ADDIS ABABA UNIVERSITY

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SCHOOL OF PUBLIC HEALTH

Estimating the Cost of Maternal and Child Health Services in Primary Health Care Facilities around Butajira.

By

Ashrafedin Youya (BSc, M.A)

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DECLARATION

I, Ashraedin Youya, hereby declare that this thesis is my original work and has not been presented for any other awards at the Addis Ababa University or any other university.

Name of Candidate: **Ashrafedin Youya**

Signature: ----------

Date: October 2014

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II. Abstract

Background: Reducing maternal and under-five mortality through the use of cost-effective strategies continues to be a challenge, particularly in Ethiopia. There is a paucity of knowledge on the cost of Maternal and Child Health (MCH) services in Ethiopia. This poses a challenge in the economic evaluation of these services and inhibits policy makers from making decisions about allocation of resources to improve health care. Providing up -to-date information about the costs of MCH services is therefore crucial. This study analyzed the overall cost of providing MCH services in public primary health care facilities around Butajira.

Methods: A cross-sectional was carried out between February and June 2014. Six public primary health care facilities in Meskan district were selected randomly for the study. All maternal and child health-care related costs for the year 2012 Gregorian calendar were collected from the public service provider's perspective. The step-down allocation approach recommended by the World Health Organization (WHO) was used for the analysis.

Results: The total annual cost of operating MCH services in the six primary health care facilities was US$110,182. The total costs attributable to antenatal care (ANC), delivery and postnatal care (PNC) services were US$14,582.7, US$22,324.2 and US$10,089.8 respectively. Medical supplies and personnel accounted for 40 % and 32 % of the total cost respectively. Overall, ANC accounted for 13.2 %, delivery 20.3 % and PNC 9 % of the total cost. Immunization and family planning (FP) comprised 27.0 % and 21.0 % of the total cost. The high costs of immunization and family planning can be attributed to high cost of vaccines and FP methods.

The average unit cost was US$ 5.5 per MCH services, ranging from US$ 4.5 per under-five visit to US$ 15.7 per delivery service visit.

Conclusion: This study has shown that the unit costs of MCH services provided in the primary health care facilities in a district level can be estimated. It is hoped that this study will provide a basis for further work of a similar nature. The results obtained in studies of this sort will provide useful information on the cost of various services in other primary health care unit setting.

Total and unit costs at service delivery points can be used for cost effectiveness analyses of MCH services and projected into the future.

Keywords: *Total cost, unit cost, Antenatal care, postnatal care, Delivery, immunization and under five.*

III. Abbreviations

ANC	Antenatal Care
C-Ma-MiE	Child and Maternal Mental health in Ethiopia
FP	Family Planning
CPR	Contraceptive Prevalence Rate
CSA	Central Statistics Agency
ETB	Ethiopian Birr
FMOH	Federal Ministry of Health
HSDP	Health Sector Development Plan
IMR	Infant Mortality Rate
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
OPD	Outpatient Department
PHC	Primary Health Care
PPHCF	Public Primary Health Care Facilities
PNC	Postnatal Care
SDA	Step down approach
SNNPR	Southern Nations, Nationalities and Peoples Region
SPSS	Statistical Packages for Social Sciences
UNICEF	United Nations Children‘s Fund
US$	United States Dollar
WHO	World Health Organization

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Chapter One Introduction

1.1 Background

Reducing maternal and under-five mortality through the use of cost-effective strategies continues to be a challenge, particularly in developing countries. The worldwide Maternal Mortality Ratio (MMR) or the number of women who die during pregnancy and childbirth per 100,000 live births, declined from 299 in 1990 to 202 in 2011, representing a 1.9 % average annual rate of decline[1]. Globally, under-five mortality also declined over the past 20 years from 9 million to 7.2 million[1].

Ethiopia, one of the most populous countries in sub-Saharan Africa (74.5 million people in 2007) and yet one of the least urbanized (16 %), and poorest (per capita gross national income of USD220, has focused on community-based preventive and promotive interventions to improve population health since 1993[2].

The maternal mortality ratio (MMR) in Ethiopia for the period 1998–2004 was estimated to be 673 deaths per 100,000 live births[3]. This estimate was lower than the previously recorded 871 deaths per 100,000 live births in 1990. In 2011, MMR in Ethiopia was estimated at 676 per 100,000 live births[3], however, a World Bank study modeling MMR estimated the current level to be 420 deaths per 100,000 live births[3, 4].

The percentage of women who were using antenatal care (ANC) and postnatal care (PNC) were 34 % and 9 % respectively in 2011 with regional variations[3].

In Ethiopia, only 10 % of births are delivered with the assistance of a trained health professional as compared to the Sub-Saharan African average of 46 %[5].

As of 2011, 29 % of married Ethiopian women of childbearing age (15–49 years) use any method of family planning; this is a dramatic increase from 2005—when only 15 % of married women of childbearing age were using any form of contraception[6].

Infant Mortality Rate (IMR) in Ethiopia declined by 39 % over the 15-year period (1995-2010) from 95 to 59 deaths per 1,000 live births, whereas the under-five mortality rate fell by 46 % from 165 to 88 deaths per 1,000 live births[7].

Estimating the costs of maternal and child health care is essential for costing, budgeting and economic-evaluation exercises. Unit cost estimation also provides an overview of the cost profile of different components of an intervention, and an indication of the total amount of resources needed to sustain or expand a project and to improve the services[8].

Cost studies of maternal and child health interventions help to assess how well resources are used in different types of health facilities as well as to assess how adequately funded these services are[8].

The costs of maternal and child health services are determined by identifying all resources used in its production and the costs of those resources. Total costs are divided by the total output to determine the cost per unit of services or unit cost of certain health care services[9].

Costs incurred in providing these services at the place of service delivery are direct costs. Other costs related to other work units that facilitated the provision of health care services comprised the indirect costs. Major indirect costs include: administration, maintenance, medical records, transport and laundry[9].

Given the limited health care resources in Ethiopia, coupled with the wide range of Maternal and Child Health services provided free of charge for all women and children efficient use of these resources is essential. However, despite the need to maximize efficiency in resource use, there are limited studies which inform the costs of MCH services in Ethiopia.

This thesis aims at contributing to the reduction of this crucial gap by examining the costs associated with maternal and child health services: antenatal, postnatal, delivery, and family planning, vaccination, and treatment of child illnesses. This knowledge can better enable health center managers and policy makers to budget and allocate the appropriate resources that will ensure higher quality of health care services.

