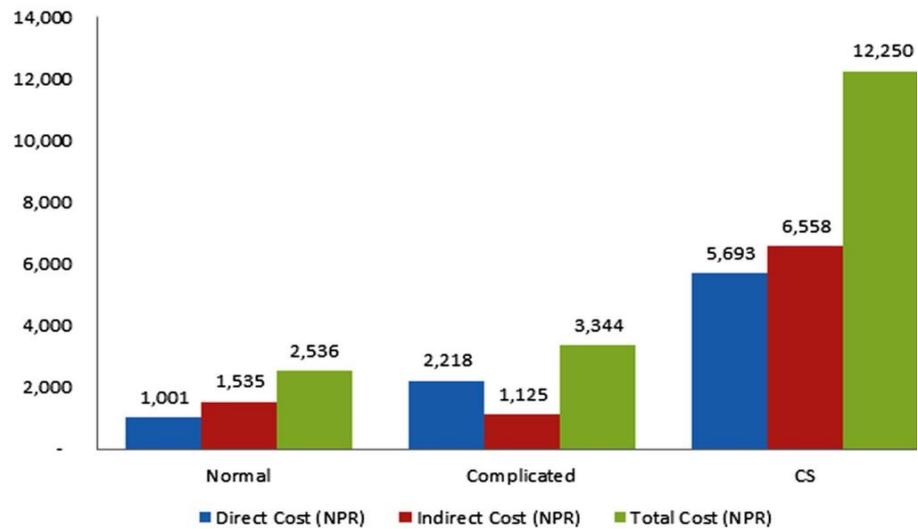




Ministry of Health & Population



Unit Cost Analysis of the Health Facility Reimbursement made under the Aama Programme



Dr. Suresh Tiwari et al



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Study Team

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EXECUTIVE SUMMARY

The Aama Programme is one of Nepal's national flagship programmes aimed at increasing institutional delivery and thereby improving maternal health outcomes. Since its launch ten years ago, the Aama Programme has made a significant contribution to increasing institutional delivery. The Aama Programme is primarily a Demand Side Financing (DSF) mechanism which includes incentives to women, free institutional delivery for all types of deliveries, incentives to health workers, and incentives for women who complete four antenatal care (4ANC) visits.

In July 2005, the Government of Nepal (GoN) launched the Maternity Incentive Scheme (MIS), which was renamed the "Safe Delivery Incentive Programme" (SDIP) in August 2006. In January 2009, the GoN removed user fees from all types of delivery in public health facilities nationwide and renamed the programme 'Aama'. An incentive for increasing the number of women accessing 4ANC visits (under the 4ANC scheme) was merged with the Aama Programme in July 2012.

In 2008, the unit cost¹ for free institutional delivery was determined based on a review of the existing fees, drugs, supplies, and charges for the different types of deliveries at health facilities. The Aama Programme unit cost has not been revised since the programme was first launched in January 2009. Several studies have raised concerns about the current rate of reimbursement provided. The Rapid Assessment VII, for example, reported that women visiting some Aama implementing private institutions were not receiving delivery care for free, with a proportion paying higher fees for complicated and caesarean section (C-section) deliveries. This kind of evidence led to the suggestion by some that private providers asked women to pay because the reimbursement level was too low.

The purpose of this study is to assess the adequacy of the current rate of reimbursement under the Aama Programme in both public and private facilities. It further intends to:

- a) determine the actual unit cost of providing delivery care and complication management (complicated and C-section delivery) in public and private health facilities;
- b) assess the adequacy of Aama unit costs provided to health facilities for normal, complicated, and C-section deliveries, and
- c) make some policy and programme-related recommendations for the future implementation of the Aama Programme.

This costing study is designed to calculate the actual cost required for normal, complicated, and C-section deliveries. The study is carried out from a healthcare systems perspective rather than a wider societal perspective. It aims to provide comprehensive coverage of the facility cost (direct and indirect) associated with all types of institutional deliveries. This includes all necessary drug and diagnostic costs, but excludes household costs related to travelling to the facility. A mixed approach was used which

¹ In this context "unit costs" refer to the reimbursement health facilities receive for performing services under the Aama Programme.

utilised both 'bottom-up' costing methods to estimate the direct costs of all type of deliveries, and top-down costing to estimate the associated indirect costs. Ten districts were purposively sampled for data collection. Proportionate allocation as per the geographical region i.e. mountain (two), hill (five), and Tarai (three) ensured that at least two districts from each development region were selected in the sample. A random sample of the strata was first done to determine the sequence of the selection of health facilities among the stratum. A total of 52 facilities, including 40 public and 12 private facilities, were included to estimate the actual cost of all types of deliveries.

The current rate of reimbursement under the Aama Programme is 1,000/1,500 Nepalese Rupees (NPR) for a normal delivery, NPR 3,000 for a complicated delivery, and NPR 7,000 for a C-section delivery. The guideline intends to cover the direct cost of care for all types of deliveries. This study finds that the current unit cost (reimbursement rate) is sufficient to cover the direct costs incurred by health facilities participating in the Aama Programme.

This study shows that the average actual cost (direct and indirect) of a normal delivery in both public and private facilities is NPR 2,889, NPR 4,422 for a complicated delivery, and NPR 11,181 for a C-section delivery. When we consider the actual direct cost (actual cost in 2014 prices), the study concludes that the current rate of reimbursement under the Aama Programme is sufficient to cover the direct costs of all types of deliveries in both public and private facilities. It should be noted that the direct cost also includes the human resources time cost required for providing delivery care. Furthermore, direct cost is also associated with the treatment regime, prescribing pattern, use of drugs, and level of human resources involved in providing delivery care. The average indirect cost of a normal delivery in a primary health care centre (PHCC) and health post is found to be higher than that of a complicated delivery. This is because only a small number of relatively productive PHCCs and health posts carry out complicated deliveries which have a low unit cost. In contrast, many PHCCs and health posts (with low utilisation and so high indirect unit costs) provide normal delivery services. A similar issue occurs in district facilities where low throughput means that indirect unit costs are higher than in zonal and central level facilities.

The average cost of a normal delivery in private facility Mission/NGO/Cooperative, private (for profit), and teaching hospitals is NPR 3,913, NPR 9,722, and NPR 2,796, respectively. The average cost of a complicated delivery in Mission/NGO/Cooperative, private, and teaching hospitals is NPR 10,864, NPR 4,746, and NPR 5,816, respectively. The average cost of a C-section delivery in Mission/NGO/Cooperative, private, and teaching hospitals is NPR 8,340, NPR 10,887, and NPR 13,264. This study indicates that the cost of normal and complicated deliveries is lower in teaching hospitals than elsewhere. However, the direct costs for all types of delivery are higher in teaching hospitals. This is likely to be because of the involvement of more highly qualified staff and a variety of complication management procedures. The direct costs in private facilities are close to the current reimbursement rate of the Aama Programme.

The total actual cost of a normal delivery in the mountain region is NPR 7,534, in the hill region NPR 2,488, and in the Tarai region NPR 2,011. Similarly, the total actual cost of a complicated delivery in the

mountains is NPR 12,639, in the hills NPR 3,483, and in the Tarai NPR 3,138. The total actual cost of a C-section delivery in the mountains is NPR 23,242, in the hills NPR 9,654, and in the Tarai NPR 11,722. The cost of normal and complicated deliveries in the Tarai is lower than that of both mountain and hill regions but the cost of a C-section is higher, which is inflated by the larger number of private providers and higher cost of some inputs.

The Aama guidelines stipulate that the participation of all public facilities functioning under the MoHP that provide delivery services is mandatory. The guideline is also open to private facilities on a voluntary basis. This study suggests that the current rate of reimbursement under the Aama Programme is sufficient to compensate for the direct costs required for public/private, different levels of facility, different levels of care, and for all geographical regions.

The study also suggests that a comprehensive national reproductive health clinical protocol should be developed to ensure that delivery practices, drugs, prescribing patterns, involvement of trained health workers, use of diagnostic services, and use of supplies in both public and private health facilities are more uniformly applied. Linking Aama with other interventions such as the free essential drugs programme would further increase value for money. A clearer guideline that sets out how facilities can use savings from the current rate of reimbursement would also help improve the delivery services in health facilities. The study also indicates that implementation of the Aama Programme in higher level private hospitals would ensure value for money because of the high cost of complicated and C-section deliveries in lower level private facilities. The detailed costs of delivery care provided in this study should also be useful for a national social health insurance programme which would need both direct and indirect costs to be reimbursed to accredited health facilities. Finally, findings from this study would be useful evidence when designing the next generation of the Aama Programme.

LIST OF ABBREVIATIONS

ANC	antenatal care
4ANC	four antenatal care visits (programme)
ANM	auxiliary nurse midwives
APH	anteartum haemorrhages
ART	antiretroviral therapy
AWPB	annual workplan and budget
BC	birthing centre
BEONC	basic emergency obstetrics and newborn (neonatal) care
CEONC	comprehensive emergency obstetrics and newborn (neonatal) care
C-section	caesarean section
DHO	district health office
DPHO	district public health officer
DoHS	Department of Health Services
DSF	demand-side financing
DUDBC	Department of Urban Development and Building Construction
EDPs	external development partners
FHD	Family Health Division
GoN	Government of Nepal
HDI	human development index
LMD	Logistics Management Division
MDG	millennium development goal
MIS	Maternity Incentive Scheme
MoHP	Ministry of Health and Population
NPHL	National Public Health Laboratory
NPR	Nepalese Rupees
NSMP	National Safe Motherhood Plan
OPM	Oxford Policy Management
OT	operating theatre
PHCC	primary health care centre
PNC	postnatal care
PPH	postpartum haemorrhages
SDIP	Safe Delivery Incentive Programme
SBA	skilled birth attendant
SHP	sub health post
SM	safe motherhood
WHO	World Health Organization

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CHAPTER ONE: BACKGROUND AND INTRODUCTION

1. Background

1.1 Maternal health in Nepal

Over the last decade Nepal has made impressive progress in improving maternal and infant health. From 1996 to 2011, there has been a significant reduction in the maternal mortality ratio from 539 to 170 deaths per 100,000 live births and in the infant mortality ratio from 108 to 46 deaths per 1,000 live births. Similarly, skilled attendant care at delivery has increased from 9% to 36% (MoHP, 2012). Several factors may have contributed to these improvements, including declining poverty levels and fertility ratios, the steady rise in female education, an increased use of modern contraceptives, skilled birth attendance, C-section deliveries, and abortion services. However, investments in maternal health services through both demand and supply side interventions are believed to be significant contributors (Jackson et al., 2010).

1.2 Evolution of the Aama Programme

In July 2005, the GoN realised the importance of increasing the demand for and use of institutional delivery services and introduced a policy guideline called the Maternity Incentive Scheme (MIS) (FHD, 2005). This programme aimed to reduce maternal and neonatal mortality and morbidity by improving equity and access to essential maternal health services via reducing financial barriers. Figure 1 summarises the evolution of the Aama Programme (FHD, 2006; FHD, 2009; FHD, 2012).

The Aama Programme currently provides funds to participating institutions for the following:

Incentives to women: Cash payments to women immediately following their institutional deliveries- NPR 1,500 (US\$ 15)² in mountain districts, NPR 1,000 (US\$ 10) in hill districts, and NPR 500 (US\$ 5) in Tarai districts.

Free institutional delivery services: Payments to health facilities for the provision of free care. The payment, referred to as 'the Aama unit costs', varies by type of delivery. For a normal delivery, health facilities with fewer than 25 beds receive NPR 1,000 (US\$ 11.11) while health facilities with 25 or more beds receive NPR 1,500 (US\$ 16.67). For complicated deliveries, health facilities receive NPR 3,000 (US\$ 33.33) and NPR 7,000 (US\$ 77.78) for C-sections. The Aama unit cost should cover the cost of medical commodities (such as essential drugs, tests, and supplies) personnel, and overhead costs e.g. electricity and water.

² US\$1= NPR 100

Figure 1: Evolution of Aama Programme

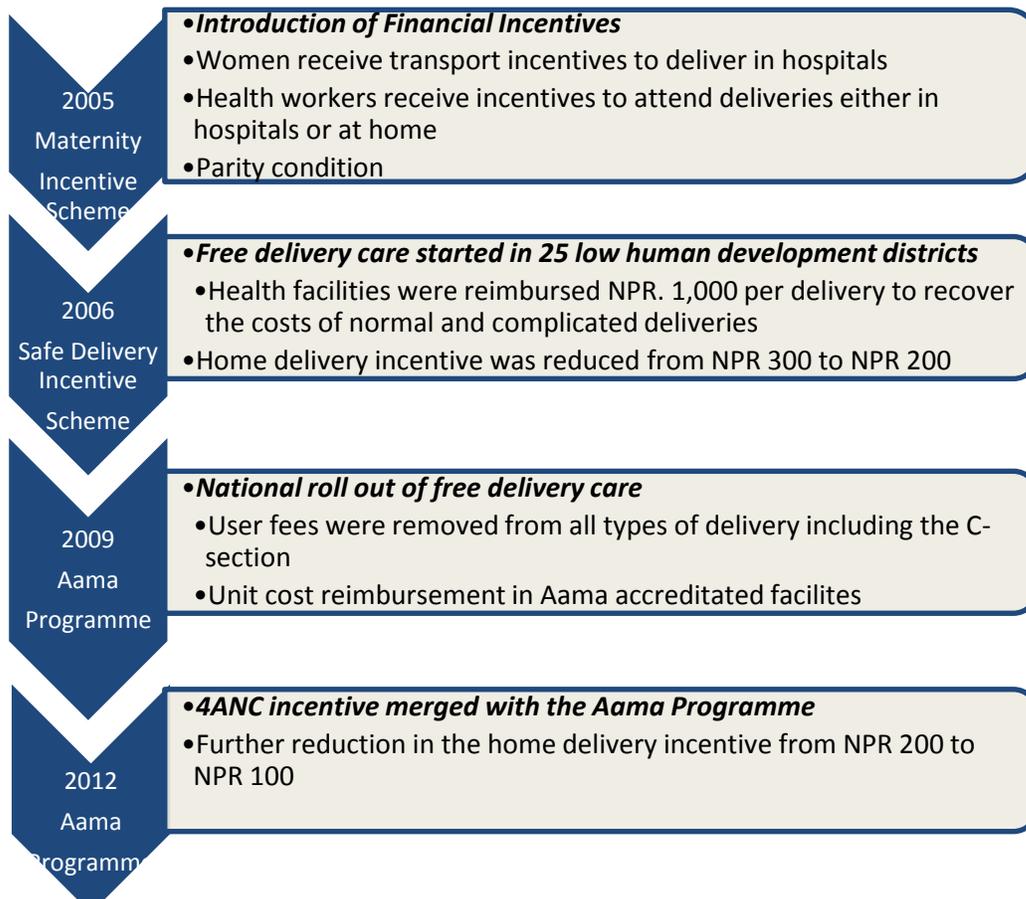


Figure 2: Components of the Aama Programme			
A. Incentive to Women			
	Tarai	Hill	Mountain
Delivery in a facility	NPR 500 (US\$5)	NPR 1,000 (US\$10)	NPR 1,500 (US\$15)
4 ANC incentive	400 (US\$4) <i>for complete 4ANC visits (at the 4th, 6th, 8th and 9th months of pregnancy)</i>		
B. Reimbursement to health facility			
Type of delivery	Normal	Complicated	C-section
Unit cost	NPR 1,000-1,500 (US\$ 10-15)	NPR 3,000 (US\$30)	NPR 7,000 (US\$70)
Health worker	NPR 300 (US\$3) to be paid from the unit cost for facility delivery		
	NPR 100 (US\$1) to be paid separately for home delivery		

Incentives to health workers for home deliveries: Incentive payments to health workers for home deliveries. The incentive was reduced to NPR 100 (US\$ 1.11) from NPR 200 (US\$ 2.22) following the second revision of the Aama Programme Guidelines.

