COSTING PROTOCOL: A GUIDE TO UNIT COST ANALYSIS OF THE HEALTH FACILITY REIMBURSEMENT MADE UNDER THE AAMA PROGRAMME

Family Health Division
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Authors

Hema Bhatt, Dr. Suresh Tiwari, Dr. Chris James, Dr. BK Suvedi, Paban Ghimire, and Tomas Lievens

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List of Acronyms

ANC	Antenatal Care
ANM	Auxiliary Nurse Midwives
APH	antepartum haemorrhages
ART	Antiretroviral Therapy
AWPB	annual workplan and budget
BEONC	Basic Emergency Obstetrics and Neonatal Care
CEONC	Comprehensive Emergency Obstetrics and Neonatal Care
C-Section	Caesarean Section
DHO	district health office
DOHS	Department of Health Services
DPHO	district public health office
DSF	Demand-side Financing
EDP	External Development Partner
FHD	Family Health Division
GoN	Government of Nepal
HP	Health Post
HDI	Human Development Index
MDG	Millennium Development Goal
MoHP	Ministry of Health and Population
NPR	Nepalese Rupees
NSMP	National Safe Motherhood Plan
OPM	Oxford Policy Management
OT	Operating Theatre
PHCC	Primary Health Care Centre
PPH	postpartum haemorrhages
SDIP	Safe Delivery Incentive Programme
SBA	Skilled Birth Attendant
SHP	Sub Health Post
SM	Safe motherhood
ToR	terms of reference
WHO	World Health Organization

TABLE OF CONTENTS

1. BACKGROUND

1.1 MATERNAL HEALTH IN NEPAL

Over the last decade Nepal has made good 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 a decline in the infant mortality rate from 108 to 46 deaths per 1,000 live births. Similarly, skilled attendant care at delivery has increased from 9% to 36% (Ministry of Health and Population [MoHP], 2012).

Several factors may have contributed to these improvements, such as declining poverty levels and fertility ratios, the steady rise in female education, increased use of modern contraceptives, skilled birth attendance, C-section (caesarean section) deliveries, and abortion services. However, investment in maternal health services through both demand and supply side interventions are believed to be the significant contributors (Jackson et al., 2010).

1.2 EVOLUTION OF THE AAMA PROGRAMME

The 1987 Safe motherhood initiative in Kenya identified maternal health as an important public health agenda in the global forum. Following the conference, many developing countries including the Government of Nepal (GoN) announced safe motherhood (SM) as a national priority programme and institutionalised SM into primary care. The development of the National Safe Motherhood Plan (NSMP) of Action (1994) demonstrated the government's commitment towards improving maternal health both at institutional and community level (Family Health Division [FHD], 2002). This commitment was further strengthened when Nepal became a signatory to the Millennium Development Goals (MDGs) whose goal five sought to reduce maternal mortality by three quarters on its 1990 level by 2015. To achieve this, the government has strengthened the supply of maternal health services, invested in skilled birth attendant (SBA) training, provided safe abortion services, and expanded and strengthened basic emergency obstetric and neonatal care (BEONC) and comprehensive emergency obstetric and neonatal care (CEONC) services across the country (FHD, 2006).

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

Table 1: Evolution of the Aama Programme

Year	Name of the Scheme/Programme	Key highlights
2005	Maternity Incentive Scheme (MIS)	• introduction of financial incentives • women receive transport incentives to deliver in hospitals • health workers receive incentives to attend deliveries either in the hospital or home
2006	Safe Delivery Incentive Programme (SDIP)	• free delivery care started in 25 districts with low human development index (HDI) • health facilities reimbursed NPR 1,000 per delivery to recover the costs of normal and complicated deliveries • home delivery incentive reduced from NPR 300 to NPR 200
2009	Aama Programme	• national roll out of free delivery care • user fees removed for all types of delivery including C-sections in government health facilities
2012	Aama Programme	• separate demand-side financing scheme, 4 ANC (4 antenatal care visits) merged with the Aama Programme • further reduction in the home delivery incentive

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

Incentives to women: Cash payments to women immediately following institutional deliveries - NPR 1,500 (US$ 16.67)[1] in mountain districts; NPR 1,000 (US$ 11.11) in hill districts, and NPR 500 (US$ 5.5) in Terai districts.

Free institutional delivery services: Payments are made to health facilities for the provision of free care. The payment (referred to as 'the Aama unit cost') 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 medicines, tests, and supplies) personnel and overhead costs e.g. electricity and water.

Incentives to health workers for home deliveries: Incentive payments are made 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 4 ANC visits: Women receive NPR 400 (US$ 4.44) if they complete four ANC visits (in 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 4 ANC incentives with the Aama Programme.

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[1] US$1= NPR 90

2. RATIONALE FOR THE STUDY

2.1 INTRODUCTION

The unit costs for free delivery care under the Aama programme were derived based on a review of the existing capital costs, 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 the cost of maternity care conducted in 2003 (Borghi et al, 2004). The proposed unit costs were presented in a national workshop where FHD collected the views of various experts and practitioners. 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 (medicines, gloves, syringes, etc.) based on a rapid review of the cost in health facilities which was then cross matched with existing studies
3. An allowance for minor quality improvements, including general incentives for staff
4. The capital costs of equipment - this refers to the delivery-specific costs of equipment required to provide the appropriate level of care. These costs were based on a review of the basic equipment packages apportioned to delivery care, which were then divided by the expected number of deliveries.