1.2 Statement of the problem

Ethiopia has one of the highest rates of maternal and child mortality in Africa. The country is expected to reduce maternal mortality by three-fourths from 871 in 1991 to 267 deaths per 100,000 deliveries and the under-five mortality by two-thirds from 211 to 54 per 1000 live births by 2015[10].

Despite marked progress in reducing MMR in Ethiopia from 676/100,000 in 2011 t0 420/100,000 in 2014, the country is still off track to reach the MDG target[3] [4].

The government of Ethiopia is striving to reduce MMR through mobilizing the resources from its financial basket and donors funds. Given the limited health care resources in Ethiopia, coupled with the wide range of maternal and child health (MCH) services provided free of charge for all women, efficient use of these resources is essential.

There is need to maximize resources, but few cost studies have been conducted in the country, and as a result there is little information on the costs of maternal and child health services.

Reliable information of estimate of spending on maternal and child health services is a critical pre-condition for sound budgeting and decision making in the health care system.

This study aims to fill this crucial gap by examining the costs associated with running the MCH services through estimating the total and unit costs in PHCF around Butajira in SNNPR.

This study can better enable primary health care managers and policy makers to budget and allocate the appropriate resources that will ensure higher quality of health care services towards reducing maternal and under-five mortality.

1.3 Research Questions

- What are the total and unit costs of Maternal and Child Health services in Public Primary Health Care in rural area of Ethiopia?
- Which type of costs (Capital, Personnel, etc) consume more public resources in these health care settings?

1.4 Objectives

1.4.1 General objective

The general objective of this study is to estimate the costs of MCH services in Butajira district.

1.4.2 Specific objectives

- To estimate the total costs of MCH services in the PHC facilities in Butajira district.
- To estimate the unit costs of MCH services in the PHC facilities in Butajira district.
- To compare the costs of MCH services across health facilities in Butajira district. .

1.5 Significance of the study

To address the health problems of maternal and child health it is necessary to have information on the costs of resources incurred in providing the services.

To date there is no empirical, detailed and standardized costing of the maternal and child health services being provided in the primary health care facilities. This has resulted to misunderstandings in the justification of budget allocation and economic evaluation.

This study can be used by health facility managers to allocate the resources within or among facilities, or to compare their performance with one another. It can help to improve efficiency, increase effectiveness, enhance sustainability, and improve quality of the services.

Cost information may also be used for the future making cost projections, budgeting, and scenario planning with ―what if?" Moreover this study can be used as a base for other researchers who are interested in costing and economic evaluation in the field of PHC.

1.6 Scope of the study

The study was conducted from the health care provider perspective to estimate resources incurred when providing services for mothers and children in 2012. Costs from clients‘ angle were not included in the analysis. This study focused on MCH services delivered in the PHC facilities in Butajira district. The services include antenatal, postnatal, delivery, immunization, and family planning and child illnesses. The cost estimation was done for actual services given in these health centers on an annual bases rather than using theoretical estimation.

Chapter Two: Literature review

2.1 Global Maternal and child health condition

Making the best use of available resources is vital in developing countries that are struggling to improve public health with limited funds. This has become even more urgent following the ambitious commitment to achieve the MDGs. Consequently, demand for information on how much additional funding would be required to attain the MDGs has increased. In response, a number of studies have tried to estimate the costs countries are likely to face in further scaling-up health interventions[1].

Maternal mortality exemplifies one of the largest health disparities between the rich and the poor. In fact, 99 % of the 536,000 maternal deaths in 2005 occurred in developing countries. Over half of all maternal deaths happen in sub-Saharan Africa and one-third in South Asia. Together, these two regions account for 86 % of maternal deaths worldwide. Women in some parts of sub-Saharan Africa have a one in six risk of maternal death[8].

It is projected that providing skilled health care workers at delivery and emergency obstetrics care could save nearly three-fourths of mothers‘ lives. Yet each year, 50 million women give birth in their homes without any professional help[11].

Only 40 % of children with pneumonia have access to antibiotics and one third of infants do not undergo a basic immunization course. Due to lack of sufficient care and family planning services, one woman dies every minute from pregnancy or childbirth complications[11].

2.2 Maternal and child health services in Ethiopia

Ethiopia has one of the highest maternal mortality ratios in the world and maternal health service utilization in Ethiopia is low[12]. Most women die because they give birth without the attendance of a skilled health worker [7]. The MMR was 673 per100, 000 in the year 2005; it was 676 per 100,000 live births in 2011 and estimated to be 420 per100, 000 live births in 2014[4].

Maternal deaths represent 30 % of all deaths to women age 15–49 years in 2011, compared with 21 % in the 2005. The 2011 Ethiopian Demographic and Health Survey (EDHS2011) reported that 34 % of women used antenatal care (ANC), 10 % women delivered with skilled attendance at birth and 9 % received postnatal care with regional variations [13].

The PNC utilization in Ethiopia is also very low, with only 7 % of women having postnatal care service in the first two days after delivery[13].

Family planning is a low-cost yet effective way to lower maternal mortality by reducing the number of high-risk births. Ethiopia has made tremendous progress in doubling the contraceptive prevalence rate (CPR) from 15 % in 2005 to 29 % in 2011. However, contraceptive prevalence rate is highly dependent on short-term family planning methods (e.g., nearly 21 % for injectables), and unmet need for family planning is still high for spacing births (16%) and limiting (9 %). Recognizing this situation, the FMOH, under HSDP IV, has set a target CPR of 66 % by 2015[6].

The percentage of children fully immunized by age 12 months has increased only slightly from 20 % to 22 % from 2000 to 2011. Infant mortality declined by 39 % between the 2000 and 2011 from 97 deaths per 1,000 live births to 59 deaths per 1,000 live births. While under-five mortality declined by 47 % over the same period, from 166 deaths per 1,000 live births to 88 deaths per 1,000 live births[14].

Ethiopia faces major health concerns including the low number of health care facilities which are ill-equipped, mal-distributed and in a state of disrepair; an acute shortage of human and material resources; and inefficient utilization of the available budget[15].
The inevitable presence of resource constraints in the health sector, and the increasing demands from the public makes it critical that managers and planners of government health services keep close track of what it costs to produce what level of health care services[16].