Incentives to pregnant women for 4ANC visits: Women receive NPR 400 (US\$ 4.44) if they complete four ANC visits (at the 4th, 6th, 8th and 9th months of pregnancy), have an institutional delivery, and make one postnatal care (PNC) visit. The second revision of the Aama guidelines merged the 4ANC incentives with the Aama Programme.

CHAPTER TWO: RATIONALE OF THE STUDY

2.1 Introduction

The unit costs for free delivery care under the Aama Programme were determined on the basis of a review of the existing capital cost, fees, and charges for the different types of deliveries at health facilities (unpublished work of FHD, 2009). Some of this information was derived from a study on coping with the burden of cost of maternity care conducted in 2003 (Borghi et al., 2004). The costs were divided into the following four components:

1. General health institution costs, reflecting the cost of personnel and running costs of each institution
2. Supply costs (drugs , gloves, syringes, etc.) based on a review of the cost in health facilities which was cross matched with existing studies
3. An allowance for minor quality improvements, including general incentives for staff
4. Capital costs of equipment which covered delivery-specific costs of equipment required to provide the appropriate level of care - the costs were based on a compilation of the basic equipment packages, apportioned to delivery care and divided by the expected number of deliveries.

The following two principal sources of fund flow were considered:

1. Regular budgets allocated through district health offices (DHOs) and district public health officers (DPHOs), primarily to finance personnel costs but also to provide resources to meet running costs and medical supplies of health facilities
2. Additional funding based on the proposed unit costs

An analysis carried out by Ensor and Witter (2008) reported that the Aama Programme's unit cost payments, together with the budget from the public, were sufficient to offset the recurrent costs to facilities. The authors suggested that the costs of complications would largely be covered by the proposed payments and budget funding (Ensor T. and Witter S., 2008). However, they also noted that the Aama unit cost payments were insufficient to offset the capital costs of deliveries and that without additional funding it might not be possible for facilities to obtain or replace capital equipment.

2.2 Rationale

The Aama Programme's unit costs have not been revised since the programme was first launched in January 2009. Several studies have raised concerns about the current level of Aama unit costs. For example, health workers surveyed in the Aama Rapid Assessment round VII (Upreti et al., 2013)

suggested that Aama unit costs for C-sections and RH negative blood type cases (a complication listed under the Aama Programme, which is to be covered for free) were not sufficient to cover the actual cost of care. Likewise, personnel at private hospitals who were visited to explore the reason behind discontinuing the Aama Programme said that the unit cost provided was insufficient to deliver quality care (Upreti et al., 2013).

The Rapid Assessment VII also found that women visiting Aama implementing private institutions were not receiving delivery care for free and that many women reported paying for drugs and cleaning services. The proportion paying was higher for complicated and C-section deliveries. This was also found to be the case at some public facilities. This mounting evidence, in light of a possible further expansion of the scheme to include more private facilities, constitutes the study rationale to re-examine the Aama unit costs.

CHAPTER THREE: OBJECTIVE AND METHODOLOGY

This chapter describes the objectives and methodology of the study. A more detailed description of the methodology as used in the study protocol can be obtained from www.nhssp.org.np.

3.1 Purpose and objectives of the costing study

The purpose of this costing study is to assess the adequacy of the Aama unit cost reimbursed to both public and private facilities. The specific objectives of this study are to:

- determine the actual unit cost of providing delivery care and complication management (complicated and C-section delivery) in public and private health facilities
- assess the adequacy of Aama unit costs provided to health facilities for normal, complicated, and C-section deliveries
- recommend options for future implementation of the Aama Programme.

3.2 Perspective of costing

This costing study is conducted from a **healthcare system perspective** rather than a wider societal perspective. The study comprehensively covers the facility cost associated with all types of institutional deliveries. This includes all necessary drug and diagnostic costs, but excludes household costs incurred to access services, for example related to travelling to the facility. This study is only focused on an assessment of the sufficiency of unit cost reimbursement for all types of deliveries made at the health facility. It does not include an assessment of other components of the Aama Programme such as the transport incentive for delivery care and 4ANC incentives.

3.3 Approach to the costing study

A mixed approach was used in this costing study. The study utilised both ‘bottom-up’ costing methods to estimate the direct costs of all type of deliveries, and ‘top-down’ costing to estimate the associated indirect costs (the details of the approach are included in the study protocol www.nhssp.org.np).

3.4 Defining health services for costing

3.4.1 Costed conditions

The study determines the cost of normal delivery as well as 14 conditions of complicated delivery (see Box 2). Standard definitions are provided in the Annex I.

Figure 3: Final list of complications for the study

1. Antepartum haemorrhages (APH)
2. Postpartum haemorrhages (PPH)
3. Severe pre-eclampsia
4. Eclampsia
5. Retained placenta
6. Puerperal sepsis
7. Instrumental deliveries
8. Multiple pregnancies/breech deliveries
9. RH negative (anti-D)
10. Post-abortion care
11. Prolonged/obstructed labour
12. Ectopic pregnancies
13. Ruptured uterus
14. Molar pregnancy

Most of these conditions are already included in the Aama package although one condition, molar pregnancy, was added as a result of expert panel discussions and at the request of the DoHS, FHD. This study includes all three modes of delivery: normal vaginal delivery, assisted vaginal delivery including vacuum and forceps (forceps deliveries though no longer recommended can still be found in practice), and C-section as included in the Aama Programme.

3.4.2 Complications

This study is limited to costing only the direct causes leading to maternal complications. Any chronic or acute condition aggravated during pregnancy and child birth is not included. For example, the costs of treating conditions such as pregnancy with heart disease/jaundice/anaemia/fever are not included. In total, 14 complications are included in this study. Each complication is further differentiated on the basis of treatment modality requiring either minor medical treatment (evacuation, assisted vaginal delivery, blood transfusion) or major medical treatment (surgical intervention including C-section, hysterectomy, re-caesarean, and ICU support).

3.4.3 Health facility ownership, type, and geographical region

The study estimates the unit cost of care at both public and private facilities implementing the Aama Programme. This includes health facilities such as birthing centres, basic emergency obstetric and newborn care (BEONC) centres, and comprehensive emergency obstetrics and newborn care (CEONC) centres implementing the Aama Programme. Health facilities were selected from all three geographical regions viz: mountain, hill, and Tarai and also from five development regions: eastern, central, western, mid-western, and far-western.

3.5 Identification and classification of resource items

Important for estimating accurate unit costs is the identification of all relevant costs, resource items, for delivery service. The total cost of producing a delivery care service comprises “direct costs” and “indirect costs”.

3.5.1 Direct cost

The costs of resources which can be directly related to the production of the different types of delivery care services are the direct costs (Mogyorosy Z, Smith P, 2005). The following are the major direct costs included in this study.

i) Human resources

Human resources refers to different cadres of workers directly involved in managing/treating delivery-related conditions that have been identified. Staff involvement was divided into procedural and hospitalisation time which includes the initial consultation; diagnoses, inpatients, ward time, and discharge. A list of staff available at different levels of care was obtained and segregated by grade or level.

ii) Drugs and supplies

Pharmaceuticals and supplies used while managing/treating each of the 14 conditions were identified. Since drug prescribing patterns are different at public and private facilities (second line drugs are generally preferred in private facilities), a separate list of pharmaceuticals were obtained.

iii) Diagnostics

Major laboratory tests and radiological examinations associated with managing/treating each of the 14 conditions including normal and C-section deliveries were identified. Diagnostics covers the cost of laboratory and radiological equipment, chemicals, and supplies required to perform specific tests/examinations. The price quoted for a particular test/examination was used to determine the cost of diagnostics. A standard price list for diagnostics was obtained for both public and private facilities.

iv) Medical Equipment

Medical equipment that is used solely for managing/treating each of the 14 conditions was identified. Equipment that is shared across different departments is covered under indirect costs. The standard working life for each type of equipment was obtained from Arges, G. S. (2008) “Estimated Useful Lives of Depreciable Hospital Assets”, AHA Press; Revised Edition. Only equipment in full working condition was included in the study.

3.5.2 Indirect cost

Indirect costs are resource items that cannot be directly associated with the production of particular services. These costs cannot be easily traced (Mogyorosy Z, Smith P, 2005). The following are the major indirect costs identified for this study:

1. Maternity ward/building and land
2. Furniture, fixtures, and beds in maternity ward
3. Shared equipment, computer hardware and software
4. General administration/management:
 - recording and printing Aama reporting forms
 - accounting and payments
 - security and cleaning
 - utilities (electricity, water)
 - communication (telephone and fax)
 - repairs, renewals and rental
 - vehicles.

The resource use identified in the study can also be classified as either capital or recurrent costs. Capital costs are the costs of acquiring fixed assets such as buildings, land, and equipment. These resources usually have a life longer than one financial year and so their cost needs to be apportioned across years. A resource item which is consumed within one financial year is a recurrent cost. Some items can be both direct and indirect costs (Mogyorosy Z, Smith P, 2005).

Table 3.1: Recurrent and Capital costs for the costing study

Recurrent Costs	Capital Costs (annualised)
1. Personnel 2. Medical commodities Drugs Medical supplies 3. Other recurrent expenditure Utilities, routine maintenance, etc.	1. Buildings 2. Medical equipment 3. Non-medical equipment Vehicles Bed Office furniture

3.6 Measurement of resource use

The type and characteristics of the resources used and the feasibility of the measurement determine the selection of the unit of resource measurement. The selection of physical units for resource use measurement should take into account the availability and quality of data and the aim of the costing study. The following shows the steps used to determine cost:

i) Primary data source

A costing survey was conducted to estimate both the direct and indirect resource utilisation while managing/treating 14 conditions including normal and C-section delivery at different levels of care (birthing centre/BEONC/CEONC, public, and private).

ii) Secondary data source

Standard guidelines and norms, important data sources, studies, and working papers were reviewed to cross validate existing best practice and also to feed in some important information for the costing study. The following are the key data sources used for this study:

1. World Health Organization (WHO) norms and national guidelines on pregnancy and childbirth
2. Standard equipment working life
3. Public salary structure by level of health worker
4. Standard price list for drugs, supplies, equipment, and laboratory
5. Previous top down costing studies
6. Cost of building construction and rental charges

iii) Attaching monetary value to each resource item

The final step in determining cost is to place a monetary value on each resource item (see Table 3.2). This study took into account both the public and private sector prices. A shadow price method was used to estimate private sector prices as they are less uniform, often distorted (market price does not reflect marginal social values of goods or services in the competitive market), and hard to obtain (Mogyorosy Z, Smith P, 2005).

Table 3.2: Resource item identification, measurement, and valuation

S.N.	Identification	Measurement	Valuation
1	Direct costs		
1.1	Human resource	Time taken in minutes taken to treat/manage each condition and time spent on hospitalisation	Salary structure of public health worker by level/grade.
1.2	Pharmaceuticals and supplies	drug×dose×duration actual unit of supplies used to treat each condition	Standardised price list obtained from Logistics Management Division (LMD) and Maternity hospital
1.3	Diagnostics	Test or radiological examination	Standardised price list obtained from the National Public Health Laboratory (NPHL)
1.4	Medical equipment	Equipment apportioned to the delivery caseloads	Undiscounted/discounted annual cost using standardised price list obtained from the LMD

2	Indirect costs		
2.1	Building/ maternity ward or land	Proportion of total facility square footage occupied by delivery services excluding corridors and stores	Square foot floor cost obtained from the Department of Urban Development and Building Construction (DUDBC)
2.2	Shared equipment, computers, and software	Equipment apportioned to the share of reproductive health caseloads (if no disaggregated information is available)	Undiscounted/ discounted annual cost using standardized price list obtained from LMD and working life from Arges 2008 Equipment Working Life obtained from Arges 2008
2.3	General administration	General administration apportioned to the share of reproductive health caseloads (if no disaggregated information is available)	Hospital records
2.4	Furniture, fixtures and beds in maternity ward	Bed Furniture Fixtures	Standardised price list from LMD Working Life from Arges 2008

3.7 Major assumptions in the study

Some major assumptions under this costing study are:

- The same normative practice exists for treating specific complications irrespective of the level of care in which it is provided. The costs of care by level still differ because of the typically higher personnel costs at higher levels of care.
- The reported practice is an accurate representation of actual practice.
- The use of average salaries and allowances adequately reflects personnel costs, as does a standardised price list for medical drugs and tests (with adjustment for different transport costs across the country). In reality there may be differences across geography and facility ownership types.