The following two principal sources of fund flow were considered:

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

An analysis carried out by Ensor and Witter reported that the Aama Programme's unit cost payments, along with the budget from the government, were sufficient to offset the recurrent costs to facilities (Ensor T and Witter S, 2008). The authors suggested that the costs of complications would largely be covered by the proposed payments and budget funding. 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 would not be possible for facilities to obtain or replace capital equipment. Capital equipment has been provided to facilities separately (it is not included in Aama payments) on a regular basis through the annual work plan and budget (AWPB). The purpose of this costing study is primarily to assess the sufficiency of the Aama unit costs that are used in both the public and private sectors.

2.2 RATIONALE

The Aama Programme's unit costs have not been revised since the scheme was first launched in January 2009. Several studies have raised concerns about the current level of Aama unit costs. During Rapid Assessment round VII, a health service provider suggested that the existing unit costs should be revised. For instance, the health workers suggested that the Aama unit cost 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 visited to explore their reasoning for discontinuing the Aama Programme said that the unit cost provided was insufficient to deliver quality health services (Upreti et al. 2013).

Another survey conducted in 2012 of six referral hospitals, four private facilities, and twelve birthing centres used a step-down approach for economic analysis to determine the unit costs of normal, complicated, and C-section childbirth services (FHD and NHSSP 2013). The study reported the average unit cost of a normal delivery at a referral hospital as NPR 1,847, around half the cost of a normal delivery at a birthing centre (NPR 3,625). There was a 12-fold difference between the unit costs of a normal birth within the sample of birthing centres studied. The average unit cost of a complicated delivery was NPR 3,227 and NPR 11,153 for a C-section at the referral hospitals. The unit costs computed in the study were higher than the reimbursement rates. However, it is important to note that the analysis did not account for government funding besides the unit cost reimbursements. Government health institutions receive funding for personnel, drug and medical supplies and other purposes, which must to be accounted for when examining the sufficiency of unit costs.

The Rapid Assessment VII (Upreti et al. 2013) also found that women visiting private institutions that had implemented the Aama programme were not receiving delivery care for free but were paying for it. The proportion paying was higher for complicated and C-section deliveries. Many women reported paying for medicines and cleaning services. This was also found to be true at government facilities in many cases. Therefore, before expanding the Aama Programme to more private facilities, the Aama unit costs need to be re-examined.

CHAPTER THREE

3. COSTING METHODOLOGY

3.1 PURPOSE AND OBJECTIVES OF COSTING

The purpose of this costing study is primarily to assess the sufficiency of Aama unit cost amounts that are 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 services (complication and C-section) in government 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. Note that this includes all necessary drug and diagnostic costs, but excludes household costs related to travelling to the facility.

This study is limited to an assessment of the sufficiency of unit cost reimbursement for all types of deliveries made to the health facility. *It does not include an assessment of other component of the Aama programme such as the transport incentive for delivery care and 4 ANC incentives.*

The costing study will take into account 2014 as the price year. All cost data will be converted to present value, using either the middle or the end of the year price value.

3.3 APPROACHES IN COSTING

A mixed approach will be used in this costing study. This means the study will use both 'bottom-up' costing methods to estimate the direct costs of all type of deliveries, complemented by 'top-down' costing to estimate the associated indirect costs.

a) Bottom–Up Costing

The bottom-up approach records resource utilisation at the patient or individual service level and aggregates this utilisation data to identify resource use (type) and measure resource utilisation in order to calculate the cost of specific services. This is useful when cost data is not available from reliable sources (Mogyorosy Z, Smith P, 2005). Bottom up costing is ingredient based, whereby the drugs, personnel, and other treatment inputs required to deliver and specific health interventions are quantified. This method will be used to estimate the direct cost associated with the production of different types of delivery care services.

Steps

1. Identify conditions related to pregnancy and child birth that will be included in the study
2. Identify a treatment/clinical management pathway for each condition using national protocol and guidelines
3. Determine the percentage treated under different treatment pathways

4. Provide a detailed description of the resource use in managing each condition (time taken by human resources (nurse/doctor), unit of supplies consumed, drug × dose × duration, lab test/radiological examination, equipment used)
    i. Identification and classification of resource items
    ii. Selecting the appropriate unit of resource measurement
    iii. Attaching value to the resource item used
5. Calculate the unit cost of managing a condition by aggregating the cost of all resource items.

b) Top –Down costing

In top-down costing the total cost of service at health facility level is first calculated and then the total cost is disaggregated to departmental level or the unit of services depending on the availability of the data (Mogyorosy Z, Smith P, 2005). This method will be used to estimate the indirect costs associated with the production of the different types of delivery care services.

Steps:

1. Identify and classify major indirect resource items
2. Select the appropriate unit of resource measurement
3. Attach value to the resource item used
4. Determine the number of woman treated for delivery and complication management in a year or the number of women treated for reproductive health complications (in case desegregated data is not available)
5. Apportion the total indirect cost of resource use to the number of delivery and complication management cases
6. Calculate the unit cost of managing a condition by aggregating the cost of all resource items.

