abt Associates Inc.

Tania Dymatraczenko, Ph.D.
Abt Associates Inc.

Freddie Ssengooba, MPH, MB.CH.B.
Institute of Public Health
Makerere University

Ronald Mangani, M.Sc.
Economics Department
Makerere University

Gerry Van Dyck, B.A.
Research International LTD



Partnerships
for Health
Reform



Abt Associates Inc. ■ 4800 Montgomery Lane, Suite 600
Bethesda, Maryland 20814 ■ Tel: 301/913-0500 ■ Fax: 301/652-3916

In collaboration with:

Development Associates, Inc. ■ Harvard School of Public Health ■
Howard University International Affairs Center ■ University Research Co., LLC



Funded by:
U.S. Agency for International Development
Office of Sustainable Development, Bureau for Africa



Partnerships
for Health
Reform

Mission

The Partnerships for Health Reform (PHR) Project seeks to improve people's health in low- and middle-income countries by supporting health sector reforms that ensure equitable access to efficient, sustainable, quality health care services. In partnership with local stakeholders, PHR promotes an integrated approach to health reform and builds capacity in the following key areas:

- > *better informed and more participatory policy processes in health sector reform;*
- > *more equitable and sustainable health financing systems;*
- > *improved incentives within health systems to encourage agents to use and deliver efficient and quality health services; and*
- > *enhanced organization and management of health care systems and institutions to support specific health sector reforms.*

PHR advances knowledge and methodologies to develop, implement, and monitor health reforms and their impact, and promotes the exchange of information on critical health reform issues.

March 2000

Recommended Citation

Levin, Ann, Mark McEuen, Tania Dmytraczenko, Freddie Ssengooba, Ronald Mangani, Gerry Van Dyck. 2000. *Costs of Maternal Health Care Services in Three Anglophone African Countries*. Special Initiatives Report 22. Bethesda, MD: Partnerships for Health Reform Project, Abt Associates Inc.

For additional copies of this report, contact the PHR Resource Center at pub_order@phrproject.com or visit our website at www.phrproject.com.

Contract No.: HRN-C-00-95-00024
Project No.: 936-5974.13

Submitted to: USAID/Office of Sustainable Development, Bureau for Africa

Robert Emrey, COTR
Policy and Sector Reform Division
Office of Health and Nutrition
Center for Population, Health and Nutrition
Bureau for Global Programs, Field Support and Research
United States Agency for International Development

Abstract

This paper is a synthesis of a case study of provider and consumer costs, along with selected quality indicators, for six maternal health services provided at one public hospital, one mission hospital, one public health center, one mission health center, and by community practitioners in Uganda, Malawi and Ghana. The study examines costs of providing the services in a selected number of facilities 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 hurting quality. This assessment is important to African countries with ambitious goals for improving maternal health but scarce public health resources and limited government budgets.

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.

The unit costs of antenatal care were \$2.21-\$6.43 in Uganda, \$3.23-\$5.77 in Malawi, and \$2.97-\$5.45 in Ghana; and of vaginal delivery \$2.71-\$33.90 in Uganda, \$10.22-\$24.03 in Malawi, and \$7.66-\$14.60 in Ghana. Obstetrical complications cost more than routine services and ranged from \$29.94-\$159.66 in the three countries.

The study finds that costs differ between hospitals and health centers as well as among mission and public facilities in the study sample. The differentials are explained through differences in the role of the facility, use and availability of materials and equipment, number and level of personnel delivering services, and utilization levels of services.

The report concludes with several policy implications for improvements in efficiency, financing options, and consumer costs.

Table of Contents

Acronyms	ix
Acknowledgments	xi
Contributors	xiii
Executive Summary.....	xv
1. Introduction.....	1
2. Background.....	3
2.1 Financing of Health Care.....	4
2.2 Safe Motherhood Programs	4
3. Costing Issues.....	7
3.1 Justification for Costing Maternal Interventions	7
3.2 Literature Review	7
4. Conceptual Framework.....	9
5. Study Methodology	11
5.1 Direct Costs.....	11
5.1.1 Labor Costs.....	11
5.1.2 Drug and Supply Costs.....	12
5.2 Indirect Costs	12
5.2.1 Methods of Allocation of Indirect Costs	13
5.3 Measures of Quality	13
5.4 Client Costs	14
5.5 Service Volume Data	14
6. Data Collection and Sample	15
7. Limitations of the Study.....	19
8. Results.....	21
8.1 Costs of Services	23
8.1.1 Unit Costs of Routine Services	23
8.1.2 Composition of Unit Costs of Routine Services.....	24
8.1.3 Unit Costs of Treatment of Obstetrical Complications	26
8.1.4 Composition of Costs of Treatment of Obstetrical Complications	28
8.1.5 Costs of Service Provision by Community Practitioners	29
8.1.5.1 Costs of Private Midwives	29

8.1.5.2	Costs of Traditional Birth Attendants.....	29
8.2	Quality of Care of Providers	30
8.2.1	Structural Quality.....	30
8.2.2	Process Quality Indicators	32
8.3	Measures of Efficiency.....	33
8.3.1	Staffing Patterns	33
8.3.2	Time Spent on Noncontact Activities	34
8.4	Client Costs	35
8.5	Client Satisfaction.....	37
8.6	Cost Recovery	38
9.	Discussion.....	41
9.1	Costs.....	41
9.1.1	Costs by Components.....	41
9.1.2	Cost Differences by Level of Provider.....	42
9.1.3	Cost Differences by Type of Provider.....	42
9.2	Efficient Use of Resources	43
9.3	Cost and Quality.....	43
9.4	Client Costs	44
9.5	Cost Recovery	45
9.6	Issues in Methods of Data Collection.....	45
10.	Policy Implications	47
10.1	Improving Efficiency.....	47
10.2	Cost Recovery	47
10.3	Consumer Costs.....	48
Annex A.	Disaggregation of Indirect Costs.....	49
Annex B.	Key Drugs, Supplies, and Equipment	51
Annex C.	Bibliography.....	53

List of Tables

Table ES1.	Policy Implications of PHR Study Findings on Cost Differences between Facilities	xviii
Table 1.	Maternal Health Cost Study Sample Size, by Facility and Country.....	16
Table 2.	Data Sources.....	17
Table 3.	Differences between Hospitals and Health Centers for Routine Services	21
Table 4.	Differences between Mission and Public Facilities.....	22

Table 5. Unit Costs of Routine Services, by Type of Facility and Country	25
Table 6. Unit Costs of Obstetrical Complications, by Type of Hospital and Country.....	28
Table 7. Cost of Services Provided by Private Midwives	29
Table 8. Costs of Services Provided by TBAs.....	30
Table 9. Process Indicators, by Facility and Country	32
Table 10. Percentage of Time spent by Nurses/Midwives on Noncontact Activities, by Facility	34
Table 11. Costs to Client: Antenatal Care and Vaginal Delivery.....	36
Table 12. Costs to Clients: Cesarean Section and Other Obstetrical Complications in Hospitals	36
Table 13. Costs to Clients: User Fees Charged by Community Practitioners	37
Table 14. Respondents Stating Quality Improvements Needed, by Facility and Country (in percent).....	38
Table 15. Cost Recovery Rates for Materials for Routine Services, by Facility and Country (in percent).....	39
Table 16. Cost Recovery Rates for Treatment of Obstetrical Complications, by Type of Hospital and Country (in percent)	40
Table 17. Possible Policy Implications of Study Findings on Cost Differences between Facilities	47

Annex Tables

Table A1. Indirect Costs of Routine Services by Type of Facility and Country (U.S. dollars).....	49
Table A2. Indirect Costs of Obstetrical Complications, by Hospital and Country.....	50

List of Figures

Figure 1. Cost of Antenatal Care Services, by Facility and Country.....	23
Figure 2. Unit Cost of Vaginal Delivery Services, by Facility and Country.....	24
Figure 3. Unit Cost of Cesarean Delivery, by Facility and Country.....	27
Figure 4. The Cost of Treating Postpartum Hemorrhage in Private and Public Hospitals.....	27
Figure 5. Availability of Key Drugs in Facilities, by Country.....	31

Figure 6. Availability of Equipment, by Facility and Country	31
Figure 7. Number of Deliveries per Midwife	33
Figure 8. Number of Laboratory Personnel per Facility by Country.....	34
Figure 9. Client Satisfaction, by Facility and Country.....	37
Figure 10. Cost Recovery Rates for Antenatal Care, by Facility and Country (Percent of total costs recovered)	39
Figure 11. Cost Recovery Rates for Vaginal Delivery, by Facility and Country (Percent of total costs recovered)	40

Acronyms

FHI	Family Health International
NGO	Non-governmental Organization
PHR	Partnerships for Health Reform Project (USAID)
TBA	Traditional Birth Attendant
USAID	United States Agency for International Development
WHO	World Health Organization

Acknowledgments

This three-country case study was supported by the Bureau for Africa of USAID and coordinated by Partnerships for Health Reform (PHR) to compare costs of maternal health services in Ghana, Malawi, and Uganda. Discussions with the Ministries of Health, as well as with USAID, World Bank, WHO, and MotherCare Project representatives in Uganda, informed the focus and design of the study.

Implementation of the cost study in each country would not have been possible without the hard work and dedication of the study teams' data collectors and observers. The study team would also like to acknowledge the support of the Makerere Institute of Public Health in Uganda, the University of Malawi Centre for Social Research, and Research International in Ghana for their participation in the study. In addition, we would like to thank all the hospital and health center staff, private midwives, traditional birth attendants, and clients that participated in and contributed to the study.

The authors are grateful for the valuable comments of Dr. Charlotte Leighton, Dr. Barbara Janowitz, Holly Fluty Dempsey, and Dr. Jeanne McDermott.

Contributors

Study Teams

Uganda: Makere University Institute of Public Health

- > Dr. Freddie Ssengoba, Institute of Public Health (Principal Investigator)
- > Dr. Florence Mirembe, OB/GYN
- > Dr. Olico Okui, Institute of Public Health
- > Dr. Margaret Nakakeeto, Institute of Public Health
- > Elizabeth Katende, Midwife
- > Edward Galiwango, Social Scientist
- > Martin Mbonye, Social Scientist

Malawi: University of Malawi Centre for Social Research

- > Ronald Mangani, Economics Department, University of Malawi (Principal Investigator)
- > Regson Chiweza, Economics Department, University of Malawi
- > Nyson Chizani, Centre for Social Research, University of Malawi
- > Isabella Muyakha, State Registered Nurse, Zomba Central Hospital

Ghana: Research International, LTD

- > Gerry Van Dyck, Research International, Ltd. (Principal Investigator)
- > Nino Sekyere-Boakye, Research International, Ltd.
- > Julia Lamptey, Nurse/Midwife
- > Charles Otoo, Costing Expert

Study Sites

Masaka District, Uganda

- > Masaka Hospital
- > Kitovu Hospital
- > Kinoni Health Centre
- > Kyamulibwa Health Centre

Blantyre District, Malawi

- > Queen Elizabeth Central Hospital
- > Mlambe Hospital
- > Mpemba Health Centre
- > Chileka Health Centre

Kwahu South District, Ghana

- > Atibe Hospital
- > Holy Family Hospital
- > Obo Health Center
- > Abetifi Health Center

Executive Summary

Introduction

This paper is a synthesis of three country case studies of provider and consumer costs, along with selected quality indicators, for six maternal health services provided at one public hospital, one mission hospital, one public health center, and one mission health center, and by community practitioners in Uganda, Malawi, and Ghana. The studies examined costs of providing the services in selected facilities 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 hurting quality. This assessment is important to African countries with ambitious goals for improving maternal health but scarce public health resources and limited government budgets.

The studies also evaluated 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.

The studies are significant, as little research has been done on the costs of maternal services in African countries. The research that has been done has used a variety of methodologies and is difficult to compare. Moreover, few studies have looked at the detailed use of personnel time or quality indicators.

Methodology

The Partnerships for Health Reform (PHR) project conducted these studies in collaboration with research teams in each of the three countries. The teams collected data on the costs of delivering six selected maternal health services—antenatal care, normal deliveries, cesarean deliveries, post-abortion care, postpartum hemorrhage complications, and eclampsia—during 1998 at a public and a mission hospital, a public and a mission health center, and by approximately 20 private midwives and 20 traditional birth attendants (TBAs) in one district of each country. The field teams collected data during one week at each of the four health facilities and spent several other weeks collecting data from private midwives and TBAs.

The field teams 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 studies did not include capital and investment costs. They did include several measures of structural quality and some 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 teams jointly planned the field study with the Ministries of Health in each country. The criteria for site selection were that service volume was high, service quality was adequate, and cost and effectiveness data were available. The rationale for these criteria was that there is little point in

costing poor quality services.¹ 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 in each of the three countries. The case study data can, however, be used to illustrate financing and efficiency issues that the ministries should consider in its efforts to strengthen maternal health services in the study districts and elsewhere in the countries.

Provider Costs

The unit costs of antenatal care were \$2.21-\$6.43 in Uganda, \$3.23-\$5.77 in Malawi, and \$2.97-\$5.45 in Ghana, and of vaginal delivery \$2.71-\$33.90 in Uganda, \$10.22-\$24.03 in Malawi, and \$7.66-\$14.60 in Ghana. Obstetrical complications cost more than routine services, ranging from \$29.94 to \$159.66 in the three countries.

The findings of the case studies regarding provider costs of services include the following:

1. The unit cost analyses indicated that material (drugs and supplies) costs were the most costly component of most of the maternal health services in the sample; they comprised on average half of the unit costs of services. The costs of labor, on the other hand, were relatively low due to low personnel salaries and staffing patterns.
2. Indirect costs comprising nonpatient contact time of personnel, support staff time, and prorated shares of maintenance and utilities made up a significant portion—16-62 percent—of total costs. These costs were related to the service volume at the facilities.
3. Routine maternal health services cost more at hospitals in the sample than health centers in the study, with the exception of antenatal care services at mission hospitals.
4. Routine maternal health services cost more at mission facilities than at public facilities, with the exception of delivery services in hospitals, while treatment of obstetrical complications cost more at the public than the mission hospitals in two of three countries.
5. Non-labor costs of service provision were similar or lower for private midwives than for health centers, while the costs of services provided by traditional birth attendants were lower than other providers, due to TBA's lower use of materials and other resources.

Provider Efficiency

These country 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 materials, as well as different staffing patterns. The measures of efficient use of resources in facilities revealed that the number of staff providing maternal health care was either too high (Uganda and Ghana) or too low (Malawi) for service volume at the public hospitals and sometimes in the mission hospitals, resulting in higher unit costs or compromised service quality.