2.3 Costs and Categories of Costs

Economists define cost as the value of resources used to produce something, including a specific health service or a health program[9]. Resources used for PHC programs can be described in many different ways. Health care costs can be distinguished as recurrent or capital costs. _Rœcurrent costs‘ are those incurred in the course of a year and are usually purchased regularly, this includes salary and benefits, medical supplies and administration. Capital cost refers to those that last longer than one year, such as buildings, vehicles and equipment. Both recurrent and capital costs can include or be classified in to direct and indirect costs[9].

In studying expenditure for one particular year, it is possible to get a distorted view of long-term average annual costs. For example, a great deal of equipment might have been purchased in the year before the study, with no expenditure on capital at all during the study period. One way to get an idea of long-term financial commitments is to identify all the capital goods being used in that year; find out the current (replacement) cost of purchasing. Estimate the total number of years each is likely to last from when it was purchased (the "working life" or "useful life"); estimate the average annual cost of each capital item in terms of a simple ~~–s~~traight line" depreciation[17].

Most capital costs involve investment in physical facilities (e.g., buildings) and durable equipment (e.g., vehicles) that have a market value, even while being used in a production process. While such capital inputs need to be replaced over time because they wear out, accounting for their costs is done separately because the amounts are relatively large when needed, and because they need to be purchased infrequently[17].

Direct recurrent costs are those costs incurred for inputs that are directly related to the production process at the service facility, like staff salaries, supplies, utilities, and rent. Indirect recurrent costs are those costs incurred for administration and management of a broader number of related facilities or outputs. For these indirect costs, a portion must be allocated to the production being considered[18, 19].

2.4 Unit cost measurement methods

The accounting and economic literature agree on the basic principles of costing[20]. A costing exercise starts with the formation of a well-defined decision problem, including the objectives of costing, the perspective of costing, and the time horizon, as well as the description of a particular service. After the service for costing has been defined in detail, the costing methodologies follow three distinctive steps: the first step is identification of resources used to deliver the service, second is the measurement of resource utilization in natural units, and thirdly attaching monetary value to resource used[21].

2.5 Types of costing methods in health care services

There are several methods in costing health care services; a systematic review of costing methods conducted by researchers concluded that no method is better than the others in all

criteria. Rather, the choice of method depends on available data, the study setting and other factors[21].

2.5.1 Top down approach

Top down costing first calculates the total costs of the service at the provider or departmental level, and then disaggregates the total costs to the department or the units of services depending on the richness of available data and the homogeneity of services provided. It can be done through multiple steps, e.g. allocate costs to cost centers, and then divide the total costs of the cost center by the number of units (e.g. women who received ANC service, etc.). This method is also called gross-costing or average costing approach, as well as departmental costing[22].

A top-down approach is suitable for homogenous services (e.g. nursery, long-term care), but it may be unsuitable for certain type of services because a top down approach assumes an equal distribution of resources between patients.

Due to the lack of detailed data, the top-down approach is sometimes the only feasible option. Furthermore, the top-down approach is cheaper and faster than a bottom up approach and can be more comprehensive than micro-costing. However, a top-down approach is less detailed and so accuracy can suffer. It does not allow detailed analysis of the cost structure or a patient level analysis[23].

2.5.2 Bottom up approach

The bottom-up approach records resource utilization at the user or individual service level, and aggregates service level utilization data to identify the type of resources used. This is used to measure resource utilization in order to calculate the costs of specific services. This method can be deployed retrospectively and prospectively using medical records, surveys, questionnaires or other reliable databases. It is particularly useful when cost data are not available from other sources[9, 20]. Currently, activity based costing is one of the most widely used forms of bottom-up costing. It breaks down the patient‘s care process into the discrete activities, which is necessary to deliver a particular service.

An activity is a collection of resource utilization combined to deliver a particular activity. Resource utilization measurement is performed separately for each activity.

A bottom-up approach gives more detail and can be more accurate than the top down approach.

It is also possible to use the billing system as source of data and it is easier to use where a fee-for-service system exists[21].

2.5.3 Step down allocation approach

The step-down allocation approach is a method in which the resources necessary to run a health center are first identified and then allotted to selected cost centers or service departments on an allocation basis. The costs centers are usually ranked according to importance and the costs are assigned to centers lower down the scale in a step-wise fashion[21]. Using this method, the accuracy of cost estimates depends on the order in which different costs are allocated, the selection of allocation base, and the number of cost centers[24]. The mixed approach could avoid some of the disadvantages of both methods. A mixed method could be cheaper than using only bottom-up approach and it could be more accurate than using only top-down approach because it can reflect variation in resource consumptions many costing study require. The mixed model allow analysts to prioritize the cost measurement towards the study objectives and decide where they will rely on direct cost measurement (micro-costing), and where they use computer based databases (macro-costing). Macro-costing can be used where resource variation is reasonably small, or when the level of aggregation is relatively high, as well as where micro-costing would be very expensive and would not be worthwhile. On the other hand, micro-costing can be used where the accuracy of resource measurement is important, and data collection is feasible in an economically sensible way.

2.6 The need for cost estimation

A cost estimation study aims to identify and measure the total costs attributable to a particular disease. Costs of illness studies are not type of economic evaluation as used to assess the costs and benefits of alternative interventions or programs. It may provide useful information which can be used in the context of an economic evaluation of interventions related to the disease category, although care must be taken as not all of the costs included in a cost of illness study represent resource costs[19].

Cost-of-illness studies can demonstrate which diseases may require increased allocation of prevention or treatment resources. But such studies are limited to determining how resources are to be allocated because it does not measure benefits. In addition, these studies employ varying

methods, which can limit the comparability of findings. The studies can vary by perspective, sources of data, type costs, and time frame of costs.

Cost studies are usually conducted to provide budgetary estimates or to estimate the costs of a program initiative, such as scaling-up or replication. The design of a cost study is important as it affects how the results might be used. Carefully designed studies can provide relevant information for policy development and program management. Cost estimation can provide a detailed understanding of the program and facilitate identifying the levels, composition of costs and variations in how a program is implemented over time. It also gives cost implications, the means and the costs of increasing a program‘s coverage and how a program might be made more effective and more cost-efficient[25].

2.7 Effect of service utilization on unit costs

Increased utilization due to scaling up may have a positive or negative impact on unit costs, depending on the current level of capacity utilization at primary health care facilities. For example, in facilities functioning at less than full capacity, unit costs are likely to fall in the short term with increases in output. As more services are delivered by existing facilities – fixed costs are distributed over a larger number of recipients[26].