3.8 Sampling strategy and sample size

Stratified random sampling was used in selecting study districts. Districts were selected based on the levels of care and institutional ownership implementing the Aama Programme across geographical region. Based on the scope of the work and also the inherent statistical limitations of representative sampling at institutional level, the sample should be understood as taking a case-study approach. By geography, Nepal is broadly divided into three horizontal zones, namely mountain, hill, and Tarai, and five development region, eastern, central, western, mid-western, and far-western. The sample frame of 75 districts is divided into five strata based on the functionality of public CEONC and availability of C-section facility in private hospitals in the districts cross-classified with geographical and development region provided in Annex- III.

A total of ten facilities were selected based on proportionate allocation by geographical region i.e. mountain (two), hill (five), and Tarai (three), ensuring that at least two districts from each development region are selected in the sample from the stratum. The sequence obtained was as follows:

- District with no public CEONC and private facility providing C-section- one mountain, one hill
- District with functional public CEONC-one mountain, one hill, one Tarai
- District with non- functional public CEONC- one Tarai, one hill
- District with both functional public CEONC and private facility providing C-section- one hill, one Tarai
- District with only private facility providing C-section- one hill

The sample districts that were randomly selected within the above strata are: Solukhumbu, Dhankuta, Kathmandu, Sarlahi, Mustang, Lamjung, Banke, Jajarkot, Kailai, and Doti.

A total of **501** public health facilities are contained within the study districts and detailed information is summarised in Table 5 (further detail available in Annex IV). Table 3.3 provides information on facilities providing the Aama Programme in the study districts.

Table 3.3: Health facilities implementing the Aama Programme in the study districts

SN	Districts	Ecological region	Public facilities			Private facilities		
			CEONC	BEONC	BC	C-section facility	Normal+ Complicated delivery	Normal delivery only
1	Solukhumbu	mountain	1	2	8	0	2	0
2	Dhankuta	hill	0	2	12	0	0	0
3	Kathmandu	hill	1	0	11	5	0	2
4	Sarlahi	Tarai	1	2	16	0	0	2
5	Mustang	mountain	0	1	2	0	0	0
6	Lamjung	hill	0	2	20	1	0	0
7	Banke	Tarai	1	2	30	3	0	0
8	Jajarkot	hill	0	4	12	0	0	0
9	Kailai	Tarai	2	5	29	0	2	0
10	Doti	hill	1	1	44	0	1	0
Total			7	21	184	9	5	4

The cost of providing normal, complicated, and C-section delivery can be obtained from CEONC centres. Similarly, the cost of normal and complicated deliveries can be obtained from BEONC centres. However,

there are certain factors such as distance, level of health worker, supply of drugs and supplies, and Aama reimbursement costs which require this study to obtain a sample from all levels of care. In this context, in order to capture the cost of care in BEONC and birthing centres, the following criteria were used:

- 50% facilities with BEONC services were selected
- 10% of the birthing centres were selected from each district

Health posts and sub health posts (SHPs) functioning as birthing centres were selected as ideally PHCC level should provide BEONC level of care. For private facilities (operating at different levels) the following criteria was used:

- In case of a district with only one private health facility implementing the Aama Programme, that facility is selected by default in the study.
- In case of a district with two or more private health facilities implementing the Aama Programme, 50% were selected.

Health facilities were selected based on the travel time to the facility by public transport. Figure 4 provides detail on the procedure used to define travel time and health facility selection.

Figure 4: Standards used to define travel time and method of health facility selection	
Standards	Travel time by public transport from district head quarter
Furthest	> 5 hours
Moderately far	3-5 hours
Moderately near	1-3 hours
Nearest	< 1 hours

Method used to select health facilities in the district:

- In case of one health facility selection, furthest located health facility was selected.
- In case of two health facility selections, one furthest and one nearest located facility was selected.
- In case of three health facility selection, one furthest, another moderately far, and the other nearest located facility was selected.
- In case of four health facility selection, one furthest, other moderately far, another moderately near, and the other nearest located facility was selected.

Note: In the case of Solukhumbu, travel time was calculated based on walking distance.

A total of 52 health facilities were selected from ten districts as summarised in table 3.4. A detailed name list of facilities is included in the Annex V.

Table 3.4: Total number of health facilities sampled for the study

Facility	Public		Private		Total number of sampled health facility
	Total	Sample	Total	Sample	
CEONC	6	6	9	6	12
BEONC	21	14	5	3	17
Birthing centre	186	20	4	3	23
Total	213	40	18	12	52

3.9 Data collection method

Both prospective and retrospective data collection methods were used to estimate resource use. Prospective data collection was done to estimate resource utilisation (medical commodities: drugs, supplies, diagnostic tests, and human resource time by cadre of worker) for each of the 14 conditions.

a) Health facility survey

A health facility survey was carried out in selected facilities to obtain both direct and indirect costs involved in treating each of the 14 conditions including normal and C-section delivery. Records were reviewed for the last year to identify different forms of complication treated in the institution. Based on a fixed number of cases to be obtained from different levels of care, a proportion of these conditions were included in the sample. Patient records (cardex) and medicine and supply registers maintained at different wards such as delivery, operative, and post-op were reviewed to take account of drugs and supplies used for treating individual patients, including the diagnostics performed. On top of this, service providers who were involved in providing care were asked to provide information, using their best judgement, about the time different health cadres spent treating those conditions. This was the basis for determining the actual practice of care associated with treating the 14 conditions.

b) Expert panel discussion

An expert panel discussion was held to review the condition specific questionnaire. Experts were asked about the intensity of all direct resource inputs by condition. This was used as the basis for estimating the normative direct costs involved in treating each of the 14 conditions at the national level.

3.10 Data collection Instruments

The study team developed two data collection instruments building on existing tools used in the similar costing studies conducted in Tanzania and Indonesia previously developed and used by OPM and modified to suit the local context and objective of the study. These were used to collect data regarding the 'actual practice' unit cost associated with treating/managing the 14 conditions, derived from interviews with health workers and a review of medical records at sampled health institutions.

a) **Expert panel workshop**

Two expert panel workshops were held to identify the conditions to be studied in the costing study and refine the condition specific questionnaire. Molar pregnancy was then included in addition to 14 conditions included in the Aama guidelines.

b) **Health facility survey questionnaire**

The health facility survey has two questionnaires capturing general information about health facilities and information on managing the 14 conditions including normal and C-section delivery at their respective level.

i) **General health facility questionnaire**

This questionnaire contains general information on health facilities which helps to estimate the indirect costs associated with treating/managing the 14 conditions. It includes information on infrastructure and physical facilities (floor occupied by maternity ward, number of beds available), staff details (technical and administrative staff), availability of medical equipment and fixed assets, annual expenditure, and the number of in-patients treated (total in-patients and those related to delivery or complication management/ reproductive health related).

ii) **Condition specific questionnaire**

This questionnaire contains information on the use of resources that help to estimate the direct costs associated with treating/managing the 14 conditions including normal and C-section delivery in that particular health facility. It includes information on the average time spent per medical personnel, actual use of pharmaceuticals and supplies, and diagnostic tests. The condition specific questionnaire is divided into normal and complicated delivery questionnaires.

3.11 Data management

All activities related to the health facility survey, including training of enumerators, data collection, entry, data cleaning, descriptive analysis, and draft report writing were subject to quality assurance procedures. The field assistant verified the quality of each questionnaire in the field. Field monitoring visits carried out by the national consultant and the study team were made to ensure the quality assurance process was rigorously applied. Every questionnaire was assessed on an individual basis by the study team. Some data captured was cross-checked through telephone interviews with facility staff and during subsequent field visits. Data entry was conducted in CS pro under the supervision of the study team. Ten percent of the data was re-entered as part of the quality assurance process, and additional analytical checks on data quality were carried out.

3.12 Data analysis

Study units (health facilities) within particular areas may share common characteristics and so are more similar to each other than those in other areas leading to a design effect that increases the standard

error of estimates. Standard errors are adjusted in the Stata statistical software by implementing the svyset command to take account of the clustered nature of sampling, stratification, and sampling weights. The estimates for facilities with particular characteristics are weighted to reflect their relative numbers in the health facilities. Weights have been assigned both at the health facility level and at individual level.

For health facilities, the weights were computed in two stages, firstly a selection of ten study districts by geographical belts and secondly a selection of health facilities within the ten study districts disaggregated by public/private and type/level of facilities. The weight assigned in this case varies across the type/level of health facilities. At the individual level, the weights were computed in three stages: firstly a selection of ten study districts by geographical belts, secondly, a selection of health facilities within the ten study districts disaggregated by public/private and type/level of facilities, and thirdly, total number of normal, complicated, and C-section deliveries in the sampled health facilities over a one year period. The weight assigned in this case varies across the individual health facilities and type/level of deliveries. The analysis of this study takes into account 2014 as the price year. All cost data was converted to present value, using the end of the year price value.

3.13 Limitations of the study

This study focuses on the supply side cost of services and does not take into account the transportation costs and other associated costs incurred by delivering women to visit a health facility. The actual cost was calculated using the prices in 2014. Therefore, caution has to be taken while interpreting the findings in consecutive years. For example:

- The price for drugs and supplies has been set at the rate available from the LMD and, for those not available in the division, the Maternity Hospital. These prices may not always accurately reflect the actual price incurred by facilities when purchasing drugs since smaller facilities may not be able to purchase in bulk (which is cheaper).
- Laboratory prices have been set at the rate of the NPHL. Many public facilities follow this rate, however, for private facilities these may sometimes under-estimate the true cost of services to facilities which will include private laboratory profit margins.
- Building prices have been set at the present day value annualised over a standard life without taking into account physical condition. This may overestimate the actual cost since facilities in practice may be maintained beyond the life of their buildings.
- The study only collected the related cost of care from the patients who received and completed delivery care in the facility. The study may under-estimate the cost of patients that receive partial care at one facility and then are referred for further care at a different facility.

CHAPTER FOUR: FINDINGS - AGGREGATE, DIRECT, AND INDIRECT COST

This chapter includes a detailed analysis of the aggregated actual cost of delivery, direct cost of delivery, and indirect cost of delivery in the following sections. It further analyses both the direct and indirect cost of delivery by level of facility, level of care, public and private, and geographical regions. Representative country-wide and disaggregated averages were obtained by applying sampling weights.

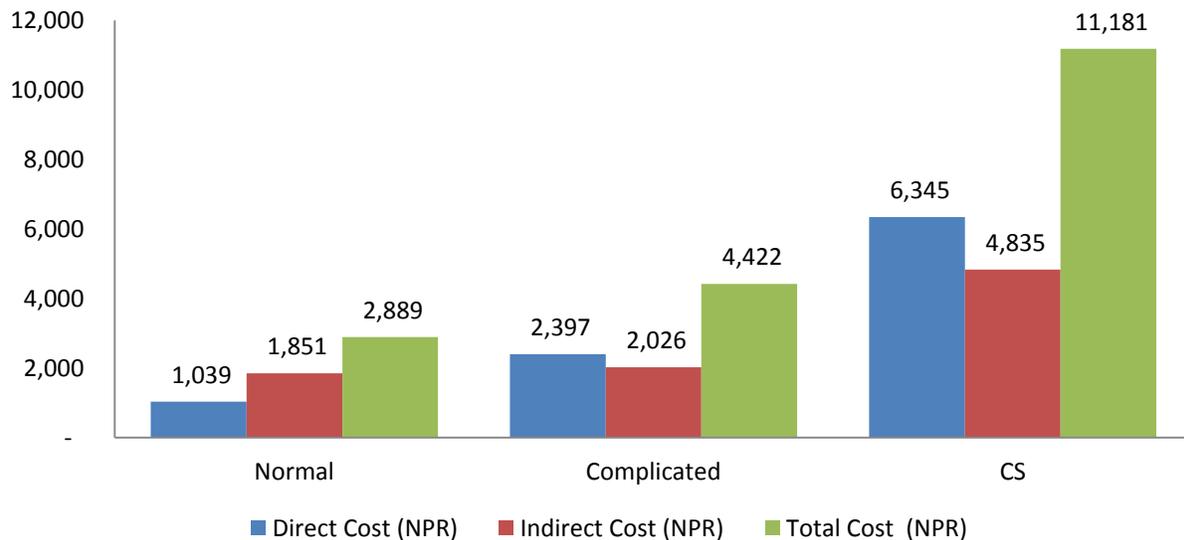
4.1 Aggregated average cost of delivery

This section provides the national average cost of normal, complicated, and C-section delivery. It also includes the disaggregated direct and indirect costs of delivery in public and private facilities.

4.1.1 Aggregated average cost of delivery in public and private facilities

The study shows that an average cost of normal delivery is NPR 2,889, complicated delivery is NPR 4,422, and C-section delivery is NPR 11,181. This is an aggregated average cost of delivery in both public and private facilities.