3.4 DEFINING HEALTH SERVICES FOR COSTING

Cost object

A cost object in this study is the service produced while managing 14 conditions (see Box 1). The study will use the term 'delivery care service' to reflect 'cost object'. Also note that most of these conditions are already under the Aama benefit package and one condition, molar pregnancy, has been added at the request of experts for this costing study.

Complications

This study is limited in 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 will be costed in this study and a list with standard definitions is provided in Annex I.

Each complication will be segregated on the basis of treatment modality requiring minor medical treatment (evacuation, assisted vaginal delivery, blood transfusion) or major treatment (surgical intervention including C-section, hysterectomy, re-caesarean, and ICU support).

Mode of delivery

This study includes all three modes of delivery: normal vaginal delivery, assisted vaginal delivery (vaccum and forcep delivery [forcep delivery, though no longer recommended, can still be practiced]), and C-section as included in the Aama programme (see Annex II for more detail).

Health facility ownership and type

This study will estimate 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 neonatal care centres (BEONC) and comprehensive emergency and neonatal care centres (CEONC).

Location of health facilities

Health facilities will be selected from all three geographical regions: Mountain, Hill, and Terai. They will also be selected from all five development regions: Eastern, Central, Western, Mid-Western, and Far-Western.

Box 1: 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

3.5 IDENTIFICATION AND CLASSIFICATION OF RESOURCE ITEMS

One of the key factors 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".

a) **Direct Costs**

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 for this study.

i) Human Resources

Different cadres of human resources directly involved in managing/treating each of the 14 conditions will be identified. Human resource involvement will be segregated into procedural and hospitalisation time which includes initial consultation, diagnoses, inpatients, ward time, and

discharge. A list of human resources available at different levels of care will be obtained. The list will be segregated by grade or level.

ii) Pharmaceuticals and Supplies

Pharmaceuticals and supplies used while managing/treating each of the 14 conditions will be identified. Due to the fact that the drug prescribing patterns are different in public and private facilities (second line drugs generally preferred in private facilities), an exhaustive list of drugs and supplies will be prepared. A standard price list for drugs and supplies will be obtained for both public and private facilities.

iii) Diagnostics

Major laboratory tests and radiological examination associated with managing/treating each of the 14 conditions will be identified. Diagnostics covers the cost of the laboratory and radiological equipment, chemicals and supplies required to perform specific tests/examinations. Prices quoted for a particular test/examination will be used to determine the cost of diagnostics.

iv) Medical Equipment

Medical equipment that is solely used for managing/treating each of the 14 conditions will be identified. Equipment that is shared across different departments is covered under indirect costs. A standard working life for the equipment will be obtained from international literature. Only equipment that is in full working condition will be included in the study.

b) **Indirect Costs**

The cost of resources that have no direct relationship to the production of different types of delivery care services are the indirect costs. These costs cannot be easily traced, or done so in an economically feasible way (Mogyorosy Z, Smith P, 2005). The following comprise the major indirect costs identified for this study which can be classified into the following headings:

1. Maternity ward and Building
2. General health facility equipment
3. Specific delivery equipment
4. Technology equipment
5. Furniture and computer hardware
6. General administration/management:
   Recording and printing Aama reporting forms
   Accounting and payments
   Security
   Cleaning
   Utilities (electricity, water)
   Communication (telephone, internet) Repairs and renewals
   Rental
   Vehicle(s)
7. Intensive Care Unit (limited to some facilities)

The resource use identified in the study can also be classified as Capital and Recurrent costs. Capital cost is the cost of acquiring fixed assets such as buildings, land, and equipment. These resource items usually have life longer than one financial year. A resource item which is consumed within one financial year is the recurrent cost. It can be both direct and indirect cost (Mogyorosy Z, Smith P, 2005).

Table 2: Recurrent and capital cost for the costing study

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

a) Source of Information for Resource Measurement

This study will use both primary and secondary sources to estimate resource use in the production of delivery care service.

i) Primary Data Source

A costing study will be conducted to estimate both the direct and indirect resource utilisation while managing/treating the 14 conditions at different levels of care (birthing centre/BEONC/CEONC, public, and private). Details on the conduct of the study are provided in a later section.

ii) Secondary Data Source

Standard guidelines and norms, important data sources, studies, and working papers from Nepal will be reviewed to cross validate existing best practice and also to feed in some important information for the costing study. The following are some important data sources identified:

1. Review of WHO norms and national guidelines on pregnancy and childbirth
2. Standard equipment working life
3. Salary structure by level of health worker in government and private facilities
4. Standard price list for medicines, supplies, equipment, and laboratory
5. Price list for medicines, supplies, and equipment obtained from the health insurance working group
6. Previous top-down costing studies
7. Cost of construction (buildings)
8. Rental charges

c) Selecting the Appropriate Unit of Resource Use Measurement

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. Table 3 provides detail on the appropriate unit to measure the resource use.

d) **Attaching Monetary Value to Each Unit of Delivery Care Resource**

The final step in determining cost is to place a monetary value on each of the resources that were utilised. This study will take into account both the public and private sector prices. Shadow price methods will be used to estimate private sector prices as they are less uniform, highly distorted (market prices do not reflect marginal social values of goods or services in the competitive market), and hard to obtain (Mogyorosy Z, Smith P, 2005). In cases where the actual price could be obtained, it would be used. Table 3 provides details on the monetary value attached to each unit of health care resources.