When the use of personnel time for noncontact activities (i.e., administrative and unoccupied time) was assessed, the time spent on administrative activities was high in many cases, ranging from 11 percent to 53 percent and 11 percent to 38 percent for supervisory nurses/midwives and enrolled nurses, respectively. The time spent on noncontact activities was higher in facilities with low service volume. The amount of time personnel spent unoccupied or on personal activities was relatively low,

¹ However, it should be noted that being well-stocked is not equivalent to high quality.

less than 11 percent for supervisory nurse/midwives and less than 17 percent for enrolled nurse/midwives.

Provider Quality

Regarding quality of care indicators, the six hospitals were generally found to have better structural quality than the six health centers. That is, they had more key drugs, supplies, and equipment, and often scored higher on process indicators. Mission facilities generally scored higher on process indicators and client satisfaction than did public facilities, although not always on structural quality indicators. Mission facilities' higher score on process indicators is likely to be related to management factors that resulted in better use of resources.

Client Costs

Costs to the client other than fees for services comprised over 50 percent of total costs when fees for services were low, as in the case of Ugandan routine services and in public facilities in Malawi (with the exclusion of the paying ward in the Malawi public hospital). When the fees were more substantial, such as in the mission facilities in Malawi and all facilities in Ghana, other costs were less than 50 percent of client costs. The relative significance of travel and other indirect costs to total client costs is that facilities should take these costs into account when adjusting levels of fees for services in facilities, particularly when user fees are low.

Costs to the client were generally higher at hospitals than at health centers, and at mission facilities than at public facilities in the study sample, due to higher user fees as well as travel costs in many cases. The differences between client costs at mission and public facilities were particularly large at the health centers, since fees were low at public health centers. Despite higher costs at hospitals, however, clients were more likely to use hospitals than health centers, probably because they felt that service value was higher at these facilities.

Cost Recovery

Cost recovery rates for operating costs were usually higher at the six hospitals than the six health centers in the sample, although this relationship did not always hold for antenatal care. They were usually higher for the six mission than the six public facilities. Cost recovery rates in facilities in Ghana were particularly high, and, in a few cases, were higher than 100 percent.

Cost recovery rates did not appear to be set systematically or considered when setting user fees in the study sample in two of the three countries, Uganda and Malawi. Policies on cost recovery should be developed, including determining the percentage of operating costs that facilities would like to recover. In addition, the facilities should ensure that adequate supplies of key materials and equipment are available in the facilities as well as compliance to standard service protocols. Taking such steps, in conjunction with willingness and ability to pay studies, should allow a cohesive cost recovery policy to be initiated in these countries.

Policy Implications

The findings of the country studies yielded some policy implications regarding the allocation of scarce resources and financing options.

Improving Efficiency

Overstaffing at hospitals in the sample resulted in higher labor costs, as in the case of the four facilities in Uganda and Ghana, while understaffing resulted in compromised service quality, as in the case of Malawi. In addition, the use of overly skilled staff to provide routine services also increased service costs. These findings suggest that the appropriate number and use of staff should be assessed at facilities and adjusted when required.

In addition, facilities should examine the time use of their staff. If they find, for example, that staff are spending too much time on administrative duties, then some of these activities should be streamlined to allow the staff to spend more time on other relevant activities.

When service volume is too low in a facility, unit costs of services increase. In such cases, facilities should try to attract more clients through promotional activities. In addition, they should assess clients' willingness and ability to pay fees for services to determine whether fees deter use and therefore should be adjusted.

Because the sample size of these studies was small, findings regarding differences in costs between facility level and private/mission differences will have to be verified in a larger costing study. In the meantime, the current findings and their possible policy implications are shown in Table ES1.

Table ES1. Policy Implications of PHR Study Findings on Cost Differences between Facilities

Findings of PHR Studies	Possible Policy Implication
Unit costs of maternal health services were less at lower levels of the health care system, particularly in public facilities.	Service costs for routine services could be reduced through increased use of services at lower levels of the health care system.
Mission facilities offered services of a quality similar to or better than public facilities.	Governments might consider contracting out/subsidizing services to mission facilities in order to increase the availability or accessibility of services.

Cost Recovery

The analysis of unit costs and percentage of costs recovered from user fees in the sample indicates that a more systematic method of price setting in these facilities would assist facilities to reach their goals of financial sustainability. A facility could 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 large differentials between user fees in some of the public and private sector facilities sampled, the public sector may want to consider raising its fees to cover more of its costs. At the same time, it should investigate how to improve its supply of essential drugs so that it can ensure a minimal level of quality control before raising fees significantly.

Before considering an increase in user fees, the public sector facilities should ensure that the population would continue to be able to utilize its services if fees were increased through some assessment of willingness and ability to pay by clients. This 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, especially when service volume is low as mentioned above. As learned in Kenya

(Collins 1996), cost recovery goals and user fee levels then need to be well communicated to the public so that they know the uses of their money and how much their services are still subsidized.

Another factor to research before setting fees is the relevance of costs to the consumer's decision to seek emergency maternal health services and the extent to which fees for service are a barrier to use of these services. While emergency maternal health care services are particularly costly to provide, high fees for the services could deter use, especially when added to other factors such as cost of and access to transport and cultural beliefs. Information on the determinants of emergency maternal service use and the relative importance of service fees could be used by facility managers/administrators in considering rates of cross-subsidization for these 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 so that there can be risk-sharing among clients. 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.

In considering premium, capitation, or other prepayment rates for maternal health services, a country's Ministry of Health or private facilities should consider the fees for all health services at its institutions and at other ones as well. This is also true for individual private facilities.

Consumer Costs

In setting user fees, facilities should take into account the total array of fees—transport fees, time, and other costs—in addition to fees for services, since these are likely to affect consumers' decisions to use maternal health services, particularly when fee structures are low. They should also investigate whether launching promotion campaigns of service benefits will increase consumer willingness to pay.

1. Introduction

In order to contribute to USAID's Population, Health and Nutrition Center's strategic objective to reduce adverse health outcomes to women as a result of pregnancy, Partnerships for Health Reform (PHR) has a Maternal and Reproductive Health Special Initiative to improve the management and sustainability of maternal and reproductive health programs. This case study synthesis concludes a three-country effort supported by USAID and coordinated by PHR and teams in Uganda, Malawi, and Ghana to estimate costs of maternal health services at a select number of facilities at different levels of the health system and among public and NGO facilities in those countries. The study was conducted at the behest of the USAID Bureau for Africa and is concurrent with a more qualitative assessment of Safe Motherhood interventions carried out by the USAID-sponsored MotherCare Project in the same countries.

The challenge for many African countries is to determine the means to improve access to and availability of quality maternal health services and making better use of ministries of health's limited resources. The PHR case studies estimated the unit costs of providing selected maternal health services in order to evaluate the reasons behind cost differences, assess the efficiency of service delivery, and determine whether management improvements might achieve cost savings without adversely affecting quality.

The main objective of the studies was to understand the structure of maternal health costs through estimating costs of key maternal health services in a select number of facilities in three sub-Saharan countries, and to determine the factors that affect costs and how variations in some of these factors can lead to variations in costs. A second objective was to estimate the cost to consumers of attaining these maternal health services. The final objective was to test a methodology to provide information to policymakers on the actual costs of selected maternal health services at different levels and by different providers from a facility/provider perspective and from a consumer perspective.

2. Background

Maternal morbidity and mortality is a major health problem in sub-Saharan African countries. Maternal mortality ratios are high and range from 300 women to as high as 1050 women per 100,000 live births. Many women also suffer from maternal morbidity because of pregnancy-related disabilities due to complications of childbirth such as infections, eclampsia, slow labor, and ruptured uteri (Favin et al. 1984). Pregnant women also have a higher susceptibility to infectious or metabolic disorders such as malaria or diabetes, and nutritional deficiencies such as anemia (Tinker and Koblinsky 1992) than nonpregnant women.

The reasons for this high mortality and morbidity include a number of factors: inadequate nutritional consumption, lack of safe water and sanitation, and limited access to maternal health services. Barriers to access to services are particularly important and include lack of transport, maldistribution of health facilities, and limited cash resources for clients.

The three countries where the case studies were conducted are Uganda, Malawi, and Ghana. While Safe Motherhood programs have been initiated in these countries, maternal mortality continues to be high: 504 per 100,000 live births in Uganda, 620 per 100,000 live births in Malawi, and 720 per 100,000 live births in Ghana.

Services are not equitably distributed in the three countries. In Uganda, for example, only about 49 percent of the population resides within five kilometers of a health facility. When services are available, barriers such as inadequate transport services, lack of access to cash, decision making within the household, and cultural factors limit their use in times of emergency.

In all three countries, maternal health services are provided by several types of health providers: public, non-governmental organization (NGO) (often mission), private practitioners, and traditional birth attendants (TBAs). For public services, several tiers exist across the health system: central hospitals, regional hospitals, district hospitals, and health centers; for NGOs, tiers may include regional hospitals, district hospitals, and health centers, depending on the size of the organization.

Private for-profit sector services have been established, often in parts of the countries with relatively higher incomes. 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.

Traditional birth attendants also provide maternal health services in their communities and are important in terms of women's lives in Africa. While they provide limited antenatal care and vaginal delivery services, they are a significant source of care. Some TBAs have received training and, in some cases, are supplied with nutritional supplements² and equipment for use in service provision.

² In Malawi, the Ministry of Health and Population supplies nutritional supplements to TBAs to distribute to their clients.

2.1 Financing of Health Care

Despite low per capita income in each of the three countries (\$330 in Uganda, \$220 in Malawi, \$370 in Ghana), the governments have traditionally provided funding for personnel and operating costs at public institutions; in addition, they subsidize mission facilities (mission facilities in Uganda and Ghana, and Christian Hospital Association facilities in Malawi). However, their role is changing as health reform is introduced in these countries. With the introduction of such changes as decentralization, cost recovery and hospital autonomy, more of the costs of services are being paid by district governments and consumers.

All three countries are undergoing health reform, resulting in changes in management of hospital and health centers. In Uganda, where decentralization has occurred, the district manages the hospitals while the Ministry of Health maintains control over the financing and staffing, and local governments have been mandated to charge fees for health services since 1993. In Malawi, a variety of health reform options such as cost recovery, decentralization, and hospital autonomy are being examined, and fees for services have been introduced in private wards in hospitals, for some outpatient care, and for specialist services. In Ghana, both decentralization and cost recovery have been implemented; user fees have been implemented since 1985 for consultation, laboratory, and other diagnostic procedures, while drug fee levels are set to recover the full costs of drugs.

The extent to which cost recovery has been introduced in each of the three countries varies. Some form of fee payment schedules has been introduced to the public sector in all of these countries, while private sector facilities, not-for-profit facilities and community practitioners have had fees in place for some time. In Uganda and Ghana, fees have been introduced at all levels in the public sector, while fees are in place only at the paying wards at the public hospitals and mission/private facilities in Malawi and not at lower levels. Fees in the public facilities are higher in Ghana because of their 'cash and carry' policy that allows facilities to charge the full costs of prescribed drugs to clients. In 1992, fee exemptions were put in place for the economically disadvantaged, children under five, pregnant women, and the elderly.

2.2 Safe Motherhood Programs

In recognition of the magnitude of disease burden attributable to maternal and perinatal causes, the three countries have developed safe motherhood programs, needs assessments have been conducted and national strategic plans for safe motherhood have been developed. Based on these strategic plans, specific interventions to reduce maternal health and morbidity are developed.

The interventions taken in each countries vary, depending on the specific needs of the countries (Mothercare 1998). In Uganda, the major activities are advocacy through meetings at the national, district, sub-county and village levels, training of maternal health personnel, provision of equipment for maternal health interventions, and improvements in transport and communication systems. In Malawi, activities include promoting general awareness on safe motherhood issues through advocacy meetings with district development committees and village health committees. In addition, use is made of drama groups and community-based safe motherhood advisors to expound upon the issues. Meetings with policymakers, program managers and donors are held to generate political, government and donor commitment for financing safe motherhood interventions. Emergency transport has been improved through the use of bicycle ambulances, radio communication systems, and maternity waiting homes.

In Ghana, specific actions included instituting a Life-Savings Skills Program, formation of the National Safe Motherhood Task Force, ongoing training and refresher training of TBAs, decentralization of emergency obstetric care to districts and subdistricts, and development of Ministry of Health standards.

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 in a small sample of facilities in sub-Saharan Africa. 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 and effectiveness of service delivery in its facilities. This information can also be used to assess how adequately funded services are and whether the current configurations of resources are adequate.

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 percentage of the unit costs of the services.

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 et al. 1997, Dmytraczenko et al. 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-\$24.69 for antenatal care, to \$27.91 for vaginal delivery, and \$55.83-\$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 noncontact 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 et al. 1998) have estimated personnel time use through methods such as recall from provider interviews. The disadvantage of the latter method is that the percentage of noncontact time (administrative and personal time as well as nonservice days for meetings, trainings, and vacation) for personnel cannot be accurately estimated.

Another approach to costing maternal health care has been to estimate the gap between the cost of drug, supply, and equipment requirements and that of those actually available. In a case study in Kenya, the gap between the cost of actual drugs, medical supplies, and equipment available in facilities and those required based on standard protocols was assessed in 16 districts (Rational Pharmaceutical Management 1998).

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; World Health

Organization [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 those that have used a variety of methodologies. This synthesis of case studies of maternal health costs in sub-Saharan African countries will attempt to fill part of this gap 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 types³: cost of supplying services and cost to the consumer.

The first, supply costs, can be measured in three ways: one is as the addition of all inputs used in the provision of a given service (total costs) which are useful to planners for budgeting purposes. A second way is looking at the unit costs of delivering a single service (average cost) which allows comparisons to be made among services and among types of health facilities. This study looks at both. The third measure is marginal costs, the additional cost associated with delivering one more unit of service; it takes into account varying costs at different levels of output. Marginal costs cannot be calculated in this study because data were only collected at one point in time.

The inputs, or components, that are used to provide services and need to be costed are the following: personnel time spent providing the service, drugs and supplies, utilities, maintenance and repair, and 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 that affect the costs of providing care in a facility are case mix and treatment protocols for interventions.

Provider costs, whether total or 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 for a specific service. Indirect costs are the costs of inputs that support services 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 type 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

³ Even though these two types of costs are part of total costs, they are separated because of their different implications on financing.

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

Clinical interventions costed in these studies include routine services like antenatal care and vaginal delivery as well as interventions that address complications and emergencies that may arise during pregnancy, childbirth, and the postpartum period. While the complications occur infrequently, they are life-threatening and need to be treated. Due to their contribution to maternal mortality and morbidity and high costs of care, two interventions for complications—cesarean section and post-abortion care—and two complications—postpartum hemorrhage and eclampsia—were selected for the study.