Figure 4.1: Total cost of normal, complicated, and C-section delivery (n=52 facilities)



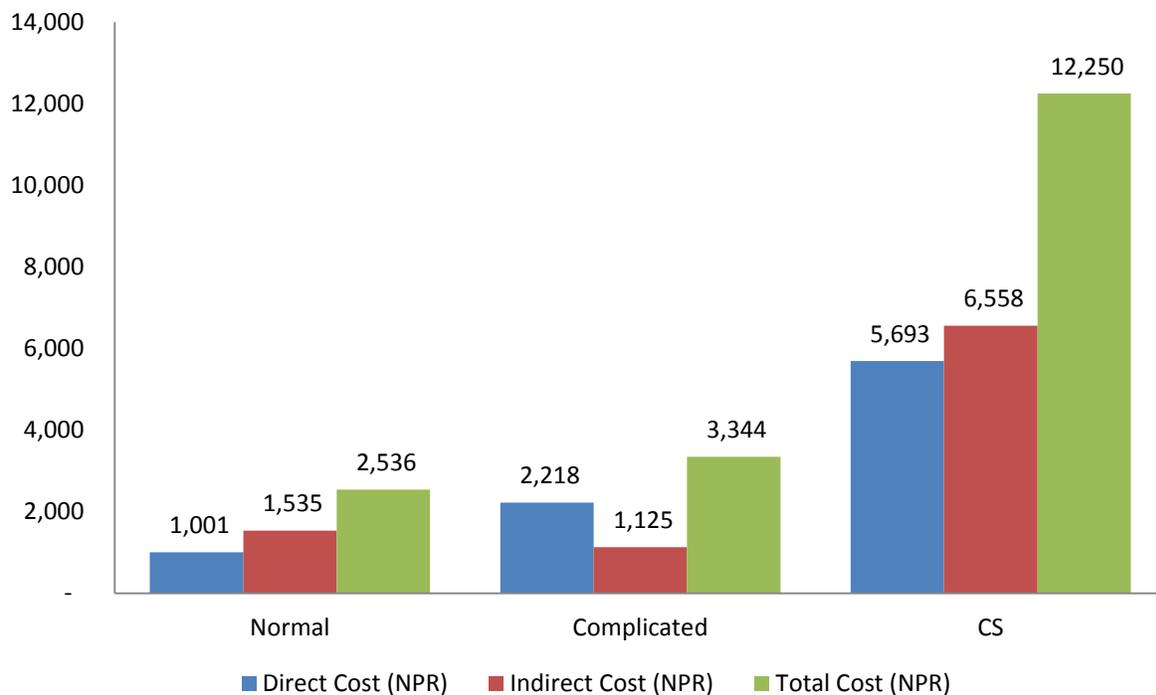
As per Aama Programme guidelines, the current provision of reimbursement includes NPR 1,000/1,500 for a normal delivery, NPR 3,000 for a complicated delivery, and NPR 7,000 for a C-section delivery. The guidelines intend to cover the direct costs of delivery care for all types of delivery. Figure 4.1 shows that the direct cost (actual cost at the prices of 2014) is sufficient to cover the direct cost of all type of delivery across all facilities. It should be noted that the direct cost also includes the human resource time cost required for providing delivery care. Furthermore, direct cost is also associated with the

treatment regime, prescribing pattern, use of drugs, and level of human resources involved in providing delivery care.

4.1.2 Average cost of delivery in public facilities

Figure 4.2 shows that the total average cost for normal, complicated, and C-section delivery is NPR 2,536, NPR 3,344, and NPR 12,250, respectively. The table indicates that the indirect cost of C-section is relatively higher compared to other types of delivery care. This is due to the use of technological equipment, operating theatre (OT) facility, and longer average length of stay.

Figure 4.2: Total cost of normal, complicated, and C-section delivery in Public facilities (n=40 facilities)



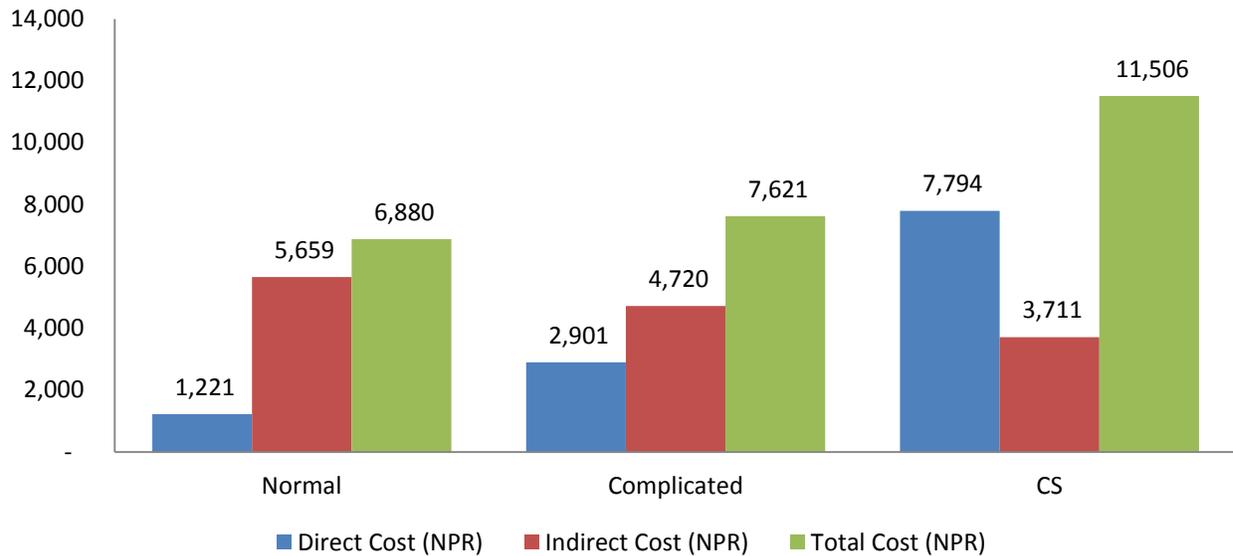
The indirect cost of a complicated delivery is found to be less than for a normal delivery. This is likely to be due to the larger number of facilities providing small numbers of normal deliveries leading to high average indirect costs. In contrast, a smaller number of facilities with high workloads and so low unit indirect costs often provide care for complications.

The study shows that the current reimbursement provision in the Aama Programme is sufficient to cover the direct cost of all types of delivery care in public facilities.

4.1.3 Average cost of delivery in private facilities

Figure 4.3 shows that the average cost of normal, complicated, and C-section delivery is NPR 6,880, NPR 7,621, and NPR 11,506, respectively. The cost of care for C-section delivery is found to be less compared to in public facilities. This likely to be due to the unavailability of private facilities in mountain regions. Public facilities in mountain areas have higher unit costs than other regions which inflates the average public sector cost.

Figure 4.3: Average cost of delivery in private facility (n=12 facilities)



The direct costs for normal, complicated, and C-section delivery is found to be sufficient when compared to the current reimbursement provided through Aama Programme. It should also be noted that the direct cost includes the time cost of human resources which is relatively higher in private facilities.

4.2. Average cost of delivery by level of public and private facilities

This section analyses the average actual cost of normal, complicated, and C-section delivery by level of public and private facilities.

4.2.1 Average cost of delivery by level of public facility

Table 4.1 shows that the average cost of a normal delivery ranges from NPR 1,349 to NPR 5,357. The average cost of a complicated delivery in a PHCC is NPR 2,153 and is NPR 2,470 in a health post. The average cost of a complicated delivery in central, zonal, and district level health facilities is NPR 3,434, NPR 3,095, and NPR 4,595, respectively. The average cost of C-section delivery in central, zonal, and district level is NPR 7,471, NPR 9,207, and NPR 18,379.

Table 4.1: Total cost of normal, complicated, and C-section delivery by level of public facility (n=40 facilities)

Type	Direct Cost (NPR)	Indirect Cost (NPR)	Total Cost (NPR)
Central Hospital			
Normal	1,199	534	1,733
Complicated	2,448	986	3,434
C-section	5,199	2,272	7,471
Zonal Hospital			
Normal	1,349	335	1,684
Complicated	2,524	571	3,095
C-section	6,981	2,226	9,207
District Hospital			
Normal	1,000	2,367	3,367
Complicated	1,452	3,143	4,595
C-section	7,762	10,617	18,379
PHCC			
Normal	767	4,590	5,357
Complicated	1,332	821	2,153
Health post			
Normal	763	1,312	2,075
Complicated	2,158	312	2,470
SHP			
Normal	735	614	1,349

The average indirect cost of normal delivery in PHCC and health post is higher than for complicated deliveries because complicated deliveries are only performed in facilities with higher levels of activity and consequently lower indirect unit costs. For similar reasons, the cost of C-sections in district hospitals exceed those in zonal and central level facilities.

The results suggest that the average direct cost for normal, complicated, and C-section delivery care are in line with the current reimbursement provided through the Aama Programme. It should be noted that the findings also support the different rates of reimbursement for normal delivery by level of facility.

4.2.2 Average cost of delivery in private facilities

The average cost of a normal delivery in a private facility Mission/NGO/Cooperatives, Private (for Profit), and teaching hospitals is NPR 3,913, NPR 9,722, and NPR 2,795, respectively. The average cost of a complicated delivery in Mission/NGO/Cooperatives, Private, and teaching hospitals is NPR 10,864, NPR 4,747, and NPR 5,817. The average cost of C-section delivery in Mission/NGO/Cooperatives, Private, and teaching hospitals is NPR 8,340, NPR 10,887, and NPR 13,263.

Table 4.2: Total cost of normal, complicated, and C-section delivery in private facilities (n=12 facilities)

Facility type	Direct Cost NPR	Indirect Cost NPR	Total cost NPR
NGO/Mission/Cooperative Hospital			
Normal	664	3,249	3,913
Complicated	1,897	8,967	10,864
C-section	6,377	1,963	8,340
Private (for profit) Hospital			
Normal	1,166	8,556	9,722
Complicated	2,320	2,427	4,747
C-section	6,758	4,129	10,887
Teaching Hospital			
Normal	1,480	1,315	2,795
Complicated	3,412	2,405	5,817
C-section	8,084	5,179	13,263

The study indicates that the cost of normal and complicated delivery is lower in teaching hospitals than elsewhere. However, the direct costs for all types of delivery are higher in teaching hospitals. This could be due to the involvement of higher level human resources and a variety of complication management procedures. The direct costs in private facilities are not far from the current reimbursement rate.

This section shows that the current reimbursement rate cost included in the Aama Programme guidelines is sufficient to offset the direct cost for normal, complicated, and C-section delivery for both public and private facilities at all levels.

4.3 Average cost of delivery by level of care in public and private facilities

This section analyses the cost of providing normal, complicated, and C-section delivery by level of care disaggregated by public and private facilities.

4.3.1 Average cost delivery by level of care in public facilities

Table 4.3 indicates that the cost of normal delivery in CEONC, BEONC, and birthing centre facilities is NPR 1,912, NPR 2,643, and NPR 2,283, respectively. Similarly, the cost of complicated delivery in CEONC, BEONC and birthing centre facilities is NPR 3,457, NPR 3,531, and NPR 2,470. The table also shows that the cost of C-section in CEONC facilities is NPR 12,251.

Table 4.3: Average cost delivery by level of care in public facilities (n=40 facilities)

Type of health facility	Direct (NPR)	Indirect (NPR)	Total (NPR)
CEONC			
Normal	1,245	667	1,912
Complicated	2,479	978	3,457
C-section delivery	5,693	6,558	12,251
BEONC			
Normal	815	1,828	2,643
Complicated	1,335	2,196	3,531
Birthing centre			
Normal	756	1,527	2,283
Complicated	2,158	312	2,470

The above table indicates that the direct cost for normal delivery is low in birthing centres and BEONC compared to CEONC. This could be due to the practice and availability of diagnostic care. However, the indirect cost is higher in BEONC and birthing centres compared to CEONC which could be due to the larger number of deliveries in CEONC facilities.

4.3.2 Average cost of delivery by type of care in private facilities

Table 4.4 indicates that the cost of normal delivery in private facilities functioning as CEONC, BEONC, and birthing centres is NPR 2,223, NPR 12,054, and NPR 10,711. Similarly, the cost of complicated delivery in CEONC, BEONC, and birthing centres is NPR 4,278, NPR 6,328, and NPR 27,809. The table also shows that the cost of C-section in CEONC is NPR 11,505.

Table 4.4: Average cost of delivery by level of care in private facility (n=12 facilities)

Health facility by type of care	Direct (NPR)	Indirect (NPR)	Total (NPR)
CEONC level			
Normal	1,292	931	2,223
Complicated delivery	2,993	1,285	4,278
C-section delivery	7,794	3,711	11,505
BEONC level			
Normal	1,240	10,814	12,054
Complicated delivery	2,102	4,226	6,328
BC level			
Normal	732	9,979	10,711
Complicated delivery	679	27,130	27,809

The above table indicates that the direct cost for normal delivery is low in birthing centres compared to BEONC and CEONC level while the indirect cost is higher in BEONC and birthing centres compared to CEONC. This likely to be due to differences in practice and availability of diagnostic care. The indirect cost of normal and complicated delivery at BEONC and birthing centre level is high compared to at CEONC level facilities due to the high indirect costs of running private health facilities in hill and mountain regions.

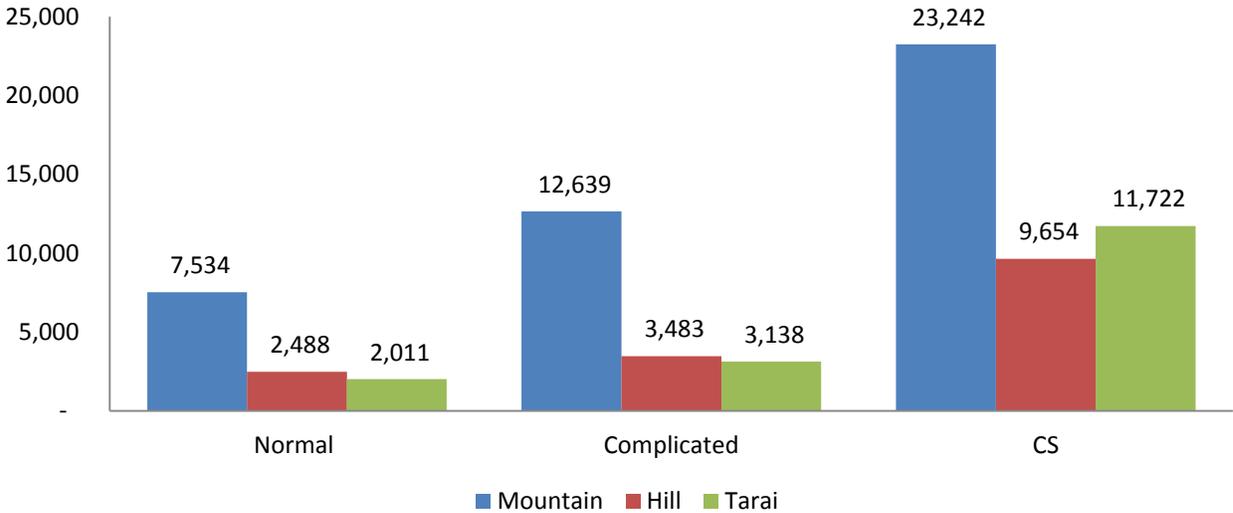
4.4. Average cost of delivery by geographical region

This section analyses the cost of providing normal, complicated, and C-section delivery by geographical region in both public and private facilities.