However, in the long run, unit costs could rise if new facilities have to be built in sparsely populated areas or if it becomes increasingly difficult to attract the remaining people in need to seek care. The likely existence of these "economies" and "diseconomies of scale" means that information on the current and expected levels of capacity utilization at different stages of scaling up is key to identifying the true costs of expanding population coverage[27].

2.8 Primary health care cost estimation in Africa

Cost analysis studies have not gained much ground in Africa, however a number of studies have been undertaken in countries such as Malawi and Ghana [25, 28, 29]. A study in Malawi which estimated the cost of MCH services revealed that 33 % of primary health care facility costs are spent on salaries and wages, while 30 % is spent on medical supplies.

In one district hospital in Ghana annual personnel cost accounted for 58 % of total expenditures while 14 % of the total hospital cost was incurred by drugs and medical supplies.

2.9 Empirical evidences on MCH services from developing countries

The range of MCH service costs is wide, from USD2.21 per antenatal visit in a public health center in Uganda to USD42.41 in a maternity hospital in Argentina. The higher cost in Argentina is reflects the higher labor costs (>70% of the total), with marginal cost (drugs and medical supplies) representing a much smaller proportion of total cost (27 %) than most other countries. Costs are generally lower in the lower level health facilities[30].

The range of unit costs for delivery is between USD2.71 for Uganda and USD140.41 for Argentina. The substantially higher cost in Argentina can again be explained by the predominance of personnel costs and the fact the deliveries are carried out by obstetricians rather than midwives. It is unclear from most of the studies who carries out the delivery (proportion of deliveries carried out by a doctor or a midwife) and so it is difficult to establish differences in cost for assistance during delivery by different health staff[29]. Study done in Thailand indicated that total cost of running the primary health center on Fiscal Year 2004 was USD 44,513.328, which the capital cost accounted 23.6 % and recurrent cost was 76.0 %[31].

Literature from Ghana shows material costs make up the majority of direct costs for MCH services for two reasons: the high input prices of materials and low labor costs. Personnel costs comprise a small %age of unit direct costs due to low personnel salaries and high service volume at the facilities. Other factors that affect personnel costs are wage rate differentials in the facilities, amount of time spent on services, level of personnel that provide services, and staffing patterns of maternal health providers. Wage rates are 12 % and 50 % higher, respectively, for registered state nurses and enrolled nurse/midwives, at the public hospital than at the mission one. Direct costs were more varied at the health centers.

The full cost of running one mission hospital in Ghana in 2002 and 2003 were USD600,295 and USD758,647 respectively; for a district hospital, the respective costs were USD 496,240 and USD 487,537. Of these, overhead costs ranged between 20 % and 42 %, while salaries made up between 45 % and 60 %. Based on healthcare utilization data of 2003, the estimated cost per outpatient attendance was USD 2.25 at the mission hospital, USD 4.51 at the district hospital and USD8.5 at the referral hospital[29].

A study carried out in Ethiopia on immunization of children during the Child Health Days indicated that at an average cost per child per one round was USD0.56[32]. When measles were included in the package the average cost per child per round was USD1.04.

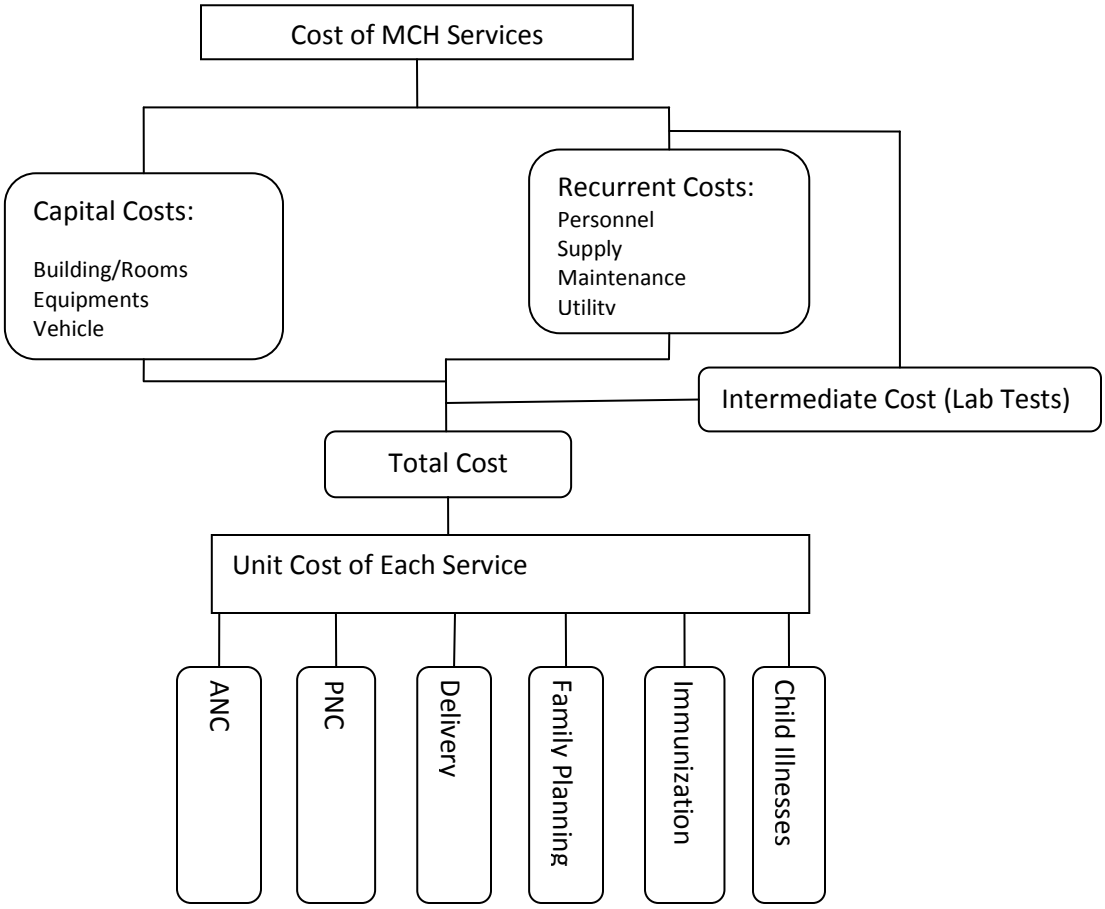
The total cost of one round of the Enhanced outreach services in Amhara and Oromiya considered together was 44.7 million Birr or USD5 million.