The studies collected data on direct costs of providing maternal services such as personnel time and materials (drugs, laboratory tests, and other supplies) used during 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 explain differences in costs. It should be noted, however, that because the studies' 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 of health personnel were conducted. Personnel were observed for one week in each facility to determine contact time on maternal services of interest and related noncontact 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. This method involves observing employees at three-minute intervals, and recording the employees' activity at the instant of observation on prestructured forms. Using the total number of observations of an employee, the percentage of observations of him or her 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. Personnel interviews were also conducted to determine estimates of noncontact time such as vacation, sick leave, and public holidays.

In order to obtain information from community practitioners, interviews were conducted with the providers about the amount of time they spent delivering maternal health services, including both contact and related administrative time. Observation of time spent with clients was not conducted due to the low likelihood of observing an event. To calculate labor costs for community practitioners, the total costs of providing services were subtracted from total revenues (user fees multiplied by number of clients of each type) to obtain net profits. These were then divided by the number of hours worked to estimate the cost of labor per hour.

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

When activities could not be observed because they rarely occur, 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 adopted the Mother-Baby Package Costing approach (WHO 1998) for calculating these costs. The methodology for estimating direct material costs involved interviewing health providers to ascertain which lines of treatments are followed in the course of a given intervention, and the percentage of clients that 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, were aggregated using the percentage of clients receiving that treatment as the weighting factor.

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. Country-specific protocols were used in determining dosages. Prices were obtained from national medical stores or pharmacies, depending on whether the facility in case was public or non-governmental.

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 but are not directly involved in service provision; examples include utilities and maintenance. 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. In these studies, the costs of personnel directly involved in maternal health care were divided into noncontact time (e.g., administrative and personal activities) and non-working days (e.g., meetings, trainings 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) noncontact time of maternal health personnel; (2) time of support personnel who work only on maternal health care services, but who were not observed during the time allocation study; and (3) general administrative and support personnel and other types of indirect costs.

The cost of noncontact 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 noncontact time would be allocated to this activity.

The cost of support personnel who 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 percent 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 percentage 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 were included in the studies so that cost differences between facilities could be explained. However, since these studies were 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 studies 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.

Process indicators include measures of compliance to guidelines in treatment protocols and client satisfaction. The former was measured through determining the procedures that were adhered to in

⁷ Outcome indicators of quality were not assessed because this information is not readily available in facilities.

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 was 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 client. In order to compare client costs to satisfaction, clients were asked to rate the service they 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 how they thought 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 collected for the 12 months of 1997. The data were disaggregated by type of service and included maternal health services as well as other health services provided at the facility.

6. Data Collection and Sample

Costing of maternal interventions was undertaken in one district in each country. In recognition of the various levels of care that deliver safe motherhood interventions, the study focused on health centers, hospitals, and community practitioners. Therefore, in each country, a district was chosen that had a public and mission hospital, a public and mission health center, and numerous community practitioners. The community level costing included 20 private midwives (private midwives had received 2-3 years of training) and 20 TBAs.⁸ In addition, these districts had to have relatively high utilization, acceptable quality of maternal services offered, and availability of good financial records. The districts where facilities were surveyed were Masaka District, located approximately 60 miles southwest of Kampala, Uganda; Blantyre District in the south of Malawi; and South Kwahu District in the Eastern Region of Ghana.

Data collection instruments were developed to collect the relevant data as outlined above. In each country, a multi-disciplinary team of social scientists, economists and clinicians was constituted and trained for data collection. Data were collected during April-October 1998.

The six hospitals (two hospitals in the three countries) provided all maternal health services: both commonly provided services (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). The health centers provided antenatal care and vaginal delivery, and limited treatment of post-abortion complications and postpartum hemorrhage. (The latter two services only appeared to be delivered in health centers in Uganda.) Community practitioners provided mostly routine services, i.e., antenatal care and vaginal delivery.⁹

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. In the health centers, four eight-hour shifts were observed. Health providers were also interviewed on their time use in and outside the facilities.

Table 1 shows the number of services observed during the week spent at each of the facilities. While antenatal care services were observed at all facilities, other services were observed only in the hospitals. At least one cesarean section was observed in the operating theatre in most cases. Rarer obstetrical complications were observed in only one facility (Malawi public hospital).

⁸ In Malawi, no data were collected on the costs of service provision of private midwives since they were not an important source of maternal care in this country.

⁹ In Ghana, some midwives treat post-abortion complications.

Table 1. Maternal Health Cost Study Sample Size, by Facility and Country

Facility/Service	Uganda		Malawi		Ghana	
	Services Observed	Average Number of Services per Month	Services Observed	Average Number of Services per Month	Services Observed	Average Number of Services per Month
Public Hospital						
Antenatal Care	2 sess. w/20+	458.0	595	2945	5 sess. w/63	257.8
Vaginal Delivery	10	83.0	100	1006	4	51.3
Cesarean Section	3	46.0	20	109	2	13.6
Post-abortion Complication	4	20.5	16	13	0	5.1
Postpartum Hemorrhage	0	4.4	6	4	0	0.3
Eclampsia	0	0.4	7	6	0	0.2
Mission Hospital						
Antenatal Care	2 sess. w/18	138.5	398	1555	159	928.25
Vaginal Delivery	8	40.0	13	213	23	146.3
Cesarean Section	1	17.0	2	12	6	21.7
Post-abortion Comp.	4	13.0	0	0.6	0	0.3
Postpartum Hemorrhage	0	1.2	0	2	0	3.8
Eclampsia	0	0.1	0	0.6	0	0.4
Public Health Center						
Antenatal Care	4 days w/27	136.0	212	448	9	29.6
Vaginal Delivery	1.0	14.7	5	50	0	8.3
Post-abortion Complication	0.0	0.0	0	0	0	0
Mission Health Center						
Antenatal Care	3 days w/10	19.0	57	123	29	75.3
Vaginal Delivery	0	7.5	5	27	2	11.4
Post-abortion Complication	1	1.0				
Private Midwives						
Antenatal Care	NA	49.0*	NA	NA	NA	21.4
Vaginal Delivery	NA	17.0*	NA			7.4
Traditional Birth Attendants						
Antenatal Care	NA	16.2*	NA	29	NA	0.1
Vaginal Delivery	NA	5.4*	NA	20	NA	3.6

*Services provided per midwife or TBA

The studies obtained indirect costs through abstracting the expenditure records for utilities, maintenance and other overhead costs including support supervision and administration personnel (see Table 2). Exit interviews were conducted with outpatient and inpatient clients at the hospitals and health centers. Approximately 40 outpatients and all inpatients were interviewed in each hospital. At the health center level, approximately 20 outpatients and inpatients were interviewed.

Table 2. Data Sources

I. Cost Component	Data Collection Technique	# of Providers
Labor	Randomized intermittent instantaneous observation Recall	Four facilities Four facilities + comm practitioners
Salaries and benefits	Record review	Four facilities
Drugs and supplies (materials)	Provider interviews	Four facilities + community practitioners
Maternal health service utilization	Service record review Provider interviews	Four facilities Community practitioners
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 + community practitioners
Treatment protocols	Intervention observation	Four facilities
Client satisfaction	Client exit interviews	Four facilities

The studies also collected data on community providers, private midwives operating the private maternity homes, and trained TBAs. Investigators interviewed private midwives and TBAs to determine the average number of services provided each month and their costs of providing services (e.g., drugs, supplies, rent, license, etc.). Because these providers provided fewer services, investigators did not observe personnel time use.

The data collection on allocation of health providers in health centers was relatively simple since all maternal health services took place in one location. Thus, the main decisions concerned determining which health personnel to observe, i.e., determining which 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 areas; vaginal delivery, post-abortion, and obstetrical complication services at maternity wards; and cesarean sections at operating theaters.

7. Limitations of the Study

Although this study extends across three countries, financial constraints limited the the sample size to only one district in each country. In each of the three countries, data were collected in one public and one mission hospital, one public and one mission health center, approximately 20 private midwives, 20 traditional birth attendants, and 128–192 clients (see Table 1). Because the sample size is small, no statistical tests of the costs providing services were conducted. It is a case study rather than a representative sample.

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 occurred while hospitals were being observed, cases of postpartum hemorrhages and eclampsia were observed only in one of the six hospitals. Consequently, the cost of personnel time for these complications in these facilities was estimated from recall data.

8. Results

The main findings of the case studies include the following:

1. The unit cost analyses indicated that material (drugs and supplies) were the most costly component of most of the six maternal health services.
2. Indirect costs, comprising nonpatient contact time of health personnel, support staff time, and prorated shares of maintenance and utilities, made up a significant portion, 16-62 percent, of total costs as well.
3. Routine maternal health services cost more at hospitals than health centers in the study sample, with the exception of antenatal care services at mission hospitals (see Table 3).
4. Routine maternal health services cost more at mission facilities than at public facilities, with the exception of delivery services in hospitals (see Table 4), while treatment of obstetrical complications cost more at the public than the mission hospitals in two of three countries.
5. Non-labor costs of service provision were similar or lower for private midwives than health centers. The costs of services provided by traditional birth attendants were lower than other providers, due to their lower use of materials and other resources.

Table 3. Differences between Hospitals and Health Centers for Routine Services

	Public (3 hospitals, 3 health centers)	Mission (3 hospitals, 3 health centers)
Antenatal Care		
Unit Cost	Higher unit cost in the hospital than health center in three countries	Higher unit cost in health centers than hospital in two countries
User Fees	Higher service fees in hospital than health center in three countries	Higher user fees in health center than hospital in two countries
Cost Recovery	Cost recovery higher in hospital than health center in three countries	Cost recovery higher in health center than hospital in two countries
Vaginal Delivery		
Unit Cost	Higher unit cost in hospital than health center in three countries	Higher unit cost in hospitals than health centers in three countries
User Fees	Higher user fees in hospital than health center in two countries observed*	Higher user fees in hospital than health center in country with observation*

* No deliveries took place in three out of six health centers in period of observation.

Note: Results are reported for 12 facilities: a public hospital, a public health center, a mission hospital, and a mission hospital in each of the three countries.

The case studies made the following findings about quality of care indicators:

1. The six hospitals had better structural quality than the six health centers and often scored higher on process indicators.
2. The six mission facilities generally scored higher on process indicators and client satisfaction than did the six public facilities, although not always on structural quality indicators. The higher scores are likely to be related to management factors that resulted in better use of resources.

Table 4. Differences between Mission and Public Facilities

	Hospitals (3 public, 3 mission)		Health Centers (3 public, 3 mission)	
	Antenatal Care	Vaginal Delivery	Antenatal Care	Vaginal Delivery
Unit Cost	Higher in mission than public in two countries	Higher in public than mission in three countries	Higher in mission than public in three countries	Higher in mission than public in three countries
Service Volume	Higher in public than mission in two countries	Higher in public than mission in two countries	Higher in mission than public in two countries	Higher in public than mission in two countries
Midwife-Service Ratio	NA	Higher in public than mission in two countries	NA	NA
User Fees	No clear pattern*	Higher in mission than public in three countries	Higher in mission than public in three countries	Higher in mission than public in country w/observation
Cost Recovery Rate	Higher in public than mission in two countries	Higher in mission than public in two countries	Higher in mission than public in three countries	Higher in mission than public in country w/observation

* Less than in one country, more than in second country, and similar in third country

Note: Results are reported for 12 facilities: a public hospital, a mission hospital, a public health center, and a mission hospital in each of the three countries

The measures of efficient use of resources in facilities revealed that the number of staff providing maternal health care was either too high (Uganda and Ghana) or low (Malawi) for service volume at the three public hospitals and sometimes in the mission hospitals in the sample. When the use of personnel time for noncontact activities, i.e., administrative and unoccupied time, was assessed, the time spent on administrative activities ranged from 11 percent to 53 percent and 11 percent to 38 percent for supervisory nurses/midwives and enrolled nurses, respectively, and was higher in facilities with low service volume. The amount of time personnel spent unoccupied or on personal activities was relatively low (<11 percent for supervisory nurse/midwives and <17 percent for enrolled nurse/midwives).

Costs to the client were generally higher at hospitals than health centers and at mission than public facilities, due to higher user fees as well as travel costs in many cases. The differences between client costs at mission and public health centers were particularly large, since fees were low at public health centers.

Cost recovery rates for operating costs were often higher at the hospitals than at the health centers in the sample, although this relationship did not always hold for antenatal care. They were usually higher at mission facilities than at public facilities. Cost recovery rates in facilities in Ghana were particularly high, and, in a few cases, were higher than 100 percent.

The following sections discuss the case study findings in some detail. They examine firstly the costs of services. Since costs are not comparable across countries due to differences in exchange rates and purchasing parity of consumers, the discussion is limited to variations in costs in the sample in each country.¹⁰ They also compare the patterns of differences in unit costs of maternal health services between levels and public and private providers. Later sections look at quality of care, efficiency, client costs and satisfaction, and cost recovery.

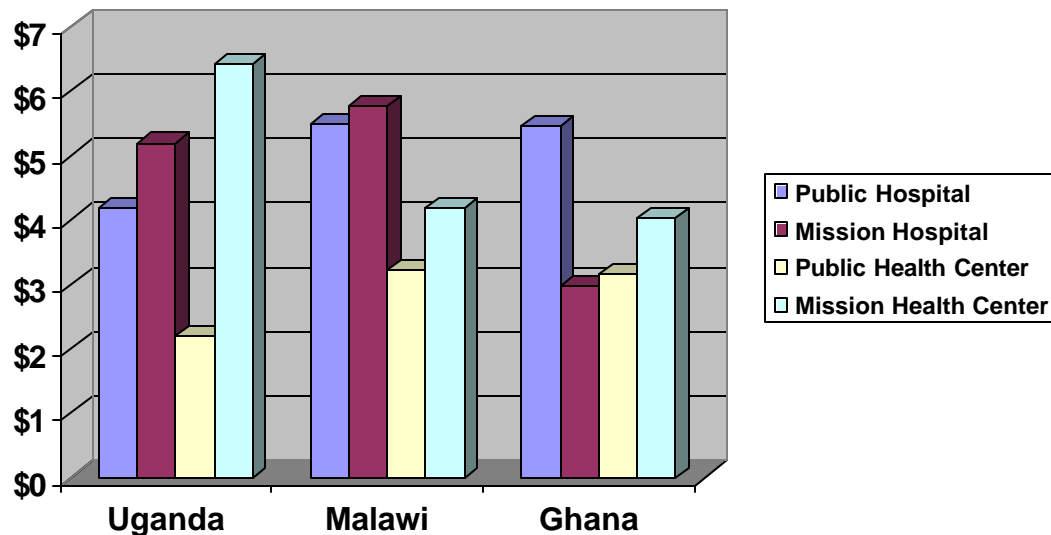
8.1 Costs of Services

8.1.1 Unit Costs of Routine Services

The costs of routine health services—antenatal care and vaginal delivery services—are presented first. Figure 1 shows the total cost of antenatal care by type of facility and by country.