Table 3: Resource use identification, measurement, and valuation

S.N.	Identification of cost	Unit of measurement/ measurement method	Source of valuation
1	**Direct costs**		
1.1	Human resources	Time taken in minutes to treat/manage each condition and time spent in hospital	Salary structure of government segregated by level/grade. Salary structure for private segregate by position.
1.2	Pharmaceuticals and supplies	Drug×dose×duration- actual unit of supplies used to treat each condition	Standardised price list obtained from government (Logistics Management Division). Price estimation for private- obtain actual data if possible.
1.3	Diagnostics	Fee or charges for a test or radiological examination	Standardised price list obtained from Nepal Public Health Laboratory/ Maternity Hospital. Price estimation for private- obtain actual data if possible.
1.4	Medical equipment	Undiscounted/discounted annual cost of equipment apportioned to the delivery caseloads	Standardised price list obtained from government (Logistics Management Division). Equipment working life (independent of use) based on international norms (World Health Organization [WHO])
2	**Indirect costs**		
2.1	Building/ maternity ward or land	Square footage - proportion to the amount of floor occupied for service delivery excluding corridors, store	Standardised floor price obtained for different geographic regions (Department of Urban Development and Building Construction).
2.2	Shared equipment, computers, and software	Undiscounted/ discounted annual cost of equipment apportioned to the relative reproductive health caseloads (if no disaggregated information is available)	Standardised price list/ market price (Logistics Management Division). Equipment working life (independent of use) - based on international norms (WHO).
2.3	General administration	Proportion to actual utilisation of overhead costs apportioned to the relative 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/ market price. Working life.
2.5	ICU	Charge of operating ICU per day	Price list obtained from maternity hospital in government and private.

3.7 MAJOR ASSUMPTIONS IN THE STUDY

Some of the major assumptions made in this costing study are:

- The same normative practice exists for treating specific complications irrespective of the level of care provided. Note that costs of care by level will still differ because of the typically higher personnel costs at higher levels of care
- The reported practice is an accurate representation of the actual practice
- We use average salaries and allowances of health workers to reflect personnel costs and a standardised price list for medical drugs and tests. In reality, there may be differences due to geography and facility ownership types
- Price estimates for private facilities may not reflect the actual scenario
- We assume that the existing states of health facilities' overall infrastructure (water, electricity, shared equipment) are sufficient to enable institutional deliveries to be provided at adequate quality.

4. CONDUCT OF THE STUDY

4.1 STUDY DESIGN

In order to be accurate with the unit cost estimates associated with the Aama programme, this costing exercise is based on a proper study rather than desktop analysis (using modelling and populating figures). The costing study will be cross-sectional and descriptive in nature.

4.2 UNIT OF STUDY

Delivery care service produced while treating or managing each of the 14 conditions is the unit of study. This will be further broken down by levels of care i.e. birthing centre, BEONC, CEONC, ownership (private and public), and geographical region (mountain, hill, and Terai).

4.3 SAMPLING STRATEGY, AND SAMPLE SIZE

The study will use stratified random sampling for selecting the study districts in order to reflect all of the types of institutions based on levels of care and institutional ownership implementing the Aama programme across geographical regions. Based on the scope of the work as well as the inherent statistical limitations of representative sampling at institution level, the sample should be understood as taking a case-study approach.

In terms of geography, Nepal is broadly divided into three horizontal geographical zones, namely mountain, hill, and Terai. There are also five development regions, namely eastern, central, western, mid-western, and far-western. The sampling frame of 75 districts is divided into five strata based on the functionality of government CEONC and availability of C-section facilities (private facility) in the districts, cross-classified with the geographical and development regions provided in the Annex III. The following can be found in districts:

- district with no government CEONC and private facility providing C-section
- district with functional government CEONC
- district with no functional government CEONC
- district with both functional government CEONC and private facility providing C-section
- district with only private facility providing C-section

Table 4: Cross-classification of districts by geographical region and functionality of CEONC and facility ownership

S.N	Strata specification	Mountain	Hill	Terai	Total
1	No government CEONC and private facility providing C-section	6	4	0	10
2	Government CEONC functional	6	21	10	37
3	Government CEONC not functional	3	5	2	10
4	Both Government CEONC and private facility providing C-section	0	4	8	12
5	Private facility providing C-section only	1	5	0	6
	Total	**16**	**39**	**20**	**75**

A total of ten facilities were selected based on proportionate allocation as per the geographical region i.e. Mountain (two), Hill (five), Terai (three), ensuring that at least two districts from each development region are selected in the sample from the stratum. A random sample of the strata was first done to determine the sequence of selection among the stratum. The sequence obtained was as follows:

- district with no government CEONC and private facility providing C-sections - one mountain; one hill
- district with functional government CEONC - one mountain; one hill; one Terai
- district with no functional government CEONC - one Terai; one hill
- district with both functional government CEONC and private facility providing C-section - one hill; one Terai
- 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.** Details of the selection process are provided in Annex IV. A total of **501** government health facilities are present in the study districts and detailed information is summarised in Table 5. A different scenario for the district is obtained when private institutions and government health facility's Aama programme is taken into account. A total of **235** government and private health facilities have been implementing the Aama programme as summarised in Table 6.