Adding measles vaccinations to the basic services packages increases the cost of a round from 44.7 million to 78.4 million Birr (USD8.7 million). The average cost per Woreda of the immunization programme was 120,527 Birr (USD13,367) per round without measles and 184 271 Birr (USD20,435) with measles.

There is little consistency in the costing methods used which making comparisons difficult. Still, most findings suggest that health care can be provided more cheaply at the health center than the hospital. So upgrading health centers for the provision of basic care is a cost-effective option. Furthermore, while obstetric surgery often needs a hospital setting, many life-saving procedures can be carried out in health centers‘ and health posts[33].

However, the more restricted opening hours plus the more limited availability of certain medical staff might make the health centre less accessible for women to receive emergency treatment. Personnel, drugs and medical supplies are the main contributors to total cost, and for certain interventions and medical supplies represent 56 % of the total cost[33].

6. Conceptual Framework for cost estimation



Chapter Three: Research Methodology

3.1 Description of the study Area

Meskan/Butajira district is located in the Gurage zone in the Southern Nations, Nationalities and Peoples Regional State (SNNPR). The district is located 130 km south of Addis Ababa and 50 km to the west of Ziway town in the Rift Valley. Previously the district was named as Meskan and Mareko but has now been divided in to three administrative regions: Meskan district, Mereko district and Butajira City administration. Meskan district has a total population of 190,771 among which 93,478 are male and 97,293 are females. Most of the district's populations live in rural area, which constitute 174,983, while the rest 15,788 are urban residents. According to Meskan district health office from the total population 6,225 are infants, 29,761 are children under five years of age and 6,848 are pregnant women.

The district is divided in to 42 sub districts (kebeles) of which 40 are rural and two are urban. Meskan district has a total of seven health centers, two hospitals and 40 health posts. The health centers deliver mainly primary health care services including the MCH services, inpatient and outpatient and other basic health services for the catchment area population.

3.2 Study Design

The aim of the study was to identify and estimate capital and recurrent costs of MCH services delivered at Butajira PHC facilities in Southern Nations and Nationalities Peoples Region (SNNPR).

The study employed a cross-sectional design and quantitative data were collected from the health providers' perspective. The data included costs of antenatal, postnatal care, delivery, family planning, immunization and child health services. The data were collected on total operating costs (e.g., personnel, supplies and material) directly associated with providing the services as well as related support costs (indirect costs) such as administration costs.

3.3 Data collection

Cost information of different inputs and resources used were collected during February 2014 to June 2014. The capital and recurrent inputs at the health facilities were listed, valued and cross checked with data obtained from the records. The capital data records were reviewed by the principal investigator.

Five data collectors carried out the interview guided by the principal investigator. The data collectors were provided with a two day-training which included explanation about the study design, costing theory and concepts, interview methods and techniques and the data collection instruments used. They were also informed about the type and sources of secondary data needed to be collected for the study.

A standard structured health facility questionnaire was used to collect data and included six sections: medical supplies, equipment, personnel, building, furniture and administration.
Improvement was done for the questionnaire after conducting pre-test in the health facilities in Butajira. The data were collected through interviews with health center heads, staff at all MCH service departments, health extension workers at the health posts. There was document review, physical measuring of rooms and counting of equipment. The prices of items were estimated through taking current market prices due to unavailability of prices of the equipments. In order to calculate staff salaries, gross salaries of the staff and incentives were taken from the finance department pay roll for the year 2012 and added up together. All costs were converted to the US dollar using the average exchange rate in 2012 (USD 1= ETB 18.685)[34]. The utilization data, such as number of ANC visits and the number of deliveries at the various health centers, health posts were also collected via document reviews.

3.4 Sampling Procedure

The four existing health centers were stratified in to urban and rural strata. Then two health centers were selected randomly i.e. Butajira health center from the urban and Sharshara Bido health center from the rural. According to the Ethiopian health service delivery system one health center is accompanied by five satellite health posts[7]. Unfortunately there were no health posts under Butajira health center catchment so the four health posts (Sharshara Macmana, Dirama, Ellie and Gobena) were selected from Sharshara Bido health center catchment area. Firstly it was proposed to take 50 % of the clients‘ of MCH services but after pre-testing the questionnaire the decision was to take all the clients‘ data for the year 2012 due to interrelation and aggregation of the information. Both the direct and indirect costs in each facility were assessed and estimated. The interview include: Health center heads, one staff from each MCH services department and one health extension worker at each health posts.

3.5 Study period

The study was carried out from January 2014 to June 2014.

3.6 Target population

The target populations were primary health care facilities found in Meskan/Butajira district in 2012.

3.7 Study Population

The study populations were the four primary health care facilities which included two health centers and four health posts in Meskan /Butajira district in 2012.

3.8 Study variables

3.8.1 Dependent variable

The total and unit cost per visit for maternal and child health service is dependant variable.

3.8.2 Independent variable

Independent variables included: total number of visits; types of costs included in the cost study (e.g., capital, recurrent); the number of full time health care providers.

3.9 Data analysis.

Unit costs of each service were calculated by dividing the costs of inputs incurred along each of the services during the base year by the total number of output of the respective services of that year. A stepping-down approach was used to allocate indirect costs to final services. EPI-Info version 3.5.1 software was employed for data entry and SPSS version 21 for analysis of data.

3.10 Methods of cost estimation

The step-down allocation (SDA) or mixed approach is used to estimate the MCH services in the primary health care facilities. SDA is a method in which the resources necessary to run a health center are first identified and then allotted to selected service departments on an allocation basis[21]. Using a SDA approach, there are six main steps: (1) defining the final product, (2) defining cost centers, (3) identifying the full cost for each input, (4) assigning inputs to cost centers, (5) allocating all costs to final cost centers, and (6) computing total and unit costs.

Accordingly, costs for each of the six primary health care facilities were calculated using full costing approach, which required the calculation of both capital and recurrent costs.

The final product defined as antenatal, delivery, postnatal, immunization and other MCH services.

Secondly, we defined cost centers/categories based on the functions of the departments. Three cost centers were identified: direct, intermediate and indirect costs centers. Direct costs centers, refer to the cost of services provided directly to patients[35]. In this study, the direct cost centers were the departments of ANC, delivery and the selected MCH services (e.g. immunization, under five, family planning, etc.). Intermediate cost centers refer to costs of pharmacy and laboratory departments. The indirect cost centers or overhead costs refer to costs incurred by departments or activities that provide services only to other departments of the health care center, not directly to patients. It included administration and vehicle costs.