4.4.1 Aggregate actual cost of delivery by geographical region

Figure below shows that the aggregated actual cost of normal delivery in mountain regions is NPR 7,534, in hill, NPR 2,488, and in Tarai, NPR 2,011. Similarly, the actual aggregated cost of complicated delivery in mountain regions is NPR 12,639, in hill, NPR 3,483, and in Tarai, NPR 3,138. The actual aggregated cost of C-section delivery in mountain regions is NPR 23,242, in hill, NPR 9,654, and Tarai, NPR 11,722.

Figure 4. 4: Aggregate actual cost of delivery by geographical region



The figure indicates that the cost of normal and complicated delivery in the Tarai is lower than that of both mountain and hill. However, C-section was found to be higher. This could be due to the number of private providers and transportation index used in the Tarai.

4.4.2 Average cost of delivery in public facility by geographical region

Table 4.5 shows that the total cost of normal delivery in mountain, hill, and Tarai is NPR 7,246, NPR 2,250, and NPR 2,216, respectively. The cost of complicated delivery in mountain, hill, and Tarai is NPR 7,339, NPR 2,983, and NPR 2,664. The cost of C-section delivery in mountain, hill, and Tarai is NPR 23,242, NPR 12,619, and NPR 9,037.

Table 4.5: Average cost of delivery in public facility by geographical region (n=40)

Geographical Region	Direct Cost (NPR)	Indirect Cost (NPR)	Total Cost (NPR)
Normal delivery			
Mountain	883	6,363	7,246
Hill	1,022	1,228	2,250
Tarai	988	1,228	2,216
Complicated delivery			
Mountain	1,950	5,389	7,339
Hill	2,133	850	2,983
Tarai	2,284	380	2,664
C-section delivery			
Mountain	6,984	16,258	23,242
Hill	5,241	7,378	12,619
Tarai	6,999	2,038	9,037

The table shows that the direct cost of C-section delivery is almost the same for each geographical region. The cost in hill districts is slightly less due to exclusion of the transport cost. However, the indirect cost in mountain is higher compared to hill and Tarai which is likely to be due to fewer patients and higher costs of operation.

4.4.3 Average cost of delivery in private facility by geographical region

Table 4.6 shows that the total cost of a normal delivery in mountain, hill, and Tarai regions is NPR 12,497, NPR 4,847, and NPR 8,849, respectively. The cost of complicated delivery in mountain, hill, and Tarai is NPR 27,809, NPR 4,339, and NPR 5,990. The cost of C-section delivery in hill and Tarai is NPR 9,328 and NPR 14,584.

Table 4.6 Average cost of delivery in private facility by geographical region (n=12)

Geographical Region	Direct Cost (NPR)	Indirect Cost (NPR)	Total Cost (NPR)
Normal delivery			
Mountain	811	11,686	12,497
Hill	1,160	3,687	4,847
Tarai	1,281	7,568	8,849
Complicated delivery			
Mountain	679	27,130	27,809
Hill	2,381	1,958	4,339
Tarai	4,067	1,923	5,990
C-section delivery			
Mountain	NA	NA	NA
Hill	6,213	3,115	9,328
Tarai	9,478	5,106	14,584

The findings show that the direct cost of normal and complicated delivery is higher in the hill and Tarai regions compared to in the mountains. This is likely to be due to the greater availability and use of diagnostic services and more highly qualified staff providing care. The direct cost of C-section delivery is higher in hill regions due to the addition of transport costs and a varied prescribing pattern.

4.5 Analysis of Direct Cost

This section analyses the direct cost of care incurred when providing normal, complicated, and C-section delivery across all levels of facility and care, public and private, and geographical region. For the purpose of analysis, direct cost includes the cost of drugs, supplies, human resources, and diagnostic services.

4.5.1 Direct cost of normal, complicated, and C-section delivery

The average direct cost of, normal, complicated, and C-section delivery is NPR 1,038, NPR 2,397, and NPR 6,344, respectively. The average cost of various items used in providing a normal delivery service is: drugs, NPR 232, supplies, NPR 220, human resources, NPR 307, and diagnostics, NPR 279. The average cost of various items used in providing a complicated delivery service is: drugs, NPR 864, supplies, NPR 481, human resources, NPR 431, and diagnostics, NPR 621. The average direct cost of items used in providing a C-section delivery service is: drugs, NPR 1,952, supplies, NPR 2,180, human resources NPR 1,380, and diagnostics, NPR 832.

Table 4.7: Direct cost of normal, complicated and C-section delivery by public and private facility (n=52 facilities)

Delivery Type	Items	Mean (NPR)	95% CI
Normal	Drugs	232	132,332
	Supplies	220	196,245
	Human resources	307	217,398
	Diagnostics	279	104,454
	Total	1,038	843, 1234
Complicated	Drugs	864	5201,207
	Supplies	481	296,666
	Human resources	431	267,595
	Diagnostics	621	1691,074
	Total	2,397	2035, 2758
C-section	Drugs	1,952	14732,432
	Supplies	2,180	14182,943
	Human resources	1,380	8721,889
	Diagnostics	832	714,950
	Total	6,344	4605, 8085

The table indicates that the human resources cost is a major cost driver for normal delivery, followed by drugs in complicated delivery and supplies in C-section delivery. This excludes the cost of Anti-D in the analysis. The direct cost of normal and complicated delivery with Anti-D increased to NPR 1,134 and NPR 2,460, respectively.

Figure 4.5: Average direct cost of normal, complicated, and C-section delivery by public and private facility

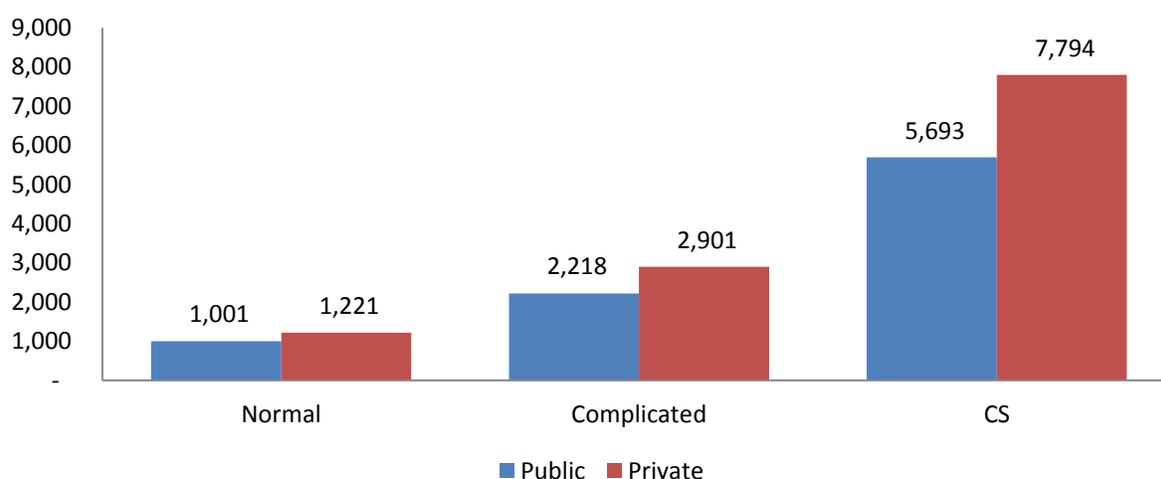


Figure 4.5 shows that the average direct cost of providing normal, complicated, and C-section delivery is higher in private facilities compared to public facilities.

4.5.2 Direct cost of delivery services by level of health facility

4.5.2.1 Aggregated direct cost of delivery in public facilities

The average cost of a normal delivery in lower level public facilities: SHP, health post, and PHCC, is NPR 735, NPR 762, and NPR 767. Similarly, the average cost of normal delivery at district level and above i.e. district, zonal, and central, is NPR 999, NPR 1, 349, and NPR 1,199. The average cost of complicated delivery in lower level public facilities, health post and PHCC, is NPR 2,158 and NPR 1,331. Similarly, the average cost of complicated delivery at district and above level facilities, i.e. district, zonal, and central, is NPR 1,451, NPR 2,525, and NPR 2,449. The average cost of C-section delivery in district, zonal, and central level facilities is NPR 7,762, NPR 6,981, and NPR 5,199.

In lower level facilities drugs appear to be the major cost contributor. At central level hospitals, diagnostic services form the greatest cost in managing complications while drugs seem to be the greatest in zonal and district level hospitals. It is to be noted that the cost of complications increases with the level of facility as a wide variety of complications get treated in higher level facilities. The variations across facilities could be explained by the difference in practices in different facilities such as drug prescribing and the use of diagnostics. For example, ferrous sulphate, vitamin A capsules, and calcium tablets are not prescribed in central level hospitals but facilities at zonal level and below prescribe it routinely according to the national protocol. Similarly, differences in supplies used such as Foley's catheter, variety in suture materials, and spinal needles used could explain some of the observed variation.

Table 4.8: Direct cost of normal, complicated, and C-section delivery by public health facility (n=40 facilities)

Type of health facility	Items	Normal Delivery (NPR)	Complicated Delivery (NPR)	C-section Delivery (NPR)
Central Hospital	Drugs	115	660	1,759
	Supplies	195	311	1,622
	Human resources	411	386	1,012
	Diagnostics	478	1,092	806
	Total	1,199	2,449	5,199
Zonal Hospital	Drugs	229	697	1,975
	Supplies	289	830	3,096
	Human resources	365	383	1,165
	Diagnostics	466	615	745
	Total	1,349	2,525	6,981
District Hospital	Drugs	228	581	2,237
	Supplies	248	300	3,637
	Human resources	301	418	1,058
	Diagnostics	222	152	830
	Total	999	1,451	7,762
PHCC	Drugs	251	434	NA
	Supplies	197	400	NA
	Human resources	237	327	NA
	Diagnostics	82	170	NA
	Total	767	1,331	NA
Health post	Drugs	247	1,434	NA
	Supplies	200	394	NA
	Human resources	211	216	NA
	Diagnostics	104	114	NA
	Total	762	2,158	NA
SHP	Drugs	337	NA	NA
	Supplies	149	NA	NA
	Human resources	249	NA	NA
	Diagnostics	-	NA	NA
	Total	735	NA	NA

The findings show that the direct cost of normal, complicated, and C-section delivery in public facilities is sufficient to cover the cost of delivery care under the Aama Programme's current rate of

reimbursement. The findings also show that the use of human resources across facilities is one of the key cost drivers. It is to be noted that the time cost of human resources is covered by the annual workplan and budget (AWPB) for public facilities and some drugs are also covered under the free essential drug list.

4.5.2.2 Aggregated direct cost of delivery in private facilities

The average cost of normal delivery in Mission/NGO/Cooperative, private (for profit), and teaching hospitals is NPR 665, NPR 1,166, and NPR 1,481, respectively. The cost of diagnostic services and human resources time are the major costs for private facilities. The cost of normal delivery in private facilities is almost double that of in Mission/NGO/Cooperative hospitals. Similarly, the higher levels and numbers of human resources involved in providing normal delivery care in teaching hospitals contributes to higher direct costs. The average cost of a complicated delivery in Missionary/NGO/Cooperatives, private, and teaching hospitals is NPR 1,897, NPR 2,320, and NPR 3,412. The cost of managing complications is highest in teaching hospitals, most probably due to the wide variety of complications treated and use of diagnostics services.

Table 4.9: Direct cost of normal, complicated and C-section delivery in different private facilities (n=12 facilities)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Missionary/NGO/Cooperatives,	Drugs	242	555	1,429
	Supplies	188	525	2,048
	Human resources	177	449	1,977
	Diagnostics	58	368	924
	Total	665	1,897	6,378
Private (for profit)	Drugs	197	759	1,608
	Supplies	171	394	2,589
	Human resources	171	449	1,670
	Diagnostics	627	718	891
	Total	1,166	2,320	6,758
Teaching Hospitals	Drugs	332	957	2,408
	Supplies	310	559	2,577
	Human resources	404	858	2,177
	Diagnostics	435	1,038	923
	Total	1,481	3,412	8,085

The average cost of a C-section delivery in private facilities, Missionary/NGO/Cooperatives, private, and teaching hospitals, is NPR 6,378, NPR 6,758, and NPR 8,085. As shown in the table, the cost of C-section delivery appears to be high in teaching hospitals which could be due to types of complications managed there. However, the difference in practice could also contribute to the higher cost of care. Differences in

practice could be in the form of differences in prescribing drugs, use of diagnostic services, and human resources. For example, a wide prescription of antibiotics, pain killers, iron capsules, and calcium tablets was observed in private facilities and teaching hospitals.

4.5.3 Aggregated direct cost of delivery services in public and private hospitals by geographical region

Table 4.10 shows that the average cost of a normal delivery in mountain, hill, and Tarai regions is NPR 878, NPR 1,049, and NPR 1,034, respectively. The average cost of a complicated delivery in mountain, hill, and Tarai regions is NPR 1,881, NPR 2,223, and NPR 2,570. The average cost of a C-section delivery in mountain, hill, and Tarai regions is NPR 6,984, NPR 5,473, and NPR 8,150. The observed variations across geographical region could be explained by the distribution of types of health facility type and the availability of C-sections. Most of the private facilities are located in the Tarai, or in district headquarters.