The cost of the service ranged from \$2.21 to \$6.43 in Uganda, \$3.23 to \$5.77 in Malawi, and from \$2.97 to \$5.45 in Ghana. The average unit cost in the four facilities in each country was similar for all three countries (approximately \$4.50). However, the range of costs was greater in Uganda than the other two countries, since the cost of antenatal care in the mission health center was particularly high.

Figure 1. Cost of Antenatal Care Services, by Facility and Country



On average, the unit cost of providing antenatal care services was higher at the three hospitals than at the three health centers. However, some exceptions were found. In Uganda, the cost of providing antenatal care at the mission health center was higher than at other facilities due to the use of a physician rather than a midwife to provide this service. In Ghana, the mission hospital had lower unit costs due to higher service volume. The costs were lowest in the public health centers, with the exception of Ghana.

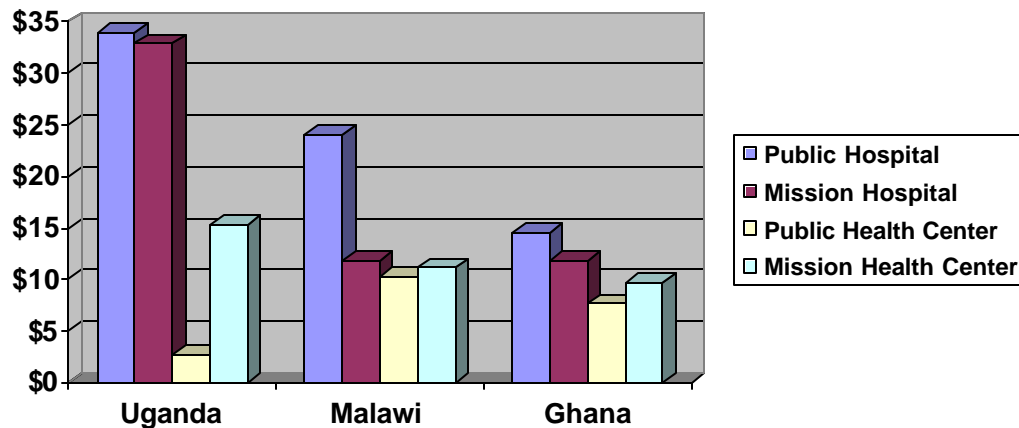
¹⁰ Costs throughout this report are given in U.S. dollars.

Comparing public and mission facilities in the sample, the unit cost of antenatal care services was generally greater at mission facilities than at public facilities. More specifically, the unit cost was higher at the mission hospital than at the public hospital in two countries (the exception being Ghana), and at all the mission health centers.

The unit cost of vaginal delivery services was \$2.71-\$33.90 in Uganda, \$10.22-\$24.03 in Malawi, and \$7.66-\$14.60 in Ghana (Figure 2). As in the case of antenatal care, the range between the lowest and highest costs was much wider in Uganda than in Malawi and Ghana and is due to differences in labor and drug costs, as will be seen below.

In all three countries, the unit cost for vaginal delivery was higher at the hospitals than at the health centers. In Uganda, the unit costs at the hospitals were twice as high as those at the health centers; in Malawi, the unit costs of the service at the public hospital was twice as high at the health centers but the cost at the mission hospital was only slightly higher. In Ghana, the cost at the hospitals was 20-40 percent higher than at the health centers.

Figure 2. Unit Cost of Vaginal Delivery Services, by Facility and Country



When the costs of vaginal delivery services at public and mission facilities were compared, the directional pattern was different between health centers and hospitals. The costs were higher at public hospitals than at the mission hospitals in the sample. In the health centers, however, the costs were higher at mission health centers than at public health centers.

8.1.2 Composition of Unit Costs of Routine Services

Table 5 shows the components of unit costs of routine services at the sample facilities. These include the direct costs of labor and materials (drugs and supplies) and indirect costs—personnel noncontact time, support personnel, and maintenance and utilities (see Annex A for an elaboration of indirect costs into labor, supervisory and support labor, and maintenance and utilities).

The cost of materials is affected by 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.

In this study, results indicated that materials comprised a large proportion of the unit costs of maternal health services, on average 51.1 percent.¹¹ They made up a larger proportion of total costs than did labor in 92 percent of cases for routine services in facilities. They also made up a larger proportion of total costs than did indirect costs in 83 percent of the 12 facilities for antenatal care, but only in 50 percent for vaginal delivery. The explanation for the difference in composition between antenatal care and vaginal delivery is that the latter is a service that requires a longer stay in the facility, and consequently uses more indirect costs such as maintenance and utilities.

Table 5. Unit Costs of Routine Services, by Type of Facility and Country

	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Uganda				
Antenatal Care				
Labor	\$0.82 (19.6)	\$0.20 (3.8)	\$0.53 (24.0)	\$2.03 (31.6)
Materials	1.48 (35.4)	4.10 (78.8)	1.03 (46.6)	1.60 (24.9)
Indirect Costs	1.88 (45.0)	0.90 (17.3)	0.64 (29.0)	2.80 (43.5)
TOTAL	\$4.18	\$5.20	\$2.21	\$6.43
Vaginal Delivery				
Labor	13.25 (39.1)	9.55 (29.0)	0.56 (20.7)	4.82* (35.1)
Materials	4.31 (12.7)	5.28 (16.1)	1.18 (43.5)	4.48 (29.3)
Indirect Costs	16.34 (48.2)	18.06 (54.9)	0.97 (35.8)	6.01 (39.3)
TOTAL	\$33.90	\$32.89	\$2.71	\$15.31
Malawi				
Antenatal Care				
Labor	0.26 (4.7)	0.15 (2.6)	0.32 (9.9)	0.42 (10.0)
Materials	4.44 (81.0)	5.08 (88.0)	2.18 (67.5)	2.94 (70.3)
Indirect Costs	0.78 (14.2)	0.54 (9.4)	0.73 (22.6)	0.82 (19.6)
TOTAL	\$5.48	\$5.77	\$3.23	\$4.18
Vaginal Delivery				
Labor	1.17 (4.9)	1.24 (10.5)	1.26 (12.3)	0.62 (5.6)
Materials	11.34 (47.2)	6.49 (55.2)	4.63 (45.3)	4.65 (41.7)
Indirect Costs	11.52 (47.9)	4.03 (34.3)	4.33 (42.4)	5.87 (52.7)
TOTAL	\$24.03	\$11.76	\$10.22	\$11.14
Ghana				
Antenatal Care				
Labor	0.77 (14.1)	0.40 (13.5)	0.52 (16.4)	0.60 (14.9)
Materials	2.59 (47.5)	2.09 (70.4)	1.94 (61.2)	2.37 (58.8)
Indirect Costs	2.09 (38.3)	0.48 (16.2)	0.71 (22.4)	1.06 (26.3)
TOTAL	\$5.45	\$2.97	\$3.17	\$4.03
Vaginal Delivery				
Labor	2.02 (13.8)	1.88 (15.8)	1.03* (13.4)	1.40*(14.4)
Materials	7.57 (51.8)	7.26 (61.0)	2.76 (36.0)	5.40 (55.4)
Indirect Costs	5.01 (34.3)	2.75 (23.1)	3.87 (50.5)	2.94 (30.2)
TOTAL	\$14.60	\$11.89	\$7.66	\$9.74

* Estimated based on recall rather than observation.

Note: Figures in parentheses are percentages.

¹¹ In Ugandan facilities, however, materials made up less than 40 percent of antenatal care costs in the public hospital and mission health center, and vaginal delivery costs at the public and mission hospitals and the mission health center.

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 maternal health providers, and wage rate differentials. Comparing hospitals to health centers, the costs were generally greater in hospitals than in health centers in the sample because of use of more personnel as well as more high-level personnel. However, labor costs for antenatal care were in some cases less expensive at hospitals, possibly because the hospitals spent less time with each client.

The studies also found differences in costs of labor when comparing public facilities and mission facilities. The costs were higher at public hospitals than at mission hospitals due to more personnel and, frequently, higher wage structures. Labor costs were higher at mission health centers than at public health centers, due to wage structure differentials and more time spent with each client.

The unit total costs of routine services were greater in hospitals than health centers in our sample due to more use of materials and higher indirect costs, particularly in the public hospitals. Material costs were higher in hospitals since more comprehensive lines of treatment are provided at these facilities than at lower-level facilities. For delivery services, the cost of labor at hospitals was higher than at health centers since more highly-skilled personnel are providing services.

When public and mission facilities are compared, the percent of total costs of routine services that went towards materials is higher at mission than public hospitals in our sample. The percentage of indirect costs, on the other hand, was higher at public hospitals in most cases. In health centers, the percent of total costs spent on materials are similar in public and mission health centers for antenatal care except in Uganda. On the other hand, the percentage of total costs spent on materials for vaginal delivery is lower in two out of three mission health centers because labor and indirect costs were higher (with the exception of indirect costs in Ghana).

8.1.3 Unit Costs of Treatment of Obstetrical Complications

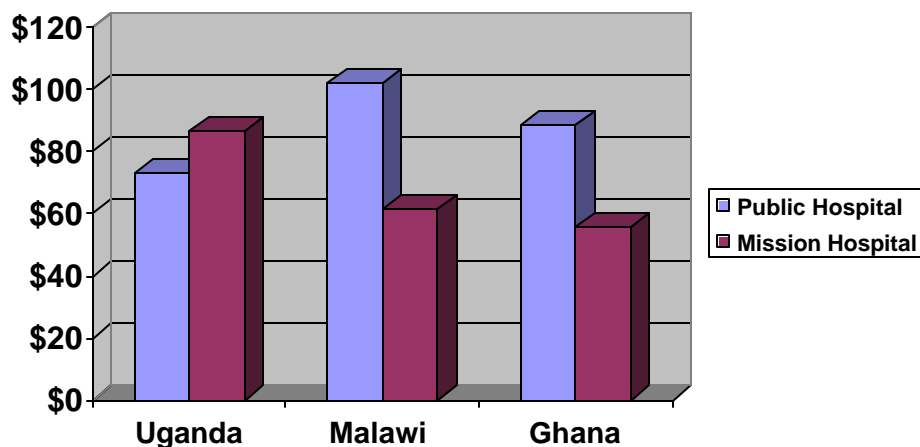
The studies also calculated the unit costs of treatment of four selected obstetrical complications: cesarean section, and treatment for post-abortion complications, postpartum hemorrhage, and eclampsia. With rare exceptions, these services are offered only at hospitals in the studies. In many cases, the complications were not observed due to the low frequency of cases treated.¹² When these interventions were not observed, the labor costs were calculated based on recall data of the amount of time spent on provision of these services.

The costs of cesarean section at the public and the mission hospitals were \$73.10 and \$86.48 respectively in Uganda, \$102.38 and \$61.39 in Malawi, and \$88.83 and \$55.60 in Ghana. That is, the costs at the public hospital were lower in Uganda, higher in Malawi and Ghana. The percent difference between unit costs in the two facilities was greatest in Malawi (40 percent), followed by a percent difference of 37 percent in Ghana and 18 percent in Uganda.

Figure 3 shows that the direction of cost differences between the public hospital and the mission hospital was not the same in all three countries. In Uganda, the unit cost of providing cesarean section was greater at the mission hospital than public hospital, but, in Malawi and Ghana, costs were greater at the public hospitals than at the mission hospitals, indicating differences in use of resources between public and mission hospitals by country.

¹² Although cesarean section deliveries took place in all hospitals during the observation periods, they were conducted in another part of the building and were not always observed.

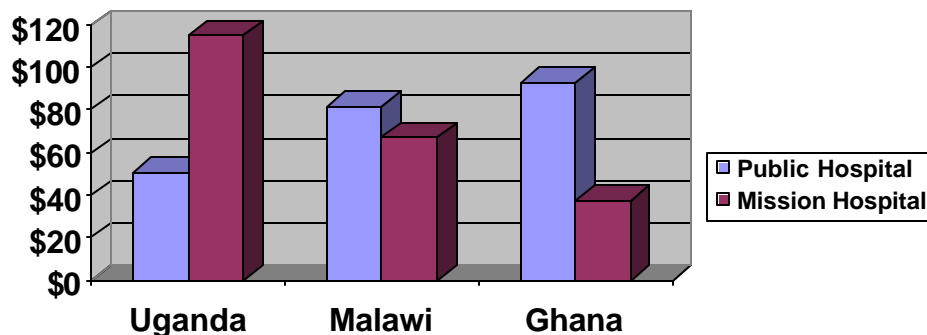
Figure 3. Unit Cost of Cesarean Delivery, by Facility and Country



The costs of treating post-abortion complications were lower than those of cesarean section in five of the six hospitals: the exception was the mission hospital in Ghana, due to this use of fewer materials and shorter hospital stays. The differences in costs at public and mission hospitals had the same directional patterns as cesarean section, however: The costs at public and mission hospitals were \$35.43 and \$57.60 in Uganda, \$41.77 and \$29.95 in Malawi, and \$66.46 and \$63.89 in Ghana, respectively.

Treatment of the last two complications, postpartum hemorrhage and eclampsia, was less frequently provided and relatively costly. For postpartum hemorrhage, the unit costs varied widely between the public and mission hospitals in two of the three countries (Figure 4): They were twice as much in the mission as the public hospital in Uganda and twice as much in the public hospital than mission hospital in Ghana, due to higher labor and material costs (see Table 6). In Malawi, however, the unit costs were relatively similar (20 percent difference).

Figure 4. The Cost of Treating Postpartum Hemorrhage in Private and Public Hospitals



The costs of treating eclampsia were particularly high at the public and mission hospitals in the sample: \$82.37 and \$159.66 in Uganda and \$106.58 and \$52.66 in Malawi. Since use of personnel time was observed only in the public hospital in Malawi and was based on recall estimates in the mission hospital in Malawi and both hospitals in Uganda, the amount of time required may have been an overestimate in the two hospitals in Uganda.

8.1.4 Composition of Costs of Treatment of Obstetrical Complications

Table 6 shows the unit costs of treating obstetrical complications by type of input in the six hospitals. Material costs comprised more than 50 percent of the total costs of all of the cesarean section and post-abortion complications services provided and most of the postpartum hemorrhage services. Materials comprised a smaller percentage of total costs of treating eclampsia, however, due to its more labor-intensive nature and longer length of stay.