Table 5: Government health facility's status in the study districts

S.N	Districts	Geographical region	Health facility segregation						Total
			Central hospital	Zonal hospital	District hospital	PHCC	HP	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	Terai	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	Terai	0	1	0	3	20	24	48
8	Jajarkot	Hill	0	0	1	3	15	21	40
9	Kailai	Terai	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**

Table 6: Health facilities implementing the Aama programme in the study districts

S.N.	District	Geographical Region	Public facilities			Private facilities		
			CEONC	BEONC	Birthing centre	C-section facility	Normal/ complicated delivery	Normal delivery
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	Terai	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	Terai	1	2	30	3	0	0
8	Jajarkot	Hill	0	4	12	0	0	0
9	Kailai	Terai	2	5	29	0	2	0
10	Doti	Hill	1	1	44	0	1	0
	Total		**7**	**21**	**184**	**9**	**5**	**4**

The costs of providing normal, complicated, and C-section delivery can be obtained from CEONC centres. Similarly, the costs of normal and complicated delivery can be obtained from BEONC centres. However, there are certain factors such as distance, level of health worker, supply provision of drugs and supplies, and Aama reimbursement costs which require this study to obtain samples from all levels of care. In this context, in order to capture the cost of care in BEONC and birthing centres, the following criterion will be used:

- 50% facilities with BEONC services will be selected
- 10% of the birthing centres will be selected from each of the districts.

Only birthing centres from health posts and sub health posts (SHPs) will be selected as, ideally, Primary Health Care Centres (PHCCs) level should provide BEONC level of care.

In the case of private facility (operating at different status) the following criteria will be used:

- In case of a district with only one private health facility implementing the Aama programme, the facility will be selected by default in the study
- In case of a district with two and more private health facilities implementing the Aama programme, 50% of them will be selected.

Health facilities will be selected based on the travel time by public transport. Box 2 provides details on the standard used to define travel time and health facility selection method for districts.

Box 2: Standards used to define travel time and method of health facility selection		
	Standards	**Travel time by public transport**
	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, the furthest located health facility will be selected
- In case of two health facility selection, one furthest and the other nearest located facility will be selected
- In case of three health facility selection, one furthest, another moderately far, and the other nearest located facility will be selected
- In case of four health facility selection, one furthest, other moderately far, another moderately near, and the other nearest located facility will be selected.

A total of 52 health facilities will be selected from ten districts as summarised in Table 7. A detailed list of facilities is included in Annex V.

Table 7: 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**

4.4 DATA COLLECTION METHOD

The study will use both prospective and retrospective data collection methods to estimate resource use. Prospective data collection will be carried out to estimate resource utilisation (medical commodities: drugs, supplies, diagnostic tests, and human resources' time by cadre of worker) for each of the 14 conditions. The following techniques will be used for data collection. Table 8 gives a summary of data collection techniques, tools, and resource estimation.

a) **Expert panel discussion**

An expert panel discussion will be held to identify the conditions to be studied for this costing study. The next expert panel discussion will be used to review and refine condition specific questionnaire.

b) **Health Facility Survey**

A health facility survey will be carried out across different levels of care (birthing centre/BEONC/CEONC, public, and private) and geographical regions to obtain both direct and indirect costs involved in treating each of the 14 conditions. Records will be 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 level of care a proportion of these conditions will be included in the sample. Patient record (cardex), medicine, and supply registers maintained at different wards such as delivery, operative, and post-op will be reviewed to take account of medicines and supplies used for treating individual patients including the diagnostics performed. Service providers who were involved in providing care would be asked to provide information on the human resource time it took to treat those conditions. Service providers' judgments will be used to estimate the time spent treating different conditions by different cadres of service provider. This will help to determine the actual practice of care associated with treating the 14 conditions.

Retrospective data collection will be done to estimate different aspects of the indirect cost which will be applied to treating specific conditions at the facility. This will be done during the health facility survey using a review of logistical/store records, monthly accounting and billing records, and administrative records. It is important that whatever data collection method is used, it should accurately measure the cost drivers (resource items that play a major part in the total cost).

4.5 DATA COLLECTION INSTRUMENTS

The study will devise three data instruments for the analysis, building on existing tools developed by OPM used in costing studies in other contexts. Two instruments will be used during the health facility survey to estimate the 'actual practice' unit cost associated with treating/managing the 14 conditions derived from interviews with health workers. One will be used to review the medical and administrative records at sampled health institutions. The other instrument will be used to estimate the 'best practice' unit cost associated with treating/managing the 14 conditions. These cost estimates are normative in nature and reflect the views of Nepalese experts.

a) Health facility survey questionnaire

The health facility survey will have two sets of questionnaires. One will be used to glean general information on health facilities; the other will be used to collect information on treating the 14 conditions at their level. Only information on conditions that get treated at that particular facility will be filled in.

i) General health facility questionnaire

This questionnaire contains general information on health facilities which will help us 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 (ambulance), annual expenditure, and the number of in-patients treated (total in-patients and those related to delivery or complication management/reproductive health related). The general health facility questionnaire is provided in Annex IV.

ii) Condition specific questionnaire

This questionnaire contains information on the use of resources that will help us to estimate the direct costs associated with treating/managing the 14 conditions in that particular health facility. It includes information on the average time spent per medical personnel, actual unit of pharmaceuticals and supplies, and diagnostic tests. The condition specific questionnaire is divided into two types: one for normal delivery and another for complicated delivery.

b) Expert panel questionnaire

The expert panel questionnaire will be similar to the condition specific questionnaire as discussed above and will contain information on the resources used to treat/manage the 14 conditions.