Table 4.10: Direct cost of normal, complicated, and C-section delivery by geographical region (n=52)

Ecological region	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section Delivery (NPR)
Mountain	Drugs	317	812	2,100
	Supplies	234	435	2,882
	Human resource	290	408	1,046
	Diagnostics	37	226	956
	Total	878	1,881	6,984
Hill	Drugs	163	600	1,710
	Supplies	184	331	1,754
	Diagnostics	354	792	812
	Human resource	348	500	1,197
	Total	1,049	2,223	5,473
Tarai	Drugs	282	1,122	2,455
	Supplies	247	628	3,058
	Human resource	277	363	1,766
	Diagnostics	228	457	871
	Total	1,034	2,570	8,150

The table shows that the cost of care is highest in the Tarai. Caution must to be taken when interpreting the findings as the lower cost of delivery in mountain regions could mean less availability of all types of care i.e. C-sections, services, diagnostics, and human resources.

4.5.4 Average direct cost of delivery services in public facility by geographical region

Table 4.17 shows that the average direct cost of normal, complicated and C-section delivery in mountain regions is NPR 883, NPR 1,950, and NPR 6,984. Similarly, the average cost of normal, complicated, and C-section delivery in hill regions is NPR 1,022, NPR 2,133, and NPR 5,241. The average cost of normal, complicated, and C-section delivery in the Tarai is NPR 988, NPR 2,284, and NPR 6,999.

Table 4.17: Direct cost of normal, complicated, and C-section delivery by geographical region in public facilities (n=40)

Geographical region	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Mountain	883	1,950	6,984
Hill	1,022	2,133	5,241
Tarai	988	2,284	6,999

The findings show that the current rate of reimbursement is sufficient to cover the direct cost of normal, complicated, and C-section delivery in all geographical regions in public facilities.

4.5.5 Average direct cost of delivery services in private facilities by geographical region

Table 4.11 shows that the average direct cost of normal and complicated delivery in mountain regions is NPR 811, and NPR679, respectively. Similarly, the average cost of normal, complicated, and C-section deliveries in hill regions is NPR 1,160, NPR 2,381, and NPR 6,213. The average cost of normal, complicated, and C-section deliveries in the Tarai is NPR 1,281, NPR 4,067, and NPR 9,478.

Table 4.11: Direct cost of normal, complicated, and C-section delivery by geographical region in private facilities (n=12 facilities)

Geographical region	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Mountain	811	679	NA
Hill	1,160	2,381	6,213
Tarai	1,281	4,067	9,478

The findings indicate that the current rate of reimbursement is generally sufficient to cover the direct cost of normal delivery in private facilities across the three regions. Similarly, the direct cost of complicated and C-section deliveries is almost sufficient to cover the current reimbursement rate. It should be noted that the cost of human resources is included in the direct cost.

4.5.4 Direct cost of delivery services by level of care

4.5.4.1 Direct cost of delivery services in public facilities by level of care

The average cost of a normal delivery at a public birthing centre, BEONC, and CEONC is NPR 756, NPR 814, and NPR 1,245. The cost of a normal delivery is highest at CEONC facilities which could be due to the variety of diagnostic services and human resources involved. The average cost of a complicated delivery at a public birthing centre, BEONC, and CEONC is NPR 2,158, NPR 1,335 and NPR 2,479. It is to be noted that a wide variety of complications are treated at CEONC facilities. The average cost of a C-section delivery at a public CEONC is NPR 5,693.

Table 4.12: Direct cost of normal, complicated, and C-section delivery by level of care in public facilities (n=40)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section Delivery (NPR)
Birthing centre	Drugs	277	1,434	NA
	Supplies	185	394	NA
	Human resources	224	216	NA
	Diagnostics	70	114	NA
	Total	756	2,158	NA
BEONC	Drugs	272	526	NA
	Supplies	204	307	NA
	Human resources	262	402	NA
	Diagnostics	76	100	NA
	Total	814	1,335	NA
CEONC	Drugs	161	677	1,823
	Supplies	237	548	2,028
	Human resources	383	382	1,050
	Diagnostics	464	872	792
	Total	1,245	2,479	5,693

Some forms of complicated delivery such as such as puerperal sepsis, manual removal of the placenta, and PPH are performed in some birthing centres.

The study indicates that drugs are the one of the major cost contributors in both birthing centres and BEONCs for normal and complicated deliveries. Supplies appear to be the major cost driver followed by drugs for C-section delivery.

4.5.4.2 Direct cost of delivery services in private facility by level of care

The average cost of a normal delivery at a private facility functioning as a birthing centre, BEONC and CEONC is NPR 731, NPR 1,240, and NPR 1,292, respectively. The average cost of a complicated delivery at a private facility providing birthing centre, BEONC, and CEONC level care is NPR 679, NPR 2,103, and NPR 2,993. The average cost of a C-section delivery in a private CEONC is NPR 7,794.

Table 4.13: Direct cost of normal, complicated and C-section delivery in different private facility (n=12)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section Delivery (NPR)
Birthing centre level	Drugs	304	154	NA
	Supplies	259	170	NA
	Human resources	160	355	NA
	Diagnostics	8	-	NA
	Total	731	679	NA
BEONC level	Drugs	200	722	NA
	Supplies	160	392	NA
	Human resources	156	251	NA
	Diagnostics	724	738	NA
	Total	1,240	2,103	NA
CEONC level	Drugs	297	856	2,239
	Supplies	269	531	2,520
	Human resources	351	745	2,115
	Diagnostics	375	861	920
	Total	1,292	2,993	7,794

The cost of normal delivery is highest at CEONC level which could be due to the variety of diagnostic services used and human resources involved. Similarly, a wider variety of complications are treated at CEONC level such as blood transfusions.

The study indicates that drugs are one of the major contributors at birthing centre level for normal delivery. Diagnostic services are the major cost drivers for CEONCs. Moreover, diagnostic services are also the major cost contributors for both normal and complicated deliveries at BEONC level. Supplies appear to be the major cost driver followed by drugs for C-section deliveries.

The findings suggest that the current rate of reimbursement under the Aama Programme is sufficient to cover normal and complicated deliveries at all levels of care. The direct cost of C-section deliveries is sufficiently covered if the human resources cost is excluded from the analysis.

4.6 Indirect costs of delivery service

This section analyses the indirect costs incurred in providing normal, complicated, and C-section delivery across all levels of facility, level of care, public and private, and geographical region. For the purpose of this analysis, indirect cost is categorised as buildings, equipment, and recurrent costs. It should be noted that the primary interest of the Aama Programme is to offset the direct cost of care. Indirect units are substantially driven by the level of activity in a facility; facilities with high throughput of patients tend to have lower indirect unit costs.

4.6.1 Aggregated indirect cost of normal, complicated, and C-section delivery

The average indirect cost of a normal delivery in both public and private facilities is NPR 1,851. The cost of buildings, equipment, and recurrent the costs is found to be NPR 1,014, NPR 346, and NPR 491, respectively. Similarly, the average indirect cost of a complicated delivery is NPR 2,026. The cost of buildings, equipment, and recurrent costs is NPR 650, NPR 544, and NPR 832. The average indirect cost of a C-section delivery is NPR 4,835. The cost of buildings, equipment, and recurrent costs is NPR 947, NPR 2,380, and NPR 1,508.

Table 4.14: Indirect cost normal, complicated and C-section delivery by items in public and private (n=52)

Items	Normal delivery (NPR)*	Complicated delivery (NPR)**	C-section delivery (NPR)***
Buildings	1,014	650	947
Equipment	346	544	2,380
Recurrent	491	832	1,508
Total	1,851	2,026	4,835

*n=52 **-n=30 ***n=12

Table 4.14 shows that the cost of buildings is the major cost driver for normal delivery. This could be due to the availability of service across all levels of facilities and geographical regions. In recent years, huge investment has been put into buildings for lower level facilities to be able to function as birthing centres.

The findings show that the equipment and recurrent costs are similar for managing complicated delivery. This could be due to the use of technological equipment, maintenance, and a lower number of cases in lower level facilities. Equipment is the major cost driver for C-section delivery and this could be due to the higher average length of stay and use of C-section equipment. The cost of building is relatively lower for C-section deliveries as a result of relatively high caseloads in these facilities.

4.6.2 Indirect cost of normal, complicated, and C-section delivery by level of health facility

4.6.2.1 Indirect cost of normal, complicated, and C-section delivery in public facility by level

The average indirect cost of a normal delivery at a lower level facility, i.e. SHP, health post, and PHCC, is NPR 614, NPR 1,312, and NPR 4,590. Similarly, the indirect cost of a normal delivery service at a district and higher level facility i.e. district, zonal, and central level hospital is NPR 2,367, NPR 335 and NPR 534. The indirect cost of a complicated delivery at health post and PHCC level is NPR 311 and NPR 821. Similarly, the indirect cost of a complicated delivery at a district, zonal, and central hospital is NPR 3,144, NPR 572, and NPR 987. The indirect cost of a C-section delivery at a district, zonal, and central hospital is NPR 10,616, NPR 2,226, and NPR 2,271.

Table 4.15: Indirect cost of normal, complicated, and C-section delivery by type of public health facility (n=40)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Central Hospital	Buildings	191	352	717
	Equipment	151	281	833
	Recurrent	192	354	721
	Total	534	987	2,271
Zonal Hospital	Buildings	118	195	656
	Equipment	52	95	651
	Recurrent	165	282	919
	Total	335	572	2,226
District Hospital	Buildings	571	738	1,141
	Equipment	472	678	7,187
	Recurrent	1,324	1,728	2,288
	Total	2,367	3,144	10,616
PHCC	Buildings	2,839	454	NA
	Equipment	783	216	NA
	Recurrent	968	151	NA
	Total	4,590	821	NA
Health post	Buildings	897	213	NA
	Equipment	162	45	NA
	Recurrent	253	53	NA
	Total	1,312	311	NA
SHP	Buildings	491	NA	NA
	Equipment	72	NA	NA
	Recurrent	51	NA	NA
	Total	614	NA	NA

Table 4.15 shows that buildings are a major cost driver for normal and complicated delivery in PHCCs, health posts, and SHPs. This is because these facilities have a relatively lower caseload to offset the cost of buildings. The average cost of normal, complicated, and C-section deliveries is higher in district hospitals compared to zonal and central hospitals. This could be due to a relatively lower caseload to offset all indirect costs. In addition, the average length of stay is also an important factor that increases the share of indirect costs in district hospitals (a maximum of nine and a half days in mountain regions). Longer stays are sometimes required in more remote areas to provide post-natal care that is less easy to deliver once women are back at their homes.

4.6.2.2 Indirect cost of normal, complicated, and C-section delivery in private facilities by level

The average indirect cost of a normal delivery in Mission/NGO/Cooperatives, private, and teaching hospitals is NPR 3,248, NPR 8,557, and NPR 1,315, respectively. Similarly, the indirect cost of a complicated delivery in Mission/NGO/Cooperatives, private, and teaching hospitals is NPR 8,967, NPR 4,508, and NPR 2,405. The indirect cost of a C-section delivery in Mission/NGO/Cooperatives, private, and teaching hospitals is NPR 1,963, NPR 4,129, and NPR 5,179.

Table 4.16: Indirect cost of normal, complicated and C-section delivery by private facility (n=12)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Missionary/ NGO/ Cooperatives	Buildings	985	2,508	391
	Equipment	1,011	3,121	1,108
	Recurrent	1,252	3,338	464
	Total	3,248	8,967	1,963
Private	Buildings	1,795	708	555
	Equipment	2,859	657	1,584
	Recurrent	3,903	3,143	1,990
	Total	8,557	4,508	4,129
Teaching hospitals	Buildings	572	1,056	2,001
	Equipment	178	333	1,190
	Recurrent	565	1,016	1,988
	Total	1,315	2,405	5,179

The findings indicate that recurrent costs are one of the major cost drivers while managing normal and complicated deliveries in all private facilities. This could be due to higher utility costs and lower numbers of cases.

The indirect cost of normal delivery care is lowest in teaching hospitals compared to Mission/NGO/Cooperatives and private facilities which could be because these facilities have relatively high levels of maternity inpatients to offset the indirect costs.

C-section deliveries at teaching hospitals appear to be high compared to at Mission/NGO/Cooperatives and private hospitals. The reason for this could be the advanced technological equipment used and longer duration of stay.

4.6.2.3 Average indirect cost of normal, complicated, and C-section delivery by geographical region

The average indirect cost of a normal delivery in mountain, hill, and Tarai regions is NPR 6,655, NPR 1,440, and NPR 977, respectively. Similarly, the indirect cost of a complicated delivery in mountain, hill, and Tarai regions is NPR 10,757, NPR 1,260, and NPR 567. The indirect cost of a C-section delivery in mountain, hill, and Tarai region is NPR 16,258, NPR 4,182 and NPR 3,571.

Table 4.17: Indirect cost of normal, complicated, and C-section delivery by geographical region (n=52)

Geographical region	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Mountain	Buildings	3,833	3,023	1,472
	Equipment	1,175	3,297	11,826
	Recurrent	1,647	4,437	2,960
	Total	6,655	10,757	16,258
Hill	Buildings	835	452	758
	Equipment	265	291	2,188
	Recurrent	340	517	1,236
	Total	1,440	1,260	4,182
Tarai	Buildings	416	243	1,138
	Equipment	209	97	791
	Recurrent	352	227	1,642
	Total	977	567	3,571

Table 4.17 indicates that buildings are a major cost contributor across the mountains, hills, and Tarai for normal deliveries. This could be due to the availability of normal delivery facilities across the regions and a low caseload. The recurrent costs are one of the major contributors to indirect costs in managing complicated deliveries in the mountains, hills, and Tarai. The caseload, average length of stay, and maintenance costs are higher compared to for normal deliveries, thus the recurrent costs are on the higher side. Equipment is the major cost contributor for C-section deliveries in the mountains and hills. The wide variation in cost can be attributed to the average length of stay (nine and a half days in the mountain region), use of C-section equipment, and a lower caseload.