Conversely, labor costs made up a smaller percentage of total costs of obstetrical complication services than did materials, except for eclampsia. Labor costs comprised 2 percent to 16.6 percent of total cesarean section costs, 3.8 percent to 27.0 percent of the costs of treating post-abortion complications, and 8.6 percent to 40.3 percent of postpartum hemorrhage services. The percentage of labor to total costs of eclampsia was relatively high in Uganda (46.8 percent to 69.6 percent), but lower in Malawi (17.9 percent to 19.7 percent).¹³

Table 6. Unit Costs of Obstetrical Complications, by Type of Hospital and Country

	Uganda		Malawi		Ghana	
	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital
Cesarean Section						
Labor	\$12.12(17)	\$10.68 (12)	\$2.00 (2)	\$4.67* (8)	\$12.55*(14)	\$8.65* (16)
Materials	38.39 (53)	53.15 (61)	54.72 (53)	44.12 (72)	51.20 (58)	38.02 (68)
Indirect Costs	22.60 (31)	22.64 (26)	45.66 (45)	12.60 (21)	25.08 (28)	8.93 (16)
TOTAL	\$73.10	\$86.48	\$102.38	\$61.39	\$88.83	\$55.60
Post-abortion Complications						
Labor	8.60 (24)	10.65 (19)	11.29 (27)	1.12* (4)	5.00* (8)	2.40* (4)
Materials	19.43 (55)	36.72 (64)	12.87 (31)	18.49 (62)	43.55 (66)	41.80 (65)
Indirect Costs	7.40 (21)	10.23 (18)	17.61 (42)	10.34 (35)	17.91 (27)	19.68 (31)
TOTAL	\$35.43	\$57.60	\$41.77	\$29.95	\$66.46	\$63.88
Postpartum Hemorrhage						
Labor	*10.18 (20)	*46.25 (40)	11.79 (14)	5.74 (9)	29.69* (32)	3.35* (9)
Materials	25.76 (51)	52.26 (46)	51.29 (63)	46.31 (69)	36.48 (39)	25.78 (69)
Indirect Costs	14.69 (29)	16.32 (14)	18.43 (23)	15.08 (22)	26.77 (29)	8.44 (22)
TOTAL	\$50.63	\$114.83	\$81.51	\$67.13	\$92.94	\$37.57
Eclampsia						
Labor	38.58* (47)	*111.15 (70)	21.02 (20)	9.43* (18)	NA	NA
Materials	13.33 (16)	19.50 (21)	19.50 (18)	21.07 (40)		
Indirect Costs	30.46 (37)	29.01 (18)	66.06 (62)	22.16 (42)		
TOTAL	\$82.37	\$159.66	\$106.58	\$52.66		

*Estimated on the basis of recall rather than observation.

Note: Figures in parentheses are percentages.

The percentage of indirect costs to total costs was 16 percent to 45 percent for cesarean section, 17.8 percent to 42.2 percent for post-abortion complications, 14.2 percent to 29.0 percent for postpartum hemorrhage, and 18 percent to 62 percent for eclampsia.

No clear pattern of directional differences was found between the unit costs of public and mission hospitals. In Uganda, costs were higher in mission than public hospitals due to higher material and labor costs. In Malawi and Ghana, costs were higher at the public hospitals than at the

¹³ Data on the cost of treatment of eclampsia was not provided in Ghana due to the low frequency of cases reported at the facilities.

mission hospitals for all types of costs. In most cases, the percentage of total costs that were indirect costs were greater at public than mission facilities. Indirect costs comprised a greater percentage of total costs at the two hospitals in Malawi than at the hospitals in Uganda and Ghana, because labor costs comprised a lower percentage.

8.1.5 Costs of Service Provision by Community Practitioners

8.1.5.1 Costs of Private Midwives

The cost of service provision by private midwives was estimated for antenatal care and vaginal delivery in Uganda and Ghana (Table 7). Labor costs were not calculated for private midwives in Uganda because the information for calculation of net profit for these solo practitioners was incomplete. Data were not collected for private midwives in Malawi because they do not comprise a significant proportion of the provider mix for maternal health care.

Table 7. Cost of Services Provided by Private Midwives

	Uganda (N=17)	Ghana (N=20)
Antenatal Care		
Labor	NA	\$1.56
Materials	0.71/3.01*	1.13
Other Personnel	0.31	0.33
Other Costs	0.10	0.00
TOTAL	\$1.39/3.42	\$3.02
Vaginal Delivery		
Labor	NA	8.81
Materials	3.10	3.55
Other Personnel	0.87	0.39
Other Costs	0.30	0.00
TOTAL	\$4.27	\$12.75

*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.

When the non-labor costs were compared, they were under \$1.50 for antenatal care (assuming no syndromic management of sexually-transmitted diseases in Uganda) and under \$4.50 for vaginal delivery services. The largest non-labor cost was materials, followed by other personnel.

The non-labor costs of service provision were similar or less than those of health centers. In Uganda, non-labor costs were more similar to those of mission health centers than public health centers, while in Ghana, non-labor costs were lower than either type of health center. However, it should be noted that costs of private midwives and those at health centers are not strictly comparable since methods of calculation are different.

8.1.5.2 Costs of Traditional Birth Attendants

The estimated unit cost of service provision by traditional birth attendants in the study sample in the three countries is presented in Table 8. The unit costs of TBA provision of antenatal care services were \$1.00 or less and of vaginal delivery services approximately \$4.00 or less. The cost of services is lower than that of services provided by private midwives and those at health centers in most cases, due to little use of materials and other personnel.

The percentage of total costs that went towards labor costs was over 50 percent, again since TBAs incurred relatively few costs for materials, other personnel, and other costs. The one exception was the cost of antenatal care services provided in Malawi since TBAs were distributing nutritional supplements to clients that they received from the Ministry of Health and Population.

Table 8. Costs of Services Provided by TBAs

	Uganda (N=20)	Malawi (N=20)	Ghana (N=20)
Antenatal Care			
Labor	\$0.96	\$0.30	NA*
Materials	0.00	0.56	0.16
Other Personnel	0.04	0.03	0.14
Other Costs	0.00	0.00	0.00
TOTAL	\$1.00	\$0.89	\$0.30
Vaginal Delivery			
Labor	3.02	1.29	3.23
Materials	0.82	0.15	0.26
Other Personnel	0.13	0.17	0.23
Other Costs	0.00	0.09	0.00
TOTAL	\$3.97	\$1.70	\$3.72

*Since few fees were charged for antenatal care by TBAs in Ghana, no labor cost was calculated.

8.2 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.

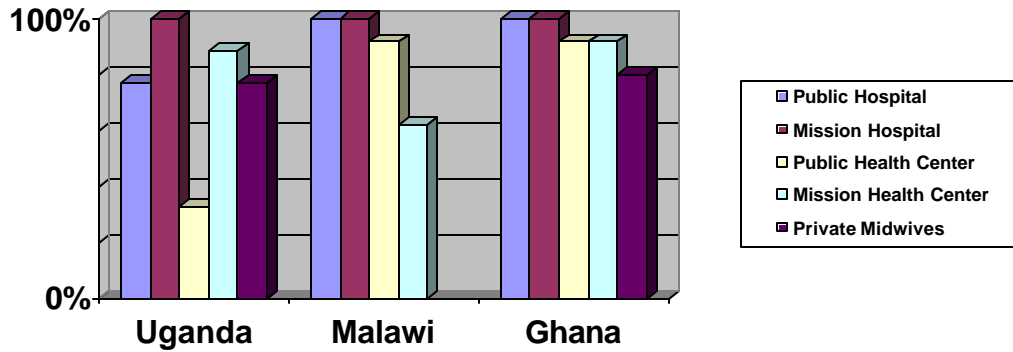
8.2.1 Structural Quality

The studies first examined the structural quality of facilities and private, i.e., the availability of key drugs and equipment (see Annex B for a list of key drugs, supplies and equipment).

The availability of key drugs in sample facilities (Figure 5) was better in Ghana than in the other two countries, possibly because of Ghana's "cash and carry" policy, which requires facilities to charge the full costs of drugs. In Malawi, the mission health center had only 62 percent of the key drugs available. In Uganda, fewer key drugs were available at the public facilities: only 33 percent in the public health center and 77 percent at the public hospital.¹⁴ The private midwives had close to 80 percent of key drugs in the two countries where they were surveyed (Uganda and Ghana).

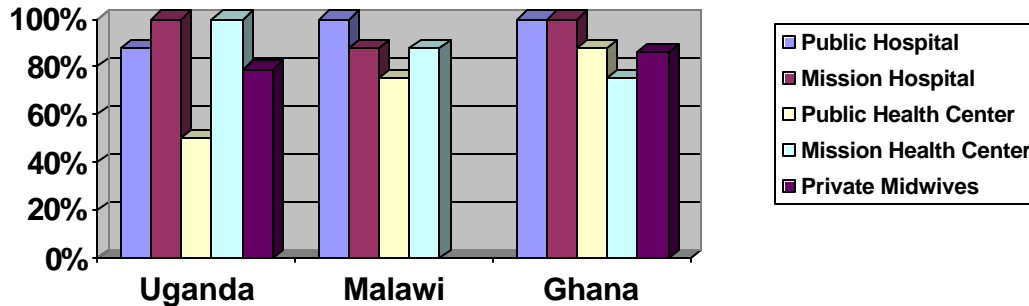
¹⁴ TBA drug availability is not shown here either because TBAs use so few drugs or because their drug use is restricted by ministry of health policies of their country.

Figure 5. Availability of Key Drugs in Facilities, by Country



The availability of key equipment was also examined (Figure 6). Most facilities and private midwives had over 80 percent of the key equipment. The exceptions were in the health centers: The public health center in Uganda had only 50 percent, the public health center in Malawi had 75 percent, and the mission health center in Ghana had 75 percent.

Figure 6. Availability of Equipment, by Facility and Country



As expected, hospitals generally had more key drugs and equipment than did health centers. On average, hospitals had most (96 percent) key drugs and equipment while health centers had only about three-quarters.

When the availability of key drugs and equipment was assessed in the two countries where private midwives were surveyed, they were found to have, on average, slightly less than the mission health centers (although in Ghana they had more equipment). They were better stocked than the Uganda public health center and slightly less well stocked than the Ghanaian public health center. TBAs, on the other hand, had few drugs and equipment.

There was no clear pattern of directional differences of drug and equipment availability among public and mission hospitals. The availability of drugs was the same in public and mission hospitals in Malawi and Ghana; in Uganda the mission hospital had more available. All hospitals had at least 88 percent of equipment, but the availability was slightly higher in the mission hospital in Uganda, and at the public hospital in Malawi. In Ghana, all key equipment was available in both hospitals.

In the six health centers, no pattern of differences of drug availability was found between public and mission health centers. Availability of equipment was higher at mission health centers than public health centers in two out of the three countries (Uganda and Malawi).

8.2.2 Process Quality Indicators

The studies also examined a few process indicators of service quality: whether clients received drugs that they were prescribed,¹⁵ and whether standard protocols were followed during service provision (Table 9).

The first measure of process quality was whether clients received drugs that they had been prescribed. Looking at level of facility, the percentage of clients that received all prescribed drugs varied from 48 percent to 100 percent in hospitals and 43 percent to 100 percent in health centers. In Uganda and Ghana, clients were slightly more likely to receive prescribed drugs at hospitals than health centers. In Malawi, however, they were more likely to receive drugs at the public health center than the public hospital.

Looking at type of facility, clients were more likely to receive prescribed drugs at mission hospitals than at public hospitals. However, among the health centers, this relationship only held in Uganda.

The second measure of process quality examined was facility adherence to standard procedures. Most key procedures took place in hospitals; in health centers they were carried out less frequently. Only one out of six hospitals (Uganda public hospital) failed to conduct laboratory tests for antenatal care clients. More procedures were skipped in health centers: Three out of six did not conduct tests for antenatal care clients, one did not conduct pelvic assessments during antenatal care, and one facility did not use a partograph (labor graph) during vaginal deliveries.

Table 9. Process Indicators, by Facility and Country

Hospitals	Uganda		Malawi		Ghana	
	Public	Mission	Public	Mission	Public	Mission
Prescribed drugs received at exit by clients						
All drugs	51%	100%	48%/54%*	96%	87%	100%
Some drugs	20%	0%	43%/43%*	4%	8%	0%
None	4%	0%	10%/3%*	0%	3%	0%
Standard procedures followed						
Antenatal Care:						
Lab tests	No	Yes	Yes	Yes	Yes	Yes
Pelvic/Phys.* Assessment	Yes	Yes	Yes	Yes	Yes	Yes
Delivery: Use labor graph	Yes	Yes	Yes	Yes	Yes	Yes
Health Centers	Public	Mission	Public	Mission	Public	Mission
Prescribed drugs received at exit by clients						
All drugs	43%	100%	96%	86%	84%	85%
Some drugs	57%	0%	4%	13%	16%	15%
None	0%	0%	0%	0%	0%	0%
Standard procedures followed						
Antenatal Care:						
Lab tests	No	Yes	No	No	Yes	Yes
Pelvic Assessment	Yes	Yes	Yes	Yes	No	Yes
Delivery: Use labor graph	Yes	NA**	Yes	No	NA**	Yes

*Includes percent for paying and non-paying wards **Procedure was not observed

¹⁵ This indicator is not strictly a process indicator since it may indicate that drugs were not dispensed because they were not available.

8.3 Measures of Efficiency

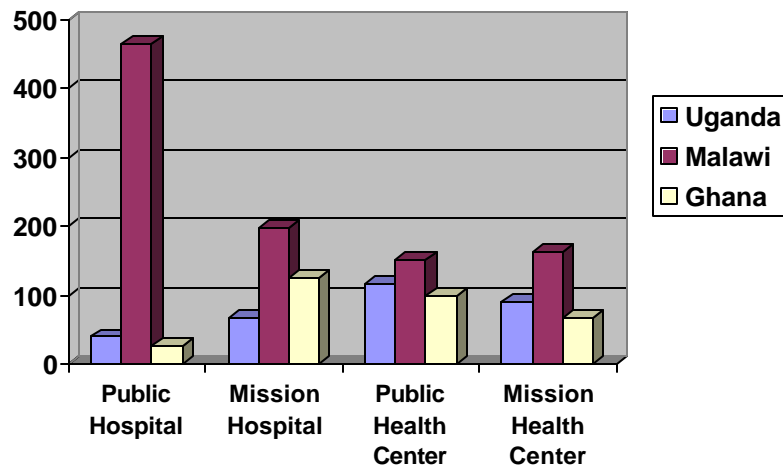
Two measures of efficiency were assessed to determine how well limited resources are being used by facilities in our sample: facility staffing patterns, and the amount of total time spent by maternal health personnel on administrative and unoccupied time.