Thirdly, full cost for each input will be identified. A list of all resources generated and grouped into the following cost categories)-personnel, administration, medical supplies building and equipment costs. The total annual costs were estimated by multiplying and summing quantities consumed on each specific item by the unit price.

Fourthly, the categorized costs assigned to the three cost centers. Some costs can be assigned immediately to certain cost centers. Accordingly, personnel, administration, pharmacy, laboratory and vehicle costs were assigned directly to the relevant cost centers. Medical supplies cost was assigned first as it accounted for the largest share of costs. In addition, personnel, building cost, equipment were distributed to direct cost centers.

Fifthly, all costs reallocated from the two cost centers (indirect and intermediate) cost to the direct cost centers (ANC, delivery and others).

In the final step, the unit cost calculated. The allocated costs for each direct cost center were divided by the number of visits of each of these centers. Unit cost (average cost) refers to the cost of providing a single service [24]. Accordingly, the unit cost for ANC was calculated by dividing the total cost of ANC over the total number of ANC consultations conducted in the year irrespective of the number of women who made multiple visits. The unit cost for delivery was calculated by dividing the total cost of delivery over the total number of deliveries in the year.

The study was conducted from provider‘s perspective during February to June 2014 looking at the reported performance of MCH services in 2012. All resources mobilized by the health facilities for the MCH service delivery were identified, quantified and valued in local currency applying step down approach.

Personnel cost was estimated through taking salaries of the staff and by adding the duty incentives as a benefit at each department.

Costs related to medical supplies were estimated by taking the total quantity of the supplies at each department and using the current market cost of the supplies and multiplying together. This is because it was difficult to find the attached cost of the supplies. Costs of medical equipments were also estimated by quantifying the equipments at each department and taking the current market cost of the equipments. Capital costs were annualized using a discount rate with their respective useful life years. A discount rate of 3% was chosen in conformity with most economic evaluation studies conducted in developed and developing countries[18], and in the absence of any accepted alternative rate used in Ethiopia. Based on expert opinion and literature review a useful life of 10 years was used for equipment and 30 years for building.

The administration costs which included maintenance, water and electricity, were estimated by taking 5 % of medical equipment for maintenance[18], using floor area for water electricity and cleaning. Vehicle and motor bike costs were also estimated in the same way as for medical equipments.

3.11 Marginal cost

The change in total cost (or total variable cost) resulting from a change in the quantity of output produced by a firm in the short run. Marginal cost indicates how much total cost changes for a given change in the quantity of output. Because changes in total cost are matched by changes in total variable cost in the short run (total fixed cost is fixed), marginal cost is the change in either total cost or total variable cost. It is found by dividing the change in total cost (or total variable cost) by the change in output. Marginal cost is one of four cost concepts used in short-run production analysis. The other three are average total cost, average fixed cost, and average variable cost. The marginal costs of production decrease as the volume of output increases because of economies of scale[24].

However, production will reach a point where *diseconomies of scale* will enter the picture and marginal costs will begin to rise again. Costs may rise because the facilities should hire more management, buy more equipment, or because you have tapped out your local sources of raw materials, causing you to spend more money to obtain the resources.

3.12 Sensitivity analysis

One-way sensitivity analysis allows a reviewer to assess the impact that changes in a certain parameter will have on the model‘s conclusions. The analysis is conducted to explore the impact of changes of variables that are susceptible to change over time or in different settings so as to assist in the generalization of the study results. This is done by changing each variable through the range of interest or assumptions, while holding other variables constant. Thus, all variables remained constant except the variable of interest[36].

Given that several studies use 3-5 % discount rates, sensitivity analysis is to assess the impact of using a higher discount rate (5 %). The life span of buildings was also varied (from 30 years to 20 years).

In addition, given that countries are embarking on several interventions and reforms to encourage women to attend ANC and deliver at the health center, we expect a future increase in utilization of ANC and delivery services at the health centers.

A sensitivity analysis was therefore performed assuming a 10 % increase in ANC visits and delivery. Thereafter the threshold for significance was set at 10 % change in costs or higher

3.12 Ethical clearance

Ethical clearance and approval letter was obtained from the Institutional Review Board of College of Health Sciences of Addis-Ababa University. Official letters were written to the Gurage zone and Butajira town health department and permission was secured at all levels. After explaining about the purpose, the possible benefit of the study and confidentiality, verbal consent was obtained from each health centers heads and official letter was written from Meskan district to Sharashra Bido health center and to the health posts accordingly.

3.13 Definition of terms

Average costs: - The total costs divided by the total number of clients[9].

Bottom-up costing approach:- This builds standard unit costs based on standard level of inputs and standard input prices, rather than using actual levels of inputs[37].

Capacity utilization: - The average number of clients using the service per day divided by the total number of clients the service can accommodate per day[37].

Cost:- A cost is the monetary value of a resource that is used to deliver specific MCH services[21].

Cost of Illness Study: - Is a measure of the costs attributable to a particular disease[19].

Direct cost: A cost that is incurred at the service delivery point e.g. salary, equipment[20].

Incremental cost:- The extra costs associated with an expansion in activity of a given service[20].

Indirect cost: - Cost that is incurred on administration and other is supporting activities[22].

Marginal cost: - The cost of producing one extra unit of MCH service[33].

Opportunity cost: is the value of opportunity forgone, strictly the best opportunity forgone, as a result of engaging resources in an activity[18].

Step down allocation methods: is a method in which the resources necessary to run a health center are first identified and allotted to selected service departments on an allocation basis [13].

Top-down costing approach:- This estimating unit costs assembles all relevant expenditure at cost centre level and divides it by units of activity[37].

Unit cost:- A cost calculated by dividing the total cost of providing a service (inputs) by the number of clients or output[37].

Chapter Four: Results

4.1 Characteristics of health facilities

The study included Butajira and Sharshara Bido health centers and Sharshara Macmana, Dirama, Ellie and Dobena health posts. Butajira health center is located in Bitajira town while Sharshara Bido health center is located in the Sharsahara sub district 7 km away from Bitajira town. The health posts are located in their respective rural (kebeles) sub districts under Shrashra Bido health center catchment. All health facilities included in this study have the minimum staff; the staff strength at each health facilities differs. For instance, Butajira health center had 12 MCH staffs, where as Sharshara Bido health center had 6 MCH staffs and the health posts all had two health extension workers each. Among the health facilities only Butajira health center had basic utilities such as electricity and water. All health facilities had basic medical equipments and supplies, still Butajira health center had large medical facilities in terms of quantity and variety. Vehicle and motor bike are available only at Butajira health center others did not have any. The catchment areas of the health facilities also varied. Ellie health post covered the smallest population of about 2,083 residents, and Butajira health center covered 20,444 residents. Butajira health center serves as a referral point even to other health centers. The health center is believed to provide quality care due to its adequate and experienced staff and better medical equipments. For this reason, a good proportion of MCH service clients visiting the Butajira health center are not within its catchment area.