Table 8: Summary of data collection technique, tools, and resource estimation

Data collection			Resource Estimation	
Technique	**Instrument**	**Method**	**Cost**	**Remarks**
Expert panel discussion	Condition specific questionnaire	Prospective	Direct	Best practice
Health facility survey	General health facility questionnaire	Retrospective	Indirect	Actual practice
	Condition specific questionnaire	Prospective/ Retrospective	Direct	

CHAPTER FIVE

5. DATA ANALYSIS PLAN

5.1 ALLOWANCE FOR TIME DIFFERENCE

Discounting and the annualising of capital expenditures will be performed. In terms of capital items, building costs will be estimated based on the rent of the building in today's prices. Equipment costs will be obtained by completing a comprehensive inventory of medical and non-medical equipment, and valuing these at replacement cost using a standardised price list. Capital costs will be annualised using a conventional formula that incorporates discounting:

$$Ai=(r\ Vi)/[1-1/(1+r)^{Li}\ ]$$

(Where for asset i, A is its annualised value, V is its replacement cost, and L is its useful working life; r is the rate of discount.)

The discount rate will be used based on the Nepalese government bond figure obtained from the World Bank (at the time of calculation). Estimates of years of useful working life for equipment will be based on international literature. Results will be presented in constant prices, both with and without discounting.

5.2 MEASURING FOR UNCERTAINTY

Uncertainties in costing exercise are inevitable as it is neither possible to cost all relevant health care resource use nor to make an accurate estimation. Similarly, costing exercises are based on several assumptions. Therefore, it becomes important to check the robustness of the results. This study will take into account sensitivity analysis to manage uncertainties.

5.2.1 Sensitivity Analysis

Sensitivity analysis is as a systematic assessment of how changes in selected resource use, input price or assumption affects the unit price estimates. Input parameters will be varied across key cost drivers reflecting resource use at public and private settings, best and actual practice.

5.3 MEASURING VARIABILITY

The unit cost associated with delivery care may vary considerably due to a difference in input parameters due to geographical differences, levels of care, and facility ownership. Subgroup analysis will be performed to minimise the effect of variability and to identify the actual cost of delivery care and complication management across different levels of care (birthing centre, BEONC, and CEONC), geographical region (Terai, hill, and mountain) and facility ownership (public and private).

5.4 UNIT OF ANALYSIS

The study will estimate the average unit cost per unit of care for normal delivery along with the 14 other conditions associated with delivery and complication management. The study will map these interventions to each of the 'normal', 'complicated', and surgical section category (C-section, hysterectomy, laparotomy) categories as in the Aama Programme (with some modification). For each of these delivery categories, the study will then estimate an aggregated average unit cost. This

will be done by weighting the unit costs of each individual delivery-related health intervention by the relative likelihood of a specific intervention being required. Box 3 provides a simple example to illustrate how aggregated average unit costs will be calculated.

Box 3:   Mapping individual interventions to aggregated unit costs: simple numerical example

Assume for ease of illustration that complicated deliveries are limited to three interventions (e.g. management of eclampsia, treatment of postpartum haemorrhage and treatment for mastitis), where Intervention A has an average unit cost per case of $50, Intervention B $40, and Intervention C $30. At the same time, Intervention C is much more likely to be needed than Interventions A and B as for every 100 mothers undergoing a complicated delivery, 80 will need Intervention C, whereas only 10 will need Intervention A, and 10 Intervention B. The weighted average unit cost per case for these complicated deliveries would then be $33.

CHAPTER SIX

6. OPERATIONAL PLAN

The operational plan describes how, when, and by whom the costing study will be conducted and what can be expected as outputs. The timetable of activities and the local budget are almost final but could be subjected to change to incorporate any uncertainties in data collection.

6.1 PHASING OF DATA COLLECTION

This costing study comprises two phases of data collection. The first phase of data collection is around estimating the Normative Best Practice. In this phase we will conduct:

i)   a review of secondary data sources
ii)   an expert panel discussion

The second phase will be carried out soon after the first phase which will involve:

i)   the health facility survey

6.2 MANAGEMENT AND HUMAN RESOURSES

The implementation committee under the FHD, DoHS, will have the overall responsibility for management and coordination of the costing study. They will work closely with advisers from NHSSP.

It is envisaged that additional locally recruited staff will be required as a part of the costing study team. The staff requirements are summarised below in Table 9. A brief work plan is found in Annex VII.

Table 9: Additional team members required for the study

S.N.	Additional study members	Unit	Task
1	Lead consultant	1	Conceptualise and facilitate conduct of the study
2	National consultant	2	Conduct of the study
3	Study coordinator	1	Managerial support
4	Field assistant	20	Data collection

Note: A survey team will work on a district by district basis and consist of a team of two people.

6.3 TRAINING FOR THE SUPERVISOR AND ENUMERATORS

Four days full board residential training will be conducted by the core team from the implementation committee and NHSSP.