8.3.1 Staffing Patterns

The adequacy of staffing within facilities is an indicator of whether provider resources are being used efficiently and whether quality services are being provided. If resources are not used efficiently, costs will be higher than necessary. For example, if a facility is overstaffed for the number of maternal health clients that it receives, then the labor costs will be high. In contrast, if a facility is understaffed, that is, the minimum number of staff necessary to provide services is not available, the quality of service provision could be inadequate.

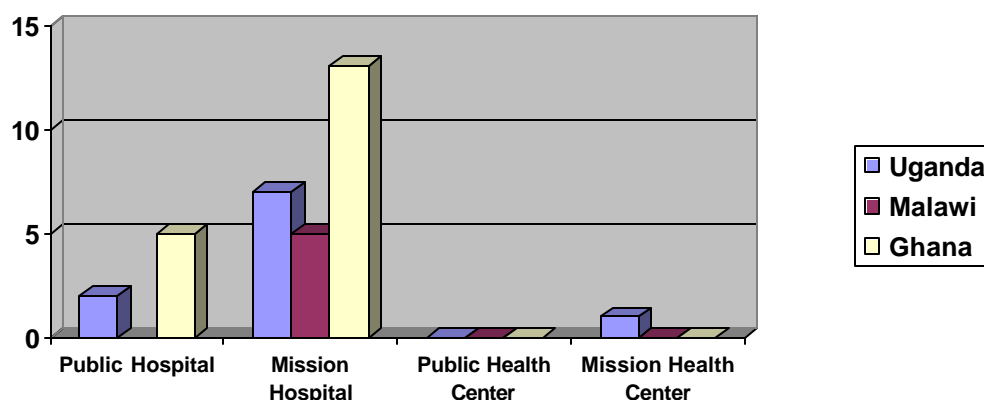
One criterion for judging appropriateness of maternal core staffing is number of nurse/midwives per facility. If it is assumed that a nurse/midwife should be able to attend 150-200 deliveries per year in a hospital setting, then the public hospitals in Uganda and Ghana and the mission hospital in Uganda were overstaffed, because they were conducting only 40, 28, and 67 deliveries per year, respectively. On the other hand, the public and mission hospitals in Malawi were understaffed, with midwives in these facilities conducting as many as 464 and 197 deliveries, respectively. The midwives at the health centers conducted fewer deliveries; this was acceptable because unlike a hospital, a health center requires at least two staff so that the center is staffed adequately at night and during holidays.

Figure 7. Number of Deliveries per Midwife



A second criterion is the number of laboratory personnel per facility. The study found the highest number of laboratory personnel in the mission hospitals (5-13), fewer at the public hospitals (2-5), and none at most health centers.

Figure 8. Number of Laboratory Personnel per Facility by Country



Note: no information was available on the number of laboratory personnel in the public hospital in Malawi.

8.3.2 Time Spent on Noncontact 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 10 shows the percentage of time that personnel spend on these two nonservice activities. The time spent on administrative activities was relatively high for supervisory midwives (average of 32 percent); it was lower for enrolled nurses/midwives (average of 19.3 percent), as would be expected. Interestingly, the time spent on administrative activities in hospitals for supervisory personnel was highest in facilities with low utilization, i.e., the Ghana public hospital, and lowest in those with high utilization, the Malawi hospitals. Similarly, enrolled nurses/midwives also were more likely to spend more time on administrative activities in facilities that had lower service volume.

Table 10. Percentage of Time spent by Nurses/Midwives on Noncontact Activities, by Facility

	Uganda		Malawi		Ghana	
	Public	Mission	Public	Mission	Public	Mission
Supervisory Nurses/Midwives						
Hospitals						
Administrative time	37%	41%	11.4%	21.8%	53.0%	21.4%
Unoccupied time	11%	13%	11.2%	12.8%	9.0%	6.3%
Health Centers						
Administrative time	20%	NA	27.0%	NA	NA	55.0%
Unoccupied time	9%	NA	10.0%	NA	NA	4.1%
Enrolled Nurses/Midwives						
Hospitals						
Administrative time	11%	17%	11.7%	23.4%	38%	18.7%
Unoccupied time	6%	10%	16.0%	13.1%	5.2%	1.8%
Health Centers						
Administrative time	23%	10%	14.8%	18.2%	8.6%	37.5%
Unoccupied time	8%	10%	27.9%	22.9%	17.8%	12.5%

The amount of time that personnel spent unoccupied or engaged in personal activities was relatively low among supervisory nurses/midwives (on average 10.6 percent at the six hospitals and 7.7 percent at the six health centers). Among enrolled nurses/midwives, the average time spent unoccupied was low at hospitals (8.7 percent) and higher at health centers (16.5 percent). The amount of time spent unoccupied did not appear to be associated with utilization. It should be noted, however, that unoccupied time may be artificially low due to observation bias, i.e., health personnel spent less time unoccupied than usual because they were being observed.

8.4 Client Costs

Data on user fees and other costs were collected from clients who received antenatal care services, those who had a vaginal or a cesarean delivery, and those who received treatment for obstetrical complications. Because of time and resource constraints, no interviews were conducted with clients of private midwives or TBAs, although information on service fees was collected from these practitioners. The sample sizes were small, particularly for non-routine services, and thus the numbers are not statistically significant.

Table 11 shows the costs incurred by consumers for routine services and includes user fees, travel costs, and other costs such as food.¹⁶ The costs for antenatal care ranged from \$0.97 to \$2.79 in Uganda, \$0.15 to \$8.70 in Malawi, and \$0.62 to \$3.15 in Ghana. For vaginal delivery, the costs ranged from \$2.26 to \$22.75 in Uganda, \$0.35 to \$7.86 in Malawi, and \$12.52 to \$20.64 in Ghana.

For routine services, the client costs were higher at hospitals than at health centers, due to higher user fees in some cases as well as greater travel costs. The higher travel costs suggest that the average distance to the hospitals was farther than to the health centers, but they could also be explained by differences in type of transport.

With the exception of the paying ward in the public hospital in Malawi, the costs to the clients were higher at the six mission facilities than at the six public facilities, either because of higher user fees or travel costs. The differences between client costs at mission and public facilities were particularly large at the health centers, since fees for services were low at public health centers.

¹⁶ Costs for medicines were included in the user fees.

Table 11. Costs to Client: Antenatal Care and Vaginal Delivery

	Uganda		Malawi		Ghana	
	Public	Mission	Public*	Mission	Public	Mission
Antenatal Care						
Hospitals (N)	(40)	(36)	(13/36)	(38)	(39)	(40)
User Fees	\$0.84	\$0.64	\$7.50/0.00	\$0.59	\$2.40	\$2.42
Travel Costs	0.83	1.26	1.13/1.12	0.51	0.60	0.64
Other Costs	0.04	0.16	0.07/0.04	0.09	0.05	0.09
Average Total Cost/Client	\$1.71	\$2.06	\$8.70/1.16	\$1.19	\$3.06	\$3.15
Health Centers (N)	(20)	(13)	(20)	(22)	(19)	(18)
User Fees	0.35	2.15	0.00	0.94	0.47	0.65
Travel Costs	0.56	0.00	0.12	0.22	0.15	0.08
Other Costs	0.07	0.64	0.13	0.01	0.00	0.05
Average Total Cost/Client	\$0.97	\$2.79	\$0.15	\$1.17	\$0.62	\$0.78
Vaginal Delivery						
Hospitals (N)	(9)	(3)	(2/21)	(27)	(2)	(9)
User Fees	4.35	18.26	7.50/0.0	5.45	11.77	18.10
Travel Costs	3.83	4.06	0.19/1.56	2.37	0.75	1.35
Other Costs	3.03	0.43	0.00/0.00	0.04	0.00	1.19
Average Total Cost/Client	\$11.20	\$22.75	\$7.69/2.56	\$7.86	\$12.52	\$20.64
Health Centers (N)	(1)		(4)	(9)		
User Fees	0.70	NA	0.00	1.35	NA	NA
Travel Costs	0.52	NA	0.30	0.41	NA	NA
Other Costs	1.04	NA	0.06	0.01	NA	NA
Average Total Cost/Client	\$2.26		\$0.35	\$1.77		

* In the public hospital in Malawi, both paying and non-paying clients were interviewed.

Client costs were greater for treatment for obstetrical complications, services offered only in hospitals. This was particularly true for cesarean sections (Table 12), for which clients paid \$13.22-\$59.24 in Uganda and \$68.39-\$139.58 in Ghana. All three components of costs—user fees, travel, and other costs—were higher than for routine services. With the exception of the paying ward in the Malawi public hospital, the costs were higher in mission than public facilities for treatment of complications.

Table 12. Costs to Clients: Cesarean Section and Other Obstetrical Complications in Hospitals

	Uganda		Malawi		Ghana	
	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital
Cesarean Section (N)	(1)	(4)			(3)	(2)
User fees	\$6.09	\$48.80	NA	NA	\$66.97	\$117.50
Travel costs	3.04	5.00	NA	NA	1.25	11.67
Other costs	4.09	5.43	NA	NA	0.14	10.42
Average total cost/client	\$13.22	\$59.24			\$68.39	\$139.58
Other Obstetrical Complications (N)		(1)	(6/10)	(5)		(4)
User fees	NA	48.70	7.50/0.00	1.96	NA	8.39
Travel costs	NA	0.00	0.20/1.38	0.32	NA	1.13
Other costs	NA	0.00	0.08/0.02	0.00	NA	1.93
Average Total cost/client		\$48.70	\$7.78/\$1.40	\$1.88	NA	\$11.44

Table 13 shows the user fees charged by community practitioners in the study sample. The fees charged by private midwives were usually higher than those charged at public health centers, but they were similar in Malawi and less than those charged at mission health centers in Uganda.

Table 13. Costs to Clients: User Fees Charged by Community Practitioners

	UGANDA		MALAWI*	GHANA	
	Private Midwives	TBAs	TBAs	Private Midwives	TBAs
Antenatal					
Median	\$0.87	\$0.22	\$0.05	\$2.47	NA
Mean	1.05	0.34	0.00	2.08	
Range	\$0.04-2.61	\$0.00-1.74	\$0.00-0.38	\$1.04-8.33	
Vaginal Delivery					
Median	8.70	3.74	1.37	8.85	2.08
Mean	7.80	3.61	1.58	8.99	3.41
Range	\$0.87-13.05	\$0.43-8.70	\$0.00-2.63	\$1.46-14.58	\$1.25-9.38

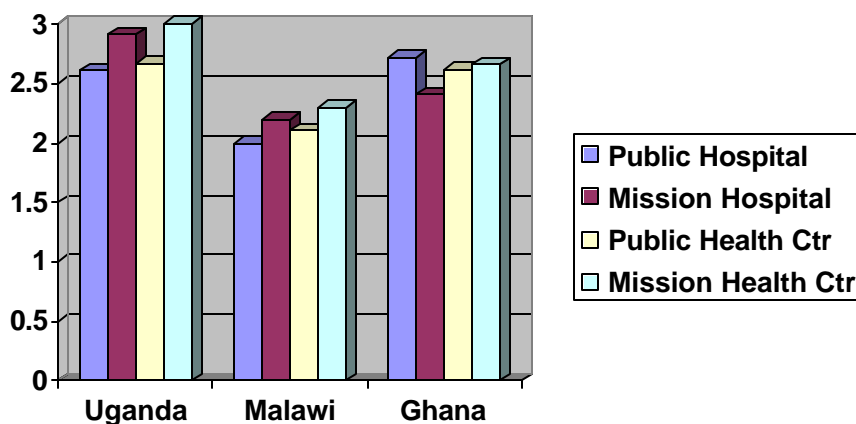
*In Malawi, data were collected only on TBAs.

Surprisingly, the fees charged by TBAs were similar to those charged at public health centers for antenatal care, but were greater for vaginal delivery. In spite of the fact that they provided fewer drugs and had less equipment, they still reported that they were able to charge these fees.

8.5 Client Satisfaction

During the exit interviews, the clients were asked about their level of satisfaction with the services they received at the health facilities in the sample. They were asked to rank three characteristics: privacy/confidentiality, attitude of health workers, and their overall impression of their visit as good (3), satisfactory (2), and poor (1). The reported client satisfaction by facility and country is shown in Figure 9.

Figure 9. Client Satisfaction, by Facility and Country



Although there is relatively small variation among respondents regarding their satisfaction with the services they received, they appeared to have a slightly better impression of their visits to the mission facilities. The exception to this was the Ghana hospitals, where the public hospital was ranked slightly higher than the mission one.

Client responses to the need for quality improvements in the facilities are shown in Table 14. In Uganda, clients wanted the facilities to shorten waiting time, have more drugs, and improve health worker attitudes, particularly at the public health center. In Malawi, where service utilization was highest, particularly at the public hospital, clients indicated that they preferred having less crowded facilities and more staff. Clients at the mission hospital and health centers were more concerned with making physical improvements to the facilities: better waiting rooms, better bathrooms, and better buildings. In Ghana, clients were most concerned with having more or better advice, more drugs, and better worker attitude. Considerable variation was found between clients at Ugandan facilities where the majority stated that no improvements were required, compared with clients at Malawian and Ghanaian facilities, where most clients felt improvements were necessary.