4.6.2.4 Average indirect cost of normal, complicated, and C-section delivery in public facilities by geographical region

The average indirect cost of a normal delivery in a public facility in the mountains, hills, and Tarai is NPR 6,363, NPR 1,228, and NPR 1,228. Similarly, the indirect cost of a complicated delivery in the mountains, hills, and Tarai is NPR 5,389, NPR 850, and NPR 380. The indirect cost of a C-section delivery in the mountains, hills, and Tarai is NPR 16,258, NPR 7,378, and NPR 2,038.

Table 4.18: Indirect cost of normal, complicated, and C-section delivery in public facilities by geographical region (n=40)

Geographical region	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Mountain	6,363	5,389	16,258
Hill	1,228	850	7,378
Tarai	1,228	380	2,038

The findings show that the indirect cost of all types of delivery is higher in the mountain regions. The indirect cost of managing complicated and C-section deliveries in hill regions is more than double that of the Tarai. This could be due to the high caseload in the Tarai.

4.6.2.5 Average indirect cost of normal, complicated, and C-section delivery in private facilities by geographical region

The average indirect cost of a normal delivery in the mountain, hill, and Tarai regions is NPR 11,686, NPR 3,687, and NPR 7,568, respectively. Similarly, the indirect cost of a complicated delivery in the mountain, hill, and Tarai regions is NPR 27,130, NPR 1,958, and NPR 1,923. The indirect cost of a C-section delivery in the hill and Tarai regions is NPR 3,115 and NPR 5,106.

Table 4.19: Indirect cost of normal, complicated, and C-section delivery in private facilities by geographical region (n=12)

Geographical region	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Mountain	11,686	27,130	NA
Hill	3,687	1,958	3,115
Tarai	7,568	1,923	5,106

The findings indicate that the indirect cost of providing normal and complicated delivery is higher in the mountains followed by in the Tarai. The indirect cost of care in the mountains is higher because of the lower number of facilities included in the study.

4.6.2.6 Average Indirect cost of normal, complicated, and C-section delivery by level of care in public facility

The average indirect cost of a normal delivery in a birthing centre, BEONC, and CEONC is NPR 1,527, NPR 1,828, and NPR 667, respectively. Similarly, the indirect cost of a complicated delivery in a birthing centre, BEONC, and CEONC is NPR 312, NPR 2,196, and NPR 978. The indirect cost of a C-section delivery in a CEONC is NPR 6,558.

Table 4.20: Indirect cost of normal, complicated, and C-section delivery by level of care in public facilities (n=40)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
BC	Buildings	1,033	213	NA
	Equipment	215	45	NA

	Recurrent	279	53	NA
	Total	1,527	312	NA
BEONC	Buildings	813	663	NA
	Equipment	320	488	NA
	Recurrent	695	1,046	NA
	Total	1,828	2,196	NA
CEONC	Buildings	203	279	917
	Equipment	112	234	4,052
	Recurrent	352	465	1,589
	Total	667	978	6,558

The findings suggest that buildings are one of the major cost drivers for providing normal delivery across birthing centres, BEONCs, and CEONCs. This could be due to the availability and use of services across the levels of care. It also suggests that recurrent costs are one of the major contributors for providing complicated deliveries in BEONCs and CEONCs. This could be due to a lower case load and higher utility costs at BEONC level. Equipment is a major cost driver at CEONC level. An important point regarding CEONCs is that the average length of stay varies from six to nine and a half days.

4.6.2.7 Average indirect cost of normal, complicated, and C-section delivery by level of care in private facilities

The average indirect cost of a normal delivery birthing centre, BEONC, and CEONC level is NPR 9,978, NPR 10,814, and NPR 930, respectively. Similarly, the indirect cost of a complicated delivery birthing centre, BEONC, and CEONC level is NPR 27,130, NPR 4,226, and NPR 1,285. The indirect cost of a C-section delivery at CEONC level is NPR 3,714.

Table 4.21: Indirect cost of normal, complicated, and C-section delivery by level of care in private facilities (n=12)

Type of health facility	Items	Normal delivery (NPR)	Complicated delivery (NPR)	C-section delivery (NPR)
Birthing centre level	Buildings	2,577	7,531	NA
	Equipment	3,793	9,502	NA
	Recurrent	3,608	10,097	NA
	Total	9,978	27,130	NA
BEONC level	Buildings	2,227	1,345	NA
	Equipment	3,249	1,212	NA
	Recurrent	5,338	1,669	NA
	Total	10,814	4,226	NA

CEONC level	Buildings	292	463	967
	Equipment	169	234	1,289
	Recurrent	469	588	1,455
	Total	930	1,285	3,711

The findings show that the recurrent costs are one of the major cost drivers for normal, complicated, and C-section deliveries across birthing centre, BEONC, and CEONC level facilities. This could be due to a lower case load at private facilities functioning at birthing centre and BEONC level. An important factor in private CEONC level care is that the average length of stay varies from 3 to 6 days.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The current reimbursement rate under the Aama Programme includes the direct cost of care for normal, complicated, and C-section deliveries. The current rate of reimbursement was set in the year 2008 and it should be noted that the actual cost of all types of care has been calculated against the prices of 2014. This chapter intends to summarise the actual cost of care in public and private facilities with these prices. The findings need to be read in the context of support provided by the GoN in addition to the Aama Programme. The GoN currently provides for free the drugs that are used during delivery care and the salaries of human resources staff. In addition, the GoN also provides the cost for buildings, equipment, and utilities.

The second section of this chapter discusses whether the current rate of reimbursement made under Aama Programme is sufficient to cover the direct cost of care.

5.1.1 Actual cost of normal, complicated, and C-section delivery in public and private facilities

This section summarises the actual cost, direct and indirect, of care that occurs when providing normal, complicated, and C-section delivery. The main conclusions are as follows:

Actual cost of normal delivery in public and private facilities

- The total actual cost of providing care for a normal delivery is NPR 2,889. This is a weighted average cost that includes direct and indirect costs in public and private facilities. The total cost of a normal delivery in a public facility is NPR 2,536, which is less than national average. The study further concludes that the cost of a normal delivery is NPR 6,880 in private facilities which is higher than the national average. The cost of normal delivery care is lower in public facilities and varies with the geographical region of the facility.
- The study shows that the total actual cost of providing a normal delivery in a public facility is NPR 2,283 in a birthing centre, NPR 2,643 in a BEONC, and NPR 1,911 in a CEONC. The total actual cost of providing a normal delivery in private facilities is NPR 10,710 at birthing centre level, NPR 12,054 at BEONC level, and NPR 2,223 at CEONC level. The study concludes that the actual cost of providing a normal delivery is lower at CEONC level at both public and private facilities. It also suggests that the actual cost for a normal delivery is relatively higher in private facilities functioning at BEONC and birthing centre level.

Actual cost of a complicated delivery in public and private facilities

- The total actual cost of providing care for complicated deliveries is NPR 4,422. It should be noted that this includes direct and indirect costs in both public and private facilities. At a public facility, the total cost for a complicated delivery comes to NPR 3,344. Similarly, the total cost of a complicated delivery at a private facility is NPR 7,621. The study concludes that the cost of a complicated delivery at a private facility is higher than the national average, higher than at public facilities, and is higher across all geographical regions.
- Further analysis of the total actual cost for providing a complicated delivery at a public facility by level of care is NPR 2,470 at birthing centres, NPR 3,532 at BEONCs, and NPR 3,457 at CEONCs. In private facilities, the cost of providing complicated delivery services is NPR 27,809 at birthing centres, NPR 6,329 at BEONCs, and NPR 4,278 at CEONCs. This indicates that the cost of providing a complicated delivery at the lowest level of private facility is generally far higher than at a higher level facility.

Actual cost of C-section delivery in public and private facilities

- The study concludes that the total actual cost for a C-section (direct/indirect and public/private) is NPR 11,181. The actual cost for providing a C-section delivery in a public facility is NPR 12,250 and NPR 11,506 in a private facility. This suggests that there is little difference in cost in providing a C-section delivery in public and private facility. No private facilities from the mountain regions were sampled in the study.
- The analysis of actual cost by level of care shows that the cost of C-section delivery in public CEONCs is NPR 12,250 and is NPR 11,506 in private CEONCs. This is because C-section delivery is provided mostly by CEONC facilities.

5.1.2 Sufficiency of the current rate of reimbursement against Aama Programme guidelines

This section summarises the direct actual cost occurring when providing normal, complicated, and C-section deliveries at both public and private facilities. Following the current Aama Programme guidelines, the rate of reimbursement for a normal delivery is NPR 1,000 for hospitals with less than 25 beds up to NPR 1,500 for hospitals with more than 25 beds. Similarly, the current rate of reimbursement for a complicated delivery is NPR 3,000 and for C-section delivery is NPR 7,000. It should be noted that a minimal incentive to health workers of NPR 300 is also included in all types of reimbursement rates.

The direct actual cost of a normal delivery in public and private facilities

- The study concludes that the total direct cost of a normal delivery is NPR 1,039. This includes the average direct cost for public and private facilities. Furthermore, analysis shows that the total direct cost for a normal delivery at a public facility is NPR 1,001 and NPR 1,221 for a private facility. This suggests that the current rate of reimbursement is sufficient to offset the direct cost of care for a normal delivery in both public and private facilities. It should be noted that the direct cost above also includes the cost of human resources.
- The direct cost for a normal delivery by level of care in a public facility is NPR 756 at birthing centre, NPR 815 at BEONC, and NPR 1,245 at CEONC level. Similarly, the direct actual cost at a private facility functioning at birthing centre level is NPR 732, NPR 1,240 at BEONC level, and NPR 1,292 at CEONC level. The study suggest that the current rate of reimbursement for a normal delivery is sufficient to cover the cost at all levels at both public and private facilities. It should be noted that the findings resemble the current provision of NPR 1,000 for lower level facilities (with under 25 beds) and NPR 1,500 for higher level facilities (with over 25 beds).

The direct actual cost of a complicated delivery in public and private facilities

- The direct actual cost for providing a complicated delivery (by public/private and level of care) is NPR 2,397. The direct actual cost for a complicated delivery at a public facility is NPR 2,218 and NPR 2,901 at a private facility. The actual direct cost of providing a complicated delivery is less at public than at private facilities. The findings suggest that the current rate of reimbursement as per the Aama Programme guidelines is sufficient to cover the cost of a complicated delivery in both public and private facilities.
- The analysis of the direct cost of a complicated delivery by level of care in public facilities shows that the cost at birthing centres is NPR 2,158, at BEONCs is NPR 1,335, and at CEONCs is NPR 2,479. Similarly, the direct actual cost by level of care at private facilities shows that cost at birthing centre level is NPR 679, at BEONC level is NPR 2,102, and at CEONC level is NPR 2,993. The study suggests that the current rate of reimbursement (NPR3000) is sufficient to cover the cost of a complicated delivery at each level of care at both public and private facilities.

The direct actual cost of a C-section delivery in public and private facilities

- The direct actual cost for providing a C-section delivery (public/private and level of care) is NPR 6,345. The direct actual cost for a C-section delivery in a public facility is NPR 5,693 and NPR 7,794 in a private facility. This concludes that the actual direct cost of providing a C-section delivery is less at public than at private facilities. The findings suggest that the current rate of reimbursement as per the Aama Programme guidelines (NPR 7,000) is sufficient to cover the cost of a C-section delivery at public facilities, and slightly insufficient to cover the cost of a C-section at private facilities.
- The analysis of actual cost by level of care shows that the cost of a C-section delivery at a public CEONC is NPR 5,693 and at a private CEONC is NPR 7,794. This is because C-section delivery is provided mostly at CEONC facilities.

5.2 Way Forward

The level of provision as per the current Aama Programme guidelines is sufficient to cover the direct costs required to provide normal, complicated, and C-section deliveries. This provision is mandatory for all public facilities providing delivery care functioning under the MoHP. However, it also includes provision for private facilities to implement the programme. This is voluntary provision for private facilities that are choose to participate. The general idea behind creating the opportunity for the private sector was that the market determines the price of service and agreeing to implement the Aama Programme would mean that the defined services could be provided within the current rate of reimbursement. The benefit of implementing the Aama Programme in the private sector does not have to be limited to the scope of the current level of direct reimbursement. The Aama Programme could provide an opportunity to encourage more clients in the future and ensure the required patient flow for teaching learning activities. Additionally, this study suggests that the current rate of reimbursement under Aama programme is, in general, sufficient to offset the direct cost required for both public and private facilities, different levels of facility, levels of care, and all geographical regions. To support the MoHP in refining the Aama Programme, a number of issues need to be addressed:

- It is important to note that public facilities receive funding for both direct and indirect costs from general taxation. An option for providing total unit costs for delivery would be only be appropriate if facilities were paid on a case-by-case basis. This may occur if the national social health insurance programme is rolled out. Paying a higher amount to private facilities (including indirect payments) would probably be necessary if the public wished to increase the role of the private sector in providing the Aama Programme. Both of these options would be very expensive, a key consideration given that the Aama Programme currently accounts for more than 40% of the FHD's budget
- Another important factor to check is whether there are sufficient funds to cover the necessary costs. Providing indirect costs to private facilities could be rationalised, however, for public facilities it could not be fully justified to assign funds from a separate budget to offset their indirect costs. Setting different levels of reimbursement for public and private might introduce

different levels of complexity. The occupancy of hospital beds and building situation have been major determinants in driving costs in facilities. It is important to take into account the cost of maintaining buildings and cost of inpatient care when setting levels of reimbursement. Continuing with the present scenario might be the best option for public facilities where the majority of costs are taken care of under a different budget heading.