6.4 CAPACITY BUILDING

This costing exercise will provide an opportunity to develop the capacity of the officials at FHD by involving them in the following processes:

- proposal development
- tool development
- training of field assistants
- monitoring
- one day-long training workshop on design and data analysis of Aama unit cost (MOHP, FHD, NHRC, academia and research institute)

6.5 DATA ANALYSIS AND MANAGEMENT

Data analysis will be the primary responsibility of the study team, located at the FHD. They will be assisted in the analysis by national consultants and technical support from NHSSP/OPM. The expert panel discussion will be led by the study team and Demand-side Financing (DSF) Advisor. All activities related to the health facility survey, including training of enumerators, data collection, data entry, data cleaning, descriptive analysis, and draft report writing will be the responsibility of the national consultant. Data analysis will be on-going as cleaned data continues to become available.

The process of data management will apply most stringently to the health facility survey. In the field after each day of data collection, the interviewer will meet with their supervisor to sort and edit questionnaires. The questionnaires will then be transported to Kathmandu, where the data will be entered into CSPro by trained data entry clerks under the close supervision of the researchers. Consistency checks will be put in place to minimise data entry errors. If problems arise, they will be resolved in consultation with the survey team that collected the data.

6.6 OUTPUTS

The expected outputs of the costing study will be:

- Costing protocol - a guiding document summarising the theory, methodology, processes, and plan of the costing study
- Final report - a document summarising key processes, major findings of the assessment, projection of the Aama programme cost based on revised unit cost, strategic recommendation, and discussion of policy implication
- Validation workshop - a one day workshop conducted with officials from MoHP, DoHS, FHD, NHRC, academia and research institute, and relevant Aama stakeholders summarising the methodology of costing, key findings, recommendation, and policy implication
- Key recommendations - a short brief for policymakers summarising the key findings and recommendations based on the projection of health facility reimbursement made under Aama with revised unit costs and public and private sector Aama implementation modality
- Data set - the cleaned data set will be made available in the public domain for future references and use.

It will be important to establish an effective dissemination strategy for these reports so that the government and its partners can make the most use of them, particularly with regard to the final report and policy brief. This costing exercise is expected to build capacity in research and survey techniques among central level teams such as FHD, NHRC, and the district data collection teams and members. It will also serve as an important document guiding future costing studies undertaken by the Government.

6.7 ETHICAL CLEARANCE

FHD has approved the terms of reference (ToR) of the study. The study intends to collect the cost, charges, and fees from the health facilities which have no conflicts of interest and involvement of human subjects in particular. However, informed consent will be obtained from interviewees and mechanisms to guarantee that confidentiality is ensured will be in place through secure data storage and the protection of anonymity. FHD will send an official letter to all health facilities requesting this information.

6.8 TIMETABLE OF ACTIVITIES

The costing study covers an entire period of one year starting from October 2014 and ending in October 2015. The data collection activity will require four weeks.

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ANNEXES

Annex I: Standard Definition of Complications Excerpted from One Health Treatment Assumption and Clinical Protocol for Medical Officer and Managing Prolonged and Obstructed Labour Module

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 1000 ml or more following the delivery of the baby, within the first 24h, or more than 24h but less than 6 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:** 2 reading of diastolic blood pressure, 110 4 hrs 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 delay in the rate of reduction on the size of uterus (<2cm/day during the first 8 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**	A complication of pregnancy in which the embryo implants outside the uterine cavity. In developing countries they are usually only recognized when they have ruptured or are in danger of rupturing requiring surgical intervention
9	**RH negative (anti D):**	**Anti-D** (RHO) Immunoglobulin is used to prevent pregnant women who have a **rhesus negative** blood group from producing antibodies against their **rhesus** positive foetus. **Rhesus** antigen is a chemical that is found on the surface of red blood cells in some people.
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 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 10 beats/minute
13	**Molar pregnancy**	Pregnancy other than the uterus

Annex II: Conditions Listed for Complicated and C-Section Delivery Unit Cost Reimbursement Made Under 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
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	1. Prolonged/obstructed labour 2. Ectopic pregnancies 3. Ruptured uteruses 4. Post-abortion perforation

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

Geographical 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 Ramechap	Parbat	Jajarkot	
Terai					
Government CEONC functional					
Mountain	Sankhuwasabha Solukhumbu Taplejung	Dolakha		Kalikot Jumla	Bajhang
Hill	Panchthar Bhojpur Illam khotang Terathum Udaypur	Bhaktapur Dhadhing Makwanpur Nuwakot	Baglung Gorkha Gulmi Tanahu	Dailekh Rolpa Pyuthan Surkhet Salyan	Doti Dadeldhura
Terai	Saptari	Bara Rautahat Dhanusa Mahottari	Kapilvastu Nawalparasi	Bardiya Dang	Kailali
Government CEONC not functional					
Mountain		Sindhupalchowk			Darchula Bajura
Hill	Dhankuta		Arghakanchi Syangja Myagdi		Baitadi
Terai		Sarlahi			Kanchanpur
Both government CEONC and private with C-section					
Mountain					
Hill		Kathmandu	Kaski	Rukum	Acham
Terai	Morang Sunsari Jhapa Siraha	Parsa Chitwan	Rupandehi	Banke	
Only Private with C-section					
Mountain					
Hill	Okhaldhunga	Kavre Lalitpur	Lamjung Palpa		
Terai					