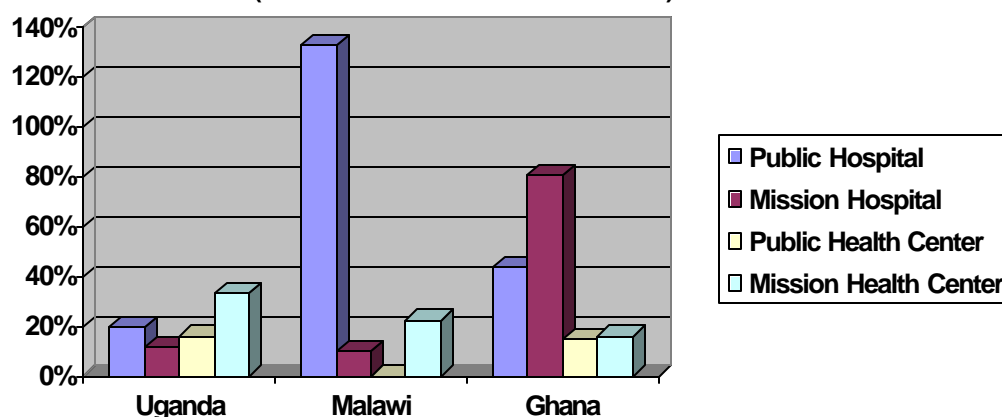
Table 14. Respondents Stating Quality Improvements Needed, by Facility and Country (in percent)

	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Uganda				
Less waiting	8	11	14	0
More drugs	10	0	5	13
Better attitude	4	9	14	0
None needed	63	65	29	67
Malawi				
Less waiting	13			
More staff	15			
Less crowded/more beds	14			21
Better attitude		25		
Better waiting/bathrooms		8	33	
Better building			28	
Cleaner facility		9		13
Electricity				31
None needed	<10	22	<10	<10
Ghana				
More or better advice	13	9		13
Better staff	8		12	22
More drugs	19	12	23	
Better attitude	8	10		
Laboratory Facilities			19	
None Needed	<1	<1	<1	9

8.6 Cost Recovery

Cost recovery, or the percentage of total costs recovered through fees for services, varies considerably across the study facilities in three countries.

Figure 10. Cost Recovery Rates for Antenatal Care, by Facility and Country (Percent of total costs recovered)



For antenatal care, the service costs recovered by user fees in the 12 facilities were relatively low. In Uganda and Malawi, the rates were less than 35 percent, with the exception of the paying ward at the public hospital in Malawi. In Ghana, the rates ranged from 15 percent in the public health center to 81 percent in the mission hospital. (As noted earlier, drug costs were being fully recovered). One reason that cost recovery rates are so low for antenatal care is that facilities often set their fees lower for this service to encourage its use. Cost recovery rates were higher for mission health centers than for public health centers, but there was no directional pattern for differences in hospitals for this service. The amount recovered for drugs and materials is higher (Table 15), but does not recover all of the costs in most cases.

Table 15. Cost Recovery Rates for Materials for Routine Services, by Facility and Country (in percent)

Service	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Uganda				
Antenatal Care	56	16	34	134
Vaginal Delivery	101	346	59	NA
Malawi				
Antenatal Care	169*	12	0	39
Vaginal Delivery	66*	84	0	29
Ghana				
Antenatal Care	93	116	24	27
Vaginal Delivery	155	249	NA	NA

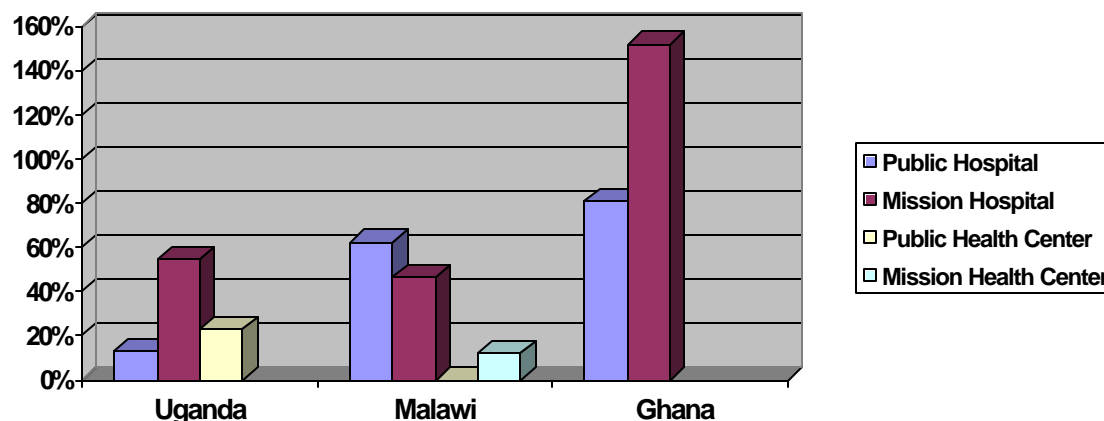
*Cost recovery is based on fees for paying clients.

Cost recovery rates (Figure 11) were generally higher for vaginal delivery than for antenatal care, particularly in the hospitals. However, they were still low in the public hospital in Uganda, the public health center in Uganda, and the mission health center in Malawi. They ranged from 12.2 percent to 23 percent for health centers, and from 13 percent in the public hospital in Uganda to 152 percent in the mission hospital in Ghana.

Cost recovery rates at mission hospitals were higher than those of public hospitals in Uganda and Ghana, but not in Malawi, due to high fees in the public paying ward. As noted above, the rates were highest at the Ghana mission hospital (152 percent). When the percentage of material costs recovered

is examined (Table 15), most were obtained at the hospitals (over 100 percent in the facilities in Uganda and Ghana); the percentage recovered at health centers was lower.

Figure 11. Cost Recovery Rates for Vaginal Delivery, by Facility and Country (Percent of total costs recovered)



*Note: cost recovery rate for public hospital in Malawi is only for paying clients

The cost recovery rates for treatment of obstetrical complications are shown in Table 16. The rates were lowest in Malawi, for treatment of postpartum hemorrhage and eclampsia. Rates were higher for post-abortion complications in Uganda than in Ghana, and higher for cesarean sections in Ghana than in Uganda.

Table 16. Cost Recovery Rates for Treatment of Obstetrical Complications, by Type of Hospital and Country (in percent)

	Uganda		Malawi		Ghana	
	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital
Cesarean Section	\$8	\$56	NA	NA	\$75	\$211
Post-abortion Complications	NA	\$81	NA	NA	\$27	\$20
Other obstetrical complications	NA	NA	\$35.9	\$6.5	NA	NA

9. Discussion

9.1 Costs

The country case studies that led to this synthesis found considerable variation in the unit costs of maternal health service provision in the sample facilities in each of the three countries, both between levels and among public and mission facilities. Unit costs were lowest for antenatal care services at all facilities because the services require little personnel time and short facility stays. Treatment of obstetrical complications was the most costly, due to higher use of drugs and supplies, personnel time in some cases, and indirect costs such as maintenance and utilities because of the longer stay required at the hospitals.

9.1.1 Costs by Components

Drugs and supplies were the most costly component of maternal health services, comprising on average half of the unit costs of services. Variations in material costs were due to the amount of materials used, type used, comprehensiveness of the treatment, and differences in input prices. Because the lines of treatment were more comprehensive in the referral hospitals that participated in the studies, as was expected, they used more drugs, supplies, and laboratory tests, and their materials costs were higher. The studies also found differences in costs between public and mission facilities. In general, more materials were used in mission health centers than in public health centers, while the differences were mixed in hospitals. Since the information on prescribing practices was obtained through provider interviews, some possibility of bias exists, i.e., the providers in our sample may have exaggerated their use of drugs and supplies. However, since similar trends were found in all three countries, the bias is probably limited. In order to examine differences in sources of drugs, quantities used of drugs, and prescribing practices in these facilities, a future study may consider examining prescribing practices through observation techniques.

Indirect costs, which comprise the costs of noncontact time of health personnel, time of supervisory and support personnel, and maintenance and utilities, were also large for the services costed in the sample: from 17 percent to 52.7 percent of routine services and 16.1 to 62 percent of obstetrical complications. These costs are often not calculated in studies, particularly the costs of noncontact time of health personnel. The high percentage of total costs spent on noncontact time demonstrates their importance and the usefulness of conducting personnel observation. This information can be used to assist managers to make efficiency improvements in their facilities, for example, to reduce the amount of time required for administrative activities such as recordkeeping.

Because they support all the services provided in a facility, indirect costs are related to the overall service volume in facilities as well as to the number of supervisory and support personnel at hospitals. As the total number of services provided increases, the percentage of indirect cost for an individual service decreases. This effect of higher utilization on a facility's indirect costs was seen in Ghana, where the indirect costs at the mission hospital, which had considerably higher utilization than did the other three facilities studied, comprised a lower percentage of total unit costs.

9.1.2 Cost Differences by Level of Provider

Unit costs of routine services differed between hospitals and health centers. In general, unit costs of services were higher at hospitals than at health centers due to more use of materials and higher indirect costs, particularly in the public hospitals. However, some exceptions occurred—such as antenatal services in mission facilities—since factors such as service volume and use of more highly skilled personnel also affected costs.

The non-labor costs of service provision of one type of community practitioner, the private midwives, were comparable or lower than those of health centers in our sample. When the non-labor costs of private midwives were compared with those at health centers, they were found to be similar to costs at mission facilities in Uganda and lower than costs at public or mission facilities in Ghana. In addition, their structural quality was found to be between that of the public health center and mission health centers.

The costs of the other type of community practitioner, the TBAs, were lower than other providers. However, it should not be concluded that they are a cost-effective alternative to other services, because they lack key drugs and equipment and competency. Instead, they should be used when other options are not available.

9.1.3 Cost Differences by Type of Provider

The studies found differences between unit costs of maternal health services in public facilities and costs in mission facilities. In mission health centers in Malawi and Ghana, costs were about 30 percent higher than in the public health centers, because more labor time and materials were used in service provision.¹⁷ While structural quality indicators—the availability of materials and equipment—were not necessarily better in the three mission health centers, the process quality indicators that were examined—receipt of prescribed drugs by patients, adherence to standard protocols for treatment—were better in two of three. Clients also indicated that they were slightly more satisfied with the services at mission health centers than at public health centers in all three countries.

It should be noted, however, that service volume was higher in public health centers in this study's sample than in mission health centers in two of the three countries (Uganda and Malawi). One explanation is that higher user fees at the mission health center may be a deterrent to use. In Ghana, however, overall use of mission facilities for maternal health care was considerably higher than use of public facilities, possibly because the difference in user fees for antenatal care services at public and mission facilities was smaller than in the other two countries.

When cost differentials were examined in public and mission hospitals, unit costs of five of the six services (the exception being antenatal care services) were found to be higher in public hospitals than in mission hospitals in Malawi and Ghana; in Uganda, costs were higher in the mission hospital for five of the services. Despite this finding, structural and process quality indicators were generally better at the mission hospital than at the public hospital in all three countries. In addition, the three mission hospitals had more appropriate staffing for the number of maternal health services that they provided.

¹⁷ The percent difference between unit costs of the two routine services in public and mission health centers in Uganda was much greater (190 percent to 465 percent) because the mission facility used a medical doctor rather than a midwife to provide routine services.

The findings suggest that the mission facilities in the sample provide maternal health services at the same level of quality or at better level than public facilities, and with costs that are slightly higher than in health centers but often lower than in hospitals. However, it should be noted that these facilities have some of the same inefficiencies—for example, underutilization of resources—as do public health facilities.

Since differences in service volume between public and mission facilities in the study sample were observed, it would be useful to conduct assessments in these countries to determine whether client choices are affected by the magnitude of user fees as well as other factors such as distance to the facility and perceived health outcomes. If service fees are a deterrent to use, then these facilities may need to make some adjustment to their fees, particularly since, in some cases, underutilization of services was observed. If the public is unaware of a facility's good service quality and thus underutilizes the facility, then the facility should consider promotion of its services.

Another private provider of health services is the private midwife. These providers offer services at similar or lower non-labor costs as do health centers, and were equipped with most key drugs and equipment to provide routine services. The private midwives in the sample appear to be a reasonable alternative for clients to use for routine services. However, it should be noted that their fees were often higher than those at health centers and more comparable to those at hospitals. In addition, wide variation in use of drugs and supplies was found among them, suggesting that some monitoring of their service quality should take place.

9.2 Efficient Use of Resources

The studies observed inefficient use of labor resources in some of the facilities. In the three public hospitals and, to a lesser extent, the three mission hospitals, the number of midwives appeared to be inappropriate, either greater than required for the number of services provided (Uganda and Ghana) or lower than required (Malawi). When overstaffing takes place, the cost of personnel used to provide services is often higher than it should be. On the other hand, if understaffing occurs, the cost of personnel is lower but the process quality of services may be unsatisfactory because less, and perhaps inadequate, time will be spent to provide a service to each client.

Health centers were generally staffed appropriately, since they required additional staff to be available to provide services at night or on weekends. However, in a few cases, health personnel were inappropriate, as in the mission health center in Uganda where a physician provided routine services, or insufficient, as in the public health center in Uganda. When the personnel are too highly skilled to provide only routine services, the labor costs will be higher than necessary. When not enough staff are posted to a health center, access to services will be limited.

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.

9.3 Cost and Quality

Although the data on quality was limited, the studies examined the relationship between cost and quality to some extent in the sample facilities. The two appear to be related but may not have a linear relationship. That is, a minimum level of resources is necessary to have structural quality, i.e., available key materials and equipment. The limited information on other measures of quality, such as process indicators and client satisfaction, did not appear to be related to cost, however. When materials and equipment were available, whether procedures were followed or not appeared to depend

less on that availability but on other factors such as how well a specific facility is managed, knowledge about standard protocols, and orientation towards client-centered care. These in turn depend on the availability of standard protocols at the central level and training of health personnel in management of personnel and resources. Thus, while there may be a relationship between cost and quality, other confounding factors are likely to be involved. This relationship needs to be explored more fully.

9.4 Client Costs

Costs to the client other than fees for services comprised more than 50 percent of total costs when fees for services were low, as in the case of Ugandan routine services and in public facilities in Malawi (with the exclusion of the paying ward in the Malawi public hospital). In cases when the fees were more substantial, such as the mission facilities in Malawi and all facilities in Ghana, costs other than fees were less than 50 percent of client costs.

The implication of the relative importance of travel and other costs to total client costs in the study sample is that facilities should take these costs into account when making adjustments to their fee levels, particularly when user fees are low. When introducing or increasing fees for services, it is also probably important for facilities to launch promotion campaigns on the benefits of using services at their facilities as well as to increase their responsiveness to client needs.

Client costs were found to be generally higher at hospitals than at health centers and at mission facilities than public facilities for the same service. Despite higher costs at hospitals, however, clients were more likely to use hospitals than health centers, probably because they felt that service value was higher at these facilities.¹⁸

The higher service volume at public facilities than mission facilities in the sample in Uganda and Malawi suggests that the higher user fees at the mission facilities may be affecting choices of public over mission facilities. For this reason, some assessment of willingness and ability to pay for services should be conducted in these countries to determine whether they are appropriate. In Ghana, on the other hand, at least twice as many clients were utilizing services at the mission facilities as at the public facilities, despite the fact that few differences were found in the study's measures of service quality. This finding suggests that factors other than cost differentials were affecting client choices in this setting, such as lack of knowledge about recent improvements in service provision or dislike of fees for services in public facilities. Further research should take place to determine how to increase utilization of the public facilities in this case.