4.2 Cost distribution by health care facilities

The total cost of running the MCH services in the six primary health care facilities in 2012 was USD 110,182, with a range from USD 3,556.6 at Ellie health post to USD 63,639.5 at Butajira health center. The two health centers accounted for 85 % of the total MCH services cost. Butajira Health Center had the highest overall MCH services cost that comprised 57.7 % of all health facilities as the health center is large with more staff, more resources and a large number of clients compared with the other health facilities. Sharshara Bido health center share 27.3 % of the total cost. The four health posts comprised the rest 15 % of the total cost.

Among the health posts, Sharshara Machmana health post accounted for 4.2 % of total costs while Ellie health post had the lowest total running cost for MCH services among the six health facilities, accounting only for 3.2 % of total costs.

Table 1: total cost distribution by health care facilities in USD in 2012

Health facility Type	**Total cost in US dollar**	**%**
Health centers		
Butajira	63639.5	57.7
Sharsahra bido	30129	27.3
Sub total	93768.5	85
Average	46884.25	42.5
Health posts		
Sharashara Machmana	4688.7	4.2
Dirama	4520.9	4.1
Ellie	3556.6	3.2
Dobena	3647.3	3.5
Sub total	16413.5	15
Average	4103.4	3.75
Grand total	110182	100
Average	18363.6	

4.3 Costs of MCH services at the primary health care facilities.

The estimated cost of antenatal service for the health centers was USD3516.4 at Sharashara Bido and USD9,686.2 at Butajira health center, with average cost of USD 6,601.3 per health center. Postnatal service was the lowest cost of all ranged from USD200.3 at Dobena health post to USD7,027 at Butajira health center, with average cost of USD1,681.6 per facility. The average cost of delivery was estimated as USD3,720.7 with a range from USD318 at Dobena health post to USD1, 3952.6 at Butajira health center. Delivery, ANC and PNC services accounted for 42.6 % of the total cost.

Table: 2 Costs of MCH services at PHC facilities by service category in USD in 2012

Health centers	**Type of MCH services**					
	ANC	PNC	Delivery	**Total**	**Average**	**%**
Butajira	9686.2	7027	13952.6	30665.8	10222	27.8
Sharshara bido	3516.4	1899.2	6729	12144.6	4048.2	11
Sub total	13202.6	8926.2	20681.6	42810.4	14270.2	38.8
Average	6601.3	4463.1	10340.8	21405.2	7135.1	19.4
Health posts	**ANC**	**PNC**	**Delivery**	**Total**	**Average**	**%**
Sharashara machmana	342	309.6	436.3	1087.9	362.6	1
Dirama	483.4	422.7	495.5	1401.6	467.2	1.2
Ellie	248	231	392.8	871.8	290.6	0.8
Dobena	306.7	200.3	318	825	275	0.7
Sub total	1380.1	1163.6	1642.6	4186.3	1395.4	3.7
Average	345	291	410.6	1046.5	348.8	1.8
Grand total	14582.7	10089.8	22324.2	46996.7	15665.6	42.6
Average	2430.45	1681.63	3720.7	7832.78		

Total immunization cost for all the six primary health care facilities was estimated as USD29,414.3, with a range from USD 707.8 at Ellie health post to USD17,740 at Butajira health center. Family planning service was found the second highest cost next to immunization with a range from USD1,131 at Dobena health post to USD9,089.7 at Butajira. The cost of under five service was accounted for USD 10515.2, with the average cost of 1752.5 per health facility. Immunization and family planning alone comprised almost half (48 %) of the total MCH services cost. Under-five service accounted for 9 % of the total MCH services.

Table: 3 Costs of MCH services by service category at PHCF in USD in 2012

Health facility	FP	Immunization	Under-5	Total	Average	%
Butajira	9089.7	17740	6144	32973.7	10991.2	30
Sharshar bido	7569	8212.4	2203	17984.4	5994.8	16.3
Sub total	16658.7	25952.4	8347	50958.1	25479.05	
Average	8329.35	12976.2	4173.5	25479.05		
Sharshara Machmana	2130.8	852.6	617.4	3600.8	1200.3	3.2
Dirama	1754.3	859	506	3119.3	1039.7	2.8
Ellie	1581	707.8	396	2684.8	895	2.4
Dobena	1131	1042.5	648.8	2822.3	940.7	2.5
Total	23255.8	29414.3	10515.2	63185.3	21061.6	57.3
Average	3875.97	4902.38	1752.53	10530.88		

4.3 Cost distribution by cost category

The total recurrent and capital costs of the six primary health care facilities were estimated to be USD110,182, where the recurrent costs accounted for (73.7 %) of the total cost. Among the recurrent costs the highest proportion was incurred by medical supplies which accounted for USD 44,074, and comprised for 54 % of the recurrent cost. The lowest medical supply cost was USD845 for Ellie health post while the highest cost of the medical supply was USD 28,571.6 for Butajira health center. The average cost for the medical supply was USD7,345.6 per facility. The total personnel cost which included salary and other benefits accounted for USD35,260, ranged from USD1,213.8 at Ellie health post to USD20,504 at Butajira health center. The total medical equipment cost was USD 20,975.2 with average cost of USD3,495.7 per facility.

Table: 4 Costs of MCH services at PHCF by cost category in USD in 2012

Cost category	Type of health facility								
	Health center		**Heath posts**						
	Butajira	Sharshara bido	Sharshara machmana	Dirama	Ellie	Dobena	Total	%	Average
Personnel	20504	8729.5	1798	1800	1213.8	1214.8	35260.1	32	5876.6
Medical equipment	10261.2	7303	1014	845	854	698	20975.2	19	3495.7
Medical supplies	28571.6	11435	1134.2	1057.6	845	1030.6	44074	40	7345.6
Grand total	63639.4	30128.9	4688.7	4521	3557	3647.4	110182	100	18363.6

The total costs related to buildings or rooms for MCH services were estimated to be USD 7165.3 with average cost of USD 1,194.2 per facility.