Annex IV: Details of the health facility in the study district

S.N.	Districts	Geographical Region	CEONC or C-section facility		BEONC or complicated and normal delivery		Birthing centre or normal delivery only		
			Public	Private	Public	Private	HP	SHP	Private
1	Solukhumbu	Mountain	Phaplu Hospital		Sotang PHCC	Pasang Lamahu Nicole Niquille	Chaulakharka		
2	Dhankuta	Hill			Dhankuta Hospital		Manobudhak		
3	Kathmandu	Hill	Paropkar Maternity and Women's Hospital	Kirtipur Hospital National Medical College Shankharapur Hospital				Lapsiphedi	Adharbhut Prasuti Sewa
4	Sarlahi	Terai			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	Terai	Bheri Zonal Hospital		Bankatuwa	Kohalpur Medical College Western Nursing Home	Kalaphanta Baijapur	Mahadevpuri	
8	Jajarkot	Hill			Jajarkot District Hospital Lumsa PHCC			Kudu	Paikh	
9	Kailai	Terai	Seti Zonal Hospital Tikapur Hospital		Bhajani Josipur Chaumala	Sewa Nursing Home	Sugarkhal Nigali	Urma	
10	Doti	Hill	District Hospital		Saraswatinagar	Sujang Hospital	Gadsera Dadh	Kapalekhi Kanachaur	

Annex V: Scope of Work for Additional Team Members

1. **Lead National Consultant**

Major Tasks:

1. Contribute to developing, pretesting, and finalising the questionnaire
2. Take a lead role in conducting the expert panel discussion
3. Participate in the meeting with FHD and study implementation committee
4. Take a lead role in facilitating the validation workshop at the end of the study
5. Contribute to training the field assistants
6. Monitor the study in the selected districts
7. Review the study report
8. Support in preparing the policy note
9. Participate in the process of bridging the findings into policy

2. **National Consultant (pharmacy and equipment)**
1. Contribute to identifying the drugs and supplies used in different types of deliveries and their cost
2. Contribute to identifying the equipment used in different types of deliveries and their cost
3. Facilitate training
4. Participate in the meeting with FHD and implementation committee
5. Help conduct the panel discussion
6. Review the study report

3. **National Consultant (Health/Economist-data analysis)**
1. Support the finalisation of the questionnaire
2. Provide necessary support in developing data entry filed and coding manual
3. Facilitate training and prepare a training report
4. Supervise data entry
5. Take a lead role in data cleaning
6. Run the preliminary analysis

4. **Study Coordinator**

Major Tasks

1. Gather major national and WHO guidelines and treatment protocol on delivery care and complication management and extract information necessary for costing study
2. Compile a major list of drugs, equipment, and diagnostic tests (laboratory and radiological examinations) required during delivery and complication management as well as a standard price list
3. Obtain information on different cadres of human resources working at birthing centres, BEONC and CEONC centres including their salary structure
4. Obtain updated information on health facility status by levels of care: birthing centre, BEONC, and CEONC as well as ownership (public and private)

5. Support the expert panel discussion and validation workshop (liaise with experts, and logistical and financial management)
6. Assist in the selection of enumerators
7. Provide necessary managerial support in conducting training of the enumerator and with field work
8. Coordinate with DHO and health facility for smooth implementation of the study

5. Field Assistant

Major Tasks:

1. Collect quality data from the field
2. Maintain regular communication with study coordinator
3. Update on the progress of field work on a daily basis
4. Report on any difficulty in filling the information or understanding information collection related to costing to the study team at the centre
5. Coordinate and collaborate with DHO and health facility for smooth implementation of the study.
6. Maintain good interpersonal relations with district and health facility staff (especially with those being interviewed)
7. Uphold self-discipline and group dynamics
8. Assure the quality of the completed form through consistency checks for missing or unusual information and verify quality of the filled forms
9. Assist in compiling information from the field and bringing it to the centre.

Annex VI: Activity Time Line

	Tasks/Weeks	Oct-Nov				Dec-Jan				Feb-Mar				April-May				Jun-Jul				Aug-Sept				Oct-Nov			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Develop a concept note on unit cost analysis	x	x	x	x	x	x																						
2	Finalisation of methodology in team							x	x																				
3	Sharing of the concept note with Stakeholders (FHD, DFID)									x	x																		
4	Incorporation of feedback, finalisation of methodology and development of the final ToR											x	x	x	x	x													
5	Consultation with obstetricians/gynaecologists on the actual treatment practice, protocol																	x	x	x									
6	Compile list of drugs, diagnostic tests, and their standard price																				x	x	x	x	x				
7	Compile WHO standards in treating pregnancy and delivery related complication																				x	x	x	x	x				
8	Compile government salary structure																				x	x	x	x	x				
9	Costing protocol preparation and finalisation																				x	x	x	x	x	x	x	x	x
10	Finalisation of data collection instrument																						x	x	x		x	x	x
	Tasks/Weeks	Aug				Sept				Oct				Nov				Dec				Jan				Feb			

#	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
11	Hiring of resource person, national consultant, supervisor, and enumerators	x	x																										
12	Expert panel Discussion			x																									
13	Training of supervisor and enumerators				x	x																							
14	Data collection					x	x	x	x																				
15	Data processing							x	x	x	x																		
16	Data analysis									x	x	x	x	x	x	x	x												
17	Write up of draft report														x	x	x	x	x										
18	Sharing of draft report																						x	x	x				
19	Conduction of validation workshop																								x	x			
20	Finalisation and submission of report																										x	x	x
21	Implementation committee meeting																										x	x	x