The service fees charged by private midwives were higher than those charged at public health centers and sometimes as high as those for hospital services, suggesting that they were competing for clients, but not targeting lower-income clients. Surprisingly, fees charged by TBAs were comparable or greater than those charged at health centers, perhaps because they were providers of "convenience," requiring no travel costs by the client. This finding suggests that clients are paying for services, even at the lowest levels. It would be of interest to find out the percentage of clientele that are able to pay their fees.

¹⁸ Table 14 on quality improvements gives some indication that clients believe that they are getting better value at hospitals.

9.5 Cost Recovery

In general, cost recovery rates of recurrent costs of maternal health services were higher at hospitals than health centers and at mission than public facilities in the study sample, and these differences may be appropriate since they are trying to attract different clientele. As noted earlier, the higher rates did not appear to be affecting choices of facility level since service volume was considerably higher at hospitals than health centers. They may be affecting choices of mission over public facilities to some extent.

The potential for increasing low cost recovery rates in facilities should be assessed, particularly when rates are lower than 20 percent. In order to do so, however, willingness and ability to pay studies should be conducted to determine whether utilization would be affected by the increase in fees.

Cost recovery rates did not appear to be set systematically or considered when setting user fees in the facilities in two of the three countries, Uganda and Malawi. In addition, there were wide differences between cost recovery in health centers, public facilities, and mission facilities. Policies on cost recovery should be developed, including determining the percentage of operating costs that facilities would like to recover. For example, facilities may set a goal of recovering the costs of drugs and supplies rather than all operating costs. When setting cost recovery goals, however, the facilities should ensure that they have adequate supplies of key materials and equipment and that they comply to standard service protocols. These steps, in conjunction with the willingness and ability to pay studies discussed above, should allow a cohesive cost recovery policy to be initiated in these countries.

9.6 Issues in Methods of Data Collection

The methodology that was used in this study differed from other costing studies of maternal health care in a few ways. First, it involved the use of personnel observation and collection of recall information rather than only recall to obtain information on how they allocated their time at the health facilities. The observation of personnel time use has both advantages and disadvantages. Two advantages are that it allows labor costs to be calculated more accurately for the activities that are observed (Bratt 1999); and it allows for the time spent on administrative and unoccupied and personal activities to be estimated. Two disadvantages are that some obstetrical complications are rarely observed and the labor costs must be estimated through recall anyway; and observation is labor-intensive, and therefore costly, and results in a reduced sample size when a study's budget is limited.

A second methodology, developed for determining the cost of materials in this study, differed from other studies in that it took a weighted average of different lines of treatment for services, based on progressions of treatment as well as severity. For example, the costs of both treating first-time visits and follow-up visits for antenatal care were determined and an average cost was determined.

The analysis of the three case studies demonstrated a few areas where data collection methods can be further enhanced. First, the way in which drug and supply costs was estimated was based on recall of maternal health personnel, usually midwives. Although it was possible to determine whether they were using key drugs and supplies, it was difficult to assess whether they were prescribing drugs correctly or whether they were overprescribing using this method of data collection. A possible alternative type of data collection would be to include some observation of use of drugs and supplies

during service provision. In addition, the use of drugs and supplies could be compared to standard country protocols for maternal health services if they are available.¹⁹

The information that was obtained through interviews with private midwives proved to be incomplete since not all of the information on their fee structures was collected. In addition, it is possible that the private midwives exaggerated their use of drugs and supplies. Other methods of obtaining this information should be reviewed and considered to get a more accurate picture of their use of resources in the provision of maternal health services.

The assessment of quality in the study was limited and should be developed more fully in a later study to more fully discuss differences in the unit costs of services in facilities.

¹⁹ These protocols should be compared with international standards as well.

10. Policy Implications

The findings of the country studies yielded some policy implications regarding the allocation of scarce resources and financing options.

10.1 Improving Efficiency

Overstaffing at hospitals in the sample resulted in higher labor costs, as in the case of the four facilities in Uganda and Ghana, while understaffing resulted in compromised service quality, as in the case of Malawi. In addition, the use of overly skilled staff to provide routine services also increased service costs. These findings suggest that the appropriate number and use of staff should be assessed at facilities and adjusted when required.

In addition, facilities should examine the time use of their staff. If they find, for example, that staff are spending too much time on administrative duties, then some of these activities should be streamlined to allow the staff to spend more time on other relevant activities.

When service volume is too low in a facility, unit costs of services increase. In such cases, facilities should try to attract more clients through improving service quality, or, when appropriate, promotional activities. In addition, they should assess clients' willingness and ability to pay fees for services to determine whether fees deter use and therefore should be adjusted.

Because the sample size of these studies was so small, findings regarding differences in costs between facility level and private/mission differences will have to be verified in a larger costing study. In the meantime, the current findings and their possible policy implications are shown in Table 17.

Table 17. Possible Policy Implications of Study Findings on Cost Differences between Facilities

Findings	Possible Policy Implication
Unit costs of maternal health services were smaller at lower levels of the health care system, particularly in public facilities.	Service costs for routine services could be reduced through increased use of services at lower levels of the health care system.
Mission facilities in this study's sample offer services that have similar or better quality as public facilities	Governments may want to consider contracting out/subsidizing services to mission facilities in order to increase the availability or accessibility of services.

10.2 Cost Recovery

The analysis of unit costs and percentage of costs recovered from user fees in the sample indicates that a more systematic method of price setting in these facilities would assist facilities to reach their goals of financial sustainability. A facility could 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 large differentials between user fees in some of the public and private sector facilities sampled, the public sector may want to consider raising its fees to cover more of its costs. At the same time, it should investigate how to improve its supply of essential drugs so that it can ensure a minimal level of quality control before raising fees significantly.

Before considering an increase in user fees, the public sector facilities should ensure that the population would continue to be able to utilize its services if fees were increased through some assessment of willingness and ability to pay by clients. This 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, especially when service volume is low as mentioned above. As learned in Kenya (Collins 1996), cost recovery goals and user fee levels then need to be well communicated to the public so that they know the uses of their money and how much their services are still subsidized.

Another factor to research before setting fees is the relevance of costs to the consumer's decision to seek emergency maternal health services and the extent to which fees for service are a barrier to use of these services. While emergency maternal health care services are particularly costly to provide, high fees for the services could deter use, especially when added to other factors such as cost of and access to transport and cultural beliefs.²⁰ Information on the determinants of emergency maternal service use and the relative importance of service fees could be used by facility managers/administrators in considering rates of cross-subsidization for these 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 so that there can be risk-sharing among clients. 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.

In considering premium, capitation, or other prepayment rates for maternal health services, a country's Ministry of Health or private facilities should consider the fees for all health services at its institutions and at other ones as well. This is also true for individual private facilities.

10.3 Consumer Costs

In setting user fees, facilities should take into account the total array of fees—transport fees, time, and, other costs in addition to fees for services, since these are likely to affect consumers' decisions to use maternal health services, particularly when fee structures are low. They should also investigate whether launching promotion campaigns of service benefits will increase consumer willingness to pay.

²⁰ Other factors such as transport costs, access to transport and cultural factors are also likely to affect use of services

Annex A. Disaggregation of Indirect Costs

Table A1. Indirect Costs of Routine Services by Type of Facility and Country (U.S. dollars)

	Hospitals		Health Centers	
	Public Hospital	Mission Hospital	Public Health Center	Mission Health Center
Uganda				
Antenatal Care				
Labor Noncontact 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 Noncontact 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
Malawi				
Antenatal Care				
Labor Noncontact Time	0.03	0.11	0.35	0.38
Other Personnel	0.29	0.26	0.11	0.42
Maintenance and Utilities	0.46	0.17	0.27	0.02
TOTAL	\$0.78	\$0.54	\$0.73	\$0.82
Vaginal Delivery				
Labor Noncontact Time	0.25	0.15	0.82	1.45
Other Personnel	6.71	1.62	1.04	4.21
Maintenance and Utilities	4.56	2.26	2.47	0.21
TOTAL	\$11.52	\$4.03	\$4.33	\$5.87
Ghana				
Antenatal Care				
Labor Noncontact Time	1.75	0.43	0.56	1.01
Other Personnel	0.20	0.03	0.08	0.03
Maintenance and Utilities	0.14	0.02	0.07	0.02
TOTAL	\$2.09	\$0.48	\$0.71	\$1.06
Vaginal Delivery				
Labor Noncontact Time	2.53	2.00	0.82	1.45
Other Personnel	1.45	0.43	1.62	1.02
Maintenance and Utilities	1.03	0.32	1.43	0.47
TOTAL	\$5.01	\$2.75	\$3.87	\$2.94

*Estimated based on recall rather than observation

Table A2. Indirect Costs of Obstetrical Complications, by Hospital and Country

	Uganda		Malawi		Ghana	
	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital	Public Hospital	Mission Hospital
Cesarean Section						
Labor Noncontact Time	\$2.64	\$2.39	\$0.59	\$1.46	\$5.20	\$3.66
Support Personnel	1.35	2.12	26.83	4.47	11.60	3.03
Maintenance and Utilities	18.61	18.13	18.24	6.67	8.28	2.24
TOTAL	\$22.60	\$22.64	\$45.66	\$12.60	\$25.08	\$8.93
Post-abortion Complications						
Labor Noncontact Time	5.59	8.63	6.34	0.59	5.49	14.41
Support Personnel	0.12	0.17	6.71	3.92	7.25	3.03
Maintenance and Utilities	1.69	1.43	4.56	5.83	5.17	2.24
TOTAL	\$7.40	\$10.23	\$17.61	\$10.34	\$17.91	\$19.68
Postpartum Hemorrhage						
Labor Noncontact Time	2.22	3.66	1.53	6.72	14.35	6.18
Support Personnel	0.84	1.33	10.06	3.36	7.25	1.30
Maintenance and Utilities	11.63	11.33	6.84	5.00	5.17	0.96
TOTAL	\$14.69	16.32	\$18.43	\$15.08	\$26.77	\$8.44
Eclampsia					NA	NA
Labor Noncontact Time	5.74	3.69	9.73	1.26		
Support Personnel	0.86	2.66	33.53	8.40		
Maintenance and Utilities	23.86	22.66	22.80	12.50		
TOTAL	\$30.46	\$29.01	\$66.06	\$22.16		

Annex B. Key Drugs, Supplies, and Equipment

Service	Key Drugs* and Supplies
Antenatal Care	Tetanus Toxoid Ferrous sulfate Folic acid
Vaginal Delivery	Paracetamol or aspirin Dextrose Lidocaine
Cesarean Section	Antibiotics Dextrose Oxytocin
Other Obstetrical Complications	Diazepam Oxytocin Diazepam Hydralazine
Service	Equipment
Antenatal Care	Fetoscope Blood pressure cuff Adult weighing scale
Obstetrics	Working autoclave Needle holder Stitch scissors Forceps (dissecting) Baby weighing scale

*Drugs include nutritional supplements, vaccines and other medicines.

Annex C. Bibliography

- Bratt, John H., James Foreit, Pai-Lien Chen, Caroline West, and Teresa de Varga. Forthcoming December 1999. "A Comparison of Four Approaches for Measuring Clinician Time Use." *Health Policy and Planning*.
- Collins, D., J.D. Quick, S.N. Musau, D. Kraushaar, and I.M. Hussein 1996. "The Fall and Rise of Cost Sharing in Kenya: The Impact of Phased Implementation." *Health Policy and Planning* 11(1): 52-63.
- Dmytraczenko, Tania, Scarlet Escalante Carrasco, Katherina Capra Seone, John Holley, Wendy Abramson, Antonio Saravia, Iain Aitken and Marilyn Aparecio. *Evaluación del Seguro Nacional de Maternidad y Niñez en Bolivia*. Technical Report 22. Bethesda, MD: Partnerships for Health Reform, Abt Associates Inc.
- Family Health International. 1996. *Manuscript on the Methodology and Cost Analysis for APROFE, the Ecuadorean IPPF Affiliate*. North Carolina: Family Health International.
- Favin, Michael, Bonnie Bradford, and Deborah Cebula. 1984. *Improving Maternal Health in Developing Countries*. Washington, DC: World Federation of Public Health Associations.
- Levin, A., A. Amin, A. Rahman, R. Saifi, Barkat-e-Khuda and K. Mozumder. 1997. "Cost-Effectiveness Analysis of Family Planning and Maternal and Child Health Alternative Service Delivery Strategies in Rural Bangladesh." *International Journal of Health Planning and Management* 14: 219-233.
- Levin, A., T. Dmytraczenko, F. Ssengooba, M. McEuen, F. Mirembe, O. Lkui, M. Nakakeeto, and P. Cowley. May 1999. *Cost of Maternal Health Care Service in Masaka District, Uganda*. Special Initiative Report 16. Bethesda, MD: Partnerships for Health Reform, Abt Associates Inc.
- Levin, A., R. Mangani, M. McEuen, R. Chiweza, N. Chizani. July 1999. *Cost of Maternal Health Care Services in Blantyre District, Malawi*. Special Initiative Report 17. Bethesda, MD: Partnerships for Health Reform, Abt Associates Inc.
- Levin, A., M. McEuen, V. Tanzi, G. Van Dyck, and N. Sekyere-Boakye. October 1999. *Cost of Maternal Health Care Services in South Kwahu District, Ghana*. Special Initiatives Report 20. Bethesda, MD: Partnerships for Health Reform, Abt Associates Inc.
- Maine, Deborah. 1991. *Safe Motherhood Programs: Options and Issues*. New York: Columbia University.
- MotherCare Project. 1998. *Addressing Obstetric and Neonatal Complications in Africa from Community and Facility Perspectives: Descriptive Reports from Ghana, Malawi, and Uganda*. Arlington, VA: John Snow Inc.
- Rational Pharmaceutical Management Project. August 1998. *The Cost Estimate Strategy (CES) for Improving the Availability and Use of Reproductive Health Commodities: Kenya Field Test Report*. Boston, MA: Management Sciences for Health.

- Rosenthal, Gerry, 1991. *Maternity Services in Cochabamba, Bolivia: Costs, Cost Recovery, and Changing Markets Report of a Field Study*. Report prepared for the Agency for International Development. Arlington, VA: Mothercare/John Snow, Inc.
- Tinker, Anne and Margerie Koblinsky, 1992. *Making Motherhood Safe*. Washington, DC: The World Bank.
- World Bank. 1993. *World Development Report*. Washington, DC.
- World Health Organization. 1994. *Mother-Baby Package: Implementing Safe Motherhood in Countries*. Geneva.
- World Health Organization. 1998. *Mother-Baby Package Costing Spreadsheet User Guide*. Prepared for Maternal and Newborn Health/Safe Motherhood, Division of Reproductive Health. Geneva.