- The study has observed varied practices relating to care, the use of diagnostic services, and drug prescribing patterns. It would be helpful to develop comprehensive national reproductive health clinical protocols which would help to ensure that guidelines around delivery care practices, drug prescribing patterns, involvement of trained health workers, use of diagnostics services, and the use of supplies in both public and private health facilities are adhered to.
- In the case of public facilities, almost all items filed under direct and indirect cost are covered under a separate budget heading. For example, in facilities that are district level or below, drugs are obtained from central, regional and district supplies under the free drugs programme. Some of these drugs are used in providing delivery services. Similarly, salaries for staff and recurrent costs necessary to run the facility (including the purchasing of equipment) are separately covered under a different budget heading. Additionally, the public facilities are financed from a separate budget overseen by a different department. The main issue is that these additional budget lines are generally not linked to levels of facilities and types of activity. As a consequence, very busy facilities are not compensated for providing services to additional patients and so the quality of care possible can suffer.
- Linking the Aama Programme with other schemes like the free essential drugs programme, unconditional grants to hospitals, and reimbursement to lower level facilities for providing free outpatient services would help reduce the administrative, management, monitoring, and reporting costs and will ensure value for money.
- Clear guidelines on how use the savings from the current rate of reimbursement would help improve the delivery services in health facilities.
- The study suggests that the private facilities functioning at a lower level demand higher costs for complicated and C-section deliveries. Thus, one important step forward would be only continue the Aama Programme in hospitals where there is a higher case load and they fully comply with the Aama guidelines such as NGO/Mission/Community hospitals or teaching hospitals.
- The broken-down costs of providing delivery care from this study would be useful for a national social health insurance programme as a basis for the reimbursement of its accredited health facilities.
- The current rate of reimbursement is insufficient to reimburse the indirect cost of care. This has serious implications for private facilities where enough money has to be made to offset the share of indirect costs i.e. buildings, equipment, and recurrent costs. A major service expense comes from the indirect costs in a private facility, especially if the bed occupancy of the facility is low. A policy discussion is thus required on whether the Aama Programme should be expanded to more private facilities including a consideration of the additional funding that this would require.

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Annex I: Standard Definition of Complications

S.N	Condition	Standard Definition
1	Antepartum haemorrhage	Vaginal bleeding after 22 weeks of pregnancy Vaginal bleeding in labour before delivery
2	Post-partum haemorrhage	Bleeding from the genital tract of 1000ml or more following the delivery of the baby, within the first 24 hours, or until six weeks from delivery
3	Pre- eclampsia	Pre-eclampsia: Gestational hypertension with significant proteinuria (≥ 0.3 g/l) after 20 weeks of gestation or during labour and/or within 48 hours of delivery Mild pre-eclampsia: two readings of diastolic blood pressure ≥ 110 , four hours apart after 20 weeks of gestation with proteinuria up to 2+ Severe pre-eclampsia: Diastolic BP ≥ 110 or more after 20 weeks of gestation with proteinuria more than 2+
4	Eclampsia	Convulsions occurring ante-, intra- or postpartum, associated with high blood pressure and proteinuria
5	Retained placenta	Placenta not delivered within 30 minutes after delivery
6	Puerperal sepsis	Infection of the genital tract occurring any time between rupture of membranes or labour and 42 day postpartum marked by pelvic pain, fever, abnormal vaginal discharge, foul odour of discharge, and a delay in the rate of reduction on the size of uterus (<2 cm/day during the first eight days).
7	Prolong/obstructed labour	Prolonged labour: onset of regular, rhythmical, painful contractions accompanied by cervical dilation where labour is longer than 24 hours Obstructed labour: In spite of strong contractions of the uterus, the foetus cannot descend through the pelvis because of a barrier preventing its descent

8	Ectopic pregnancy	An ectopic pregnancy is a complication of pregnancy in which the embryo implants outside the uterine cavity- in developing countries they are usually only recognised when they have ruptured or are in danger of rupturing requiring surgical intervention
9	RH negative (anti D):	
10	Post abortion care	Treatment of women experiencing complications after undergoing unsafe abortions- complications include haemorrhage, sepsis, peritonitis, and trauma to the cervix, vagina, uterus, and abdominal organs
11	Breech delivery	Baby lies in in longitudinal and podilic presents at the pelvic brim- commonest mal-presentation
12	Multiple pregnancy	Fundal height more than period of gestation, multiple foetal poles and two foetal heart sounds with difference of ten beats /minute
13	Ruptured Uterus	Uterine rupture is a potentially catastrophic event during childbirth by which the integrity of the myometrial wall is breached. In an incomplete rupture the peritoneum is still intact. With a complete rupture the contents of the uterus may spill into the peritoneal cavity or the broad ligament.
14	Molar pregnancy	Molar pregnancy is an abnormal form of pregnancy in which a non-viable fertilized egg implants in the uterus and will fail to come to term. A molar pregnancy is a gestational trophoblastic disease which grows into a mass in the uterus that has swollen chorionic villi. These villi grow in clusters that resemble grapes.

Annex II: Conditions Listed for Complicated and C-Section in the Aama Programme

Conditions listed as <u>complicated delivery service</u> in Aama guidelines for unit cost reimbursement	C-section conditions listed for <u>C-section service</u> in Aama guidelines for unit cost reimbursement
<ul style="list-style-type: none"> 1. Antepartum haemorrhages (APH) 2. Postpartum haemorrhages (PPH) 3. Pre-eclampsia 4. Eclampsia 5. Retained placenta 6. Puerperal sepsis 7. Instrumental deliveries 8. Multiple pregnancies/breech deliveries 9. RH negative (anti-D) 10. Post-abortion care 	<ul style="list-style-type: none"> 11. Prolonged/obstructed labour 12. Ectopic pregnancies 13. Ruptured uteruses 14. Post-abortion perforation

Annex III: 75 Districts Stratified by Functionality of CEONC and C-section Facility in Private

Ecological region	Eastern (n)=16	Central (n)=19	Western (n)=16	Mid-western (n)=15	Far-western (n)=9
No government CEONC					
Mountain		Rasuwa	Manang Mustang	Dolpa Humla Mugu	
Hill		Sindhuli Ramechhap	Parbat	Jajarkot	
Tarai					
Government CEONC functional					
Mountain	Sankhuwasabha Solukhumbu Taplejung	Dolakha		Jumla Kalikot	Bajhang
Hill	Panchthar Bhojpur Illam khotang Terathum Udaypur	Bhaktapur Dhadhing Makwanpur Nuwakot	Baglung Gorkha Gulmi Tanahu	Dailekh Rolpa Pyuthan Surkhet Salyan	Doti Dadeldhura
Tarai	Saptari	Bara Rautahat Dhanusa Mahottari	Kapilvastu Nawalparasi	Bardiya Dang	Kailali
Government CEONC non functional					
Mountain		Sindhupalch owk			Darchula Bajura
Hill	Dhankuta		Arghakanchi Syangja Myagdi		Baitadi
Tarai		Sarlahi			Kanchanpur
Both government CEONC and private with C-section					
Mountain					
Hill		Kathmandu	Kaski	Rukum	Accham
Tarai	Morang Sunsari Jhapa Siraha	Parsa Chitwan	Rupandehi	Banke	

Only Private with C-section					
Mountain					
Hill	Okhaldhunga	Kavre Lalitpur	Lamjung Palpa		
Tarai					

Annex IV: Government health facilities status of the study districts

S.N	Districts	Geographical Region	Health facility segregation						Total
			Central hospital	Zonal hospital	District hospital	PHCC	Health post	SHP	
1	Solukhumbu	Mountain	0	0	1	2	18	14	35
2	Dhankuta	Hill	0	0	1	2	24	11	38
3	Kathmandu	Hill	1	0	0	8	24	34	67
4	Sarlahi	Tarai	0	0	1	5	10	84	100
5	Mustang	Mountain	0	0	1	1	12	3	17
6	Lamjung	Hill	0	0	0	2	20	38	60
7	Banke	Tarai	0	1	0	3	20	24	48
8	Jajarkot	Hill	0	0	1	3	15	21	40
9	Kailai	Tarai	0	1	1	5	20	17	44
10	Doti	Hill	0	0	1	2	20	29	52
	Total		1	2	7	33	183	275	501

Annex V: Details of health facilities in the study district

S.N.	Districts	Ecological Region	CEONC or C-section facility		BEONC or complicated and normal delivery		Birthing centre or normal delivery only		
			Public	Private	Public	Private	Health post	SHP	Private
1	Solukhumbu	Mountain	Phaplu Hospital		Sotang PHCC		Chaulakharka		Pasang Lamahu Nicole Niquille
2	Dhankuta	Hill			Dhankuta Hospital		Manobudhak		
3	Kathmandu	Hill	Paropkar Maternity and Women's Hospital	Kirtipur Hospital National Medical College Shankharapur Hospital				Lapsiphedhi	Adharbhut Prasuti Sewa
4	Sarlahi	Tarai			Malanguwa Hospital Barathawa PHCC Achalgad PHCC Lalbandhi PHCC		Harkatuwa	Gaurishankar	Family Planning Clinic
5	Mustang	Mountain			Jomsom District Hospital		Lete PHCC		

6	Lamjung	Hill		Community Hospital	Chandreswor PHCC		Chisankhu	Bansar	
7	Banke	Tarai	Bheri Zonal Hospital		Bankatuwa	Kohalpur Medical Collge Western Nursing Home	Kalaphanta Bajapur	Mahadevpuri	
8	Jajarkot	Hill			Jajarkot District Hospital Limsa PHCC		Kudu	Paikh	
9	Kailai	Tarai	Seti Zonal Hospital Tikapur Hospital		Bhajani Josipur Chaumala	Sewa Nursing Home	Sugarkhal Nigali	Urma	
10	Doti	Hill	District Hospital		Saraswatinagar	Soojung Hospital	Gadsera Daud	Kapalekkhi Kanachaur	

Annex VI: Direct cost of complication

Type of health facility	Items	Mean	95% CI	
APH	Drugs	359	(156)	875
	Supplies	427	(352)	1,206
	Human resources	432	317	548
	Diagnostics	1,080	1,046	1,113
	Total	2,298	923	3,673
PPH	Drugs	1,469	1,019	1,919
	Supplies	587	218	955
	Human resources	398	(13)	810
	Diagnostics	347	(100)	793
	Total	2,801	2,043	3,558
Pre-eclampsia	Drugs	942	515	1,370
	Supplies	1,767	1,435	2,099
	Human resources	1,442	1,152	1,731
	Diagnostics	765	685	844
	Total	4,916	4,415	5,416
Eclampsia	Drugs	2,156	875	3,437
	Supplies	1,218	832	1,604
	Human resources	1,003	602	1,405
	Diagnostics	1,195	152	2,237
	Total	5,572	2,995	8,150
Retained placenta	Drugs	640	562	718
	Supplies	482	281	683
	Human resources	460	328	592
	Diagnostics	479	72	887
	Total	2,061	1,404	2,718
Puerperal sepsis	Drugs	879	879	879

	Supplies	96	93	99
	Human resources	306	306	307
	Diagnostics	674	673	676
	Total	1,955	1,955	1,957
Prolong/obstructed labor	Drugs	1,139	931	1,347
	Supplies	1,457	1,128	1,786
	Human resources	1,005	698	1,313
	Diagnostics	616	434	799
	Total	4,217	3,261	5,173
Ectopic pregnancy	Drugs	2,103	1,342	2,865
	Supplies	1,958	944	2,972
	Human resources	1,271	21	2,520
	Diagnostics	990	811	1,169
	Total	6,322	3,150	9,494
RH Anti D/ normal delivery	Drugs	327	180	475
	Supplies	220	196	245
	Human resources	307	217	398
	Diagnostics	279	104	454
	Total	1133	838	1429
RH Anti D/ complicated delivery	Drugs	928	603	1252
	Supplies	481	296	666
	Human resources	431	267	595
	Diagnostics	621	169	1074
	Total	2461	2084	2837
Post abortion complication	Drugs	689	561	816
	Supplies	556	336	777
	Human resources	535	436	634
	Diagnostics	920	766	1,074
	Total	2,700	2,474	2,925

Ruptured Uterus	Drugs	3,813	3,085	4,542
	Supplies	2,147	1,178	3,115
	Human resources	1,684	1,353	2,015
	Diagnostics	2,130	1,427	2,833
	Total	9,774	8,940	10,608
Molar pregnancy	Drugs	1,121	1,044	1,197
	Supplies	305	168	443
	Human resources	412	393	431
	Diagnostics	1,349	1,308	1,391
	Total	3,187	2,993	3,381

Note: The direct cost of twin and breech delivery does not influence the cost of care. It largely depends on the obstetric complication and procedure utilised.

B

Type of health facility	Items	Mean	95% CI	
Vacuum delivery	Drugs	513	331	695
	Supplies	480	317	644
	Human resources	445	255	636
	Diagnostics	468	231	705
	Total	1,906	1,436	2,377
Forceps delivery	Drugs	1,018	(120)	2,157
	Supplies	572	230	915
	Human resources	869	659	1,078
	Diagnostics	756	431	1,081
	Total	3,215	1,946	4,485
C-section	Drugs	1,834	1,258	2,409
	Supplies	2,223	1,471	2,976
	Human resources	1,371	891	1,852
	Diagnostics	745	590	900
	Total	6,173	4,322	8,024
Laparotomy	Drugs	2,640	2,447	2,834
	Supplies	1,932	1,180	2,684
	Human resources	1,434	750	2,119
	Diagnostics	1,335	1,182	1,489
	Total	7,341	5,946	8,738
Evacuation	Drugs	878	839	917
	Supplies	330	318	342
	Human resources	400	394	407
	Diagnostics	1,369	1,362	1,376
	Total	2,977	2,925	3,030

MVA	Drugs	508	190	826
	Supplies	517	171	863
	Human resources	336	304	368
	Diagnostics	737	535	940
	Total	2,098	1,481	2,715
MRP	Drugs	621	536	706
	Supplies	493	195	791
	Human resources	438	317	559
	Diagnostics	341	16	666
	Total	1,893	1,311	2,475
Medical management	Drugs	1,209	440	1,978
	Supplies	403	342	464
	Human resources	377	61	693
	Diagnostics	394	(115)	902
	Total	2,383	2,200	2,565
D&C	Drugs	1,104	663	1,546
	Supplies	1,473	1,140	1,807
	Human resources	589	170	1,009
	Diagnostics	823	612	1,033
	Total	3,989	3,845	4,135