The building costs ranged from USD545.5 at Ellie health post to USD2,586 at Butajira health center. The administration costs which included electricity, water, stationery and other utilities was estimated as USD1,882.8 and ranged from USD34.7 at Dirama health post to USD1354.4 at Butajira. Generally the cost of medical supplies comprised for 40 % of all cost categories, followed by personnel cost 32 %. Medical equipments accounted for 19 %, while building and administration comprised 6.5 % and 1.7 % of total cost respectively.

Table 5: Distribution of cost by cost category at PHCF in Butajira in USD in 2012

Cost category	Type of Health facility								
	Health center		Health posts						
	Butajira	Sharshara bido	Sharshara macmana	Dirama	Ellie	Dobena	Total	**%**	**Ave**
Furniture	362.2	249.4	43	57	55	58	824.6	0.7	137.4
Building	2586	2039	663.5	726.6	545.5	604.7	7165.3	6.5	1194.2
Administration	1354.4	373	36	34.7	43.4	41.3	1882.8	1.7	313.8
Grand total	63639.4	30128.9	4688.7	4521	3557	3647.4	110182	100	18363.6

4.4 Number of visits, total and unit costs of MCH services.

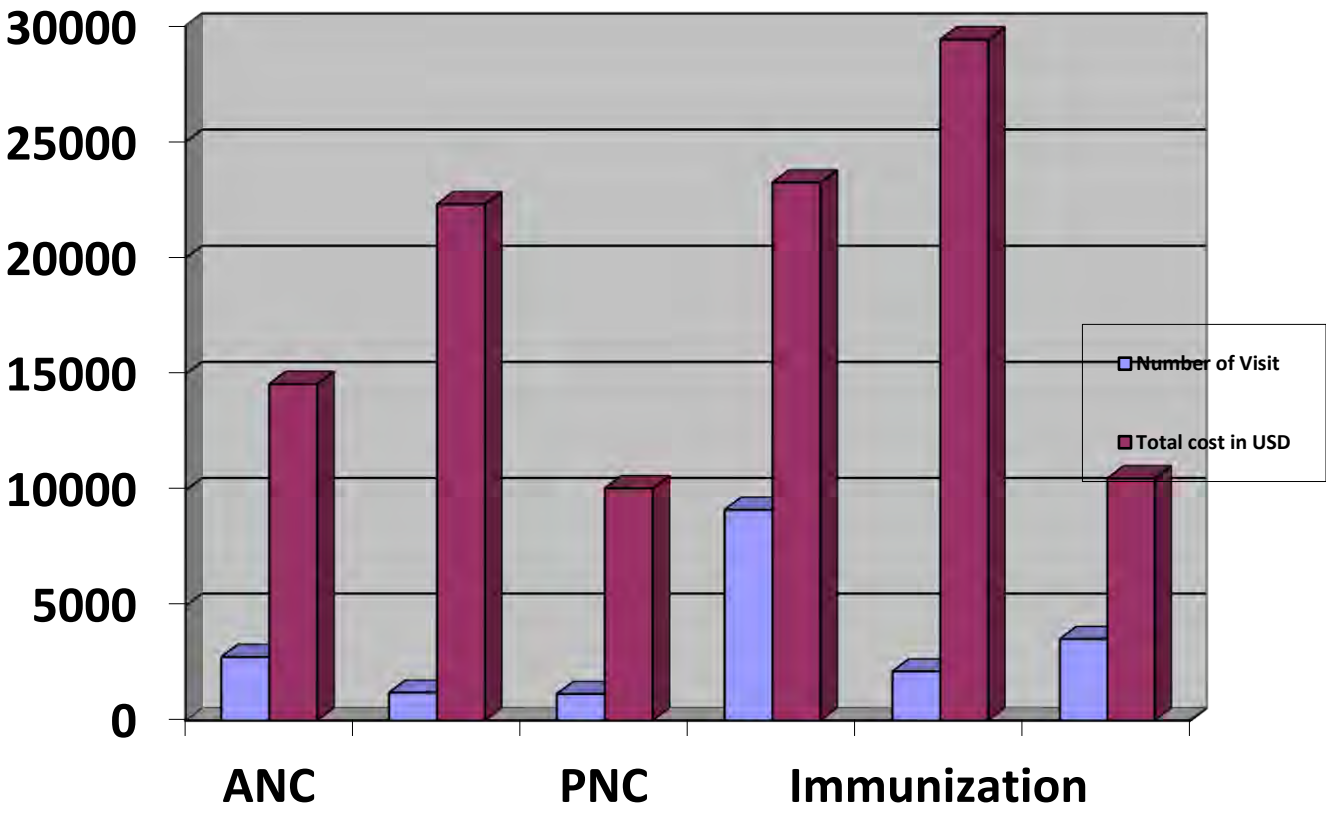
The total number of ANC visits for all six primary health care facilities were 2,720 with average ANC visit of 453 per facility. The total number of deliveries was 1,217 with average of 203 deliveries per facility. The total number of PNC visits for all health facilities were 1,156 with average of 192 visits per facility.

The number of ANC visits, deliveries and PNC visits varied among the health facilities. There were only 142 ANC at Sharshara Bido health center while 1,888 ANC visits were recorded at Butajira health center. On the other hand there were 876 deliveries at Butajira health center but only 184 deliveries at Sharshara bido health center. There were 37 ANC visits at Dobena health post and 62 visits at Dirama health post, with average of 51.7 PNC visits per health post. The number of deliveries ranged from 32 at Dobena health post to 48 at Dirama while there were 43 and 54 PNC visits at Dobena and Sharshara machmana health post respectively.

All six health facilities spent on average USD6.25 per ANC visit, USD 15.7 per delivery and USD 7.7 per PNC visit. An ANC visit cost USD 5 at Butajira health center and USD 7.8 at Dirama health post. The estimated unit cost for delivery at Sharshara bido health center was USD36.6 and USD 16 at Butajira health center. The unit cost for ANC and delivery services did not differ substantially at health posts. The highest unit cost per ANC was USD 8.3 at Dobena and USD 4.3 at Ellie health post. The unit cost per delivery at the health posts showed similar results that ranged from USD 10 at Dobena health post and USD 11.2 at Ellie health post.

The unit cost per PNC visit was USD13.4 at Sharshara Bido health center and USD 8.5 at Butajira health center. The PNC unit cost for the health posts were estimated as USD 5.2 at Ellie health post and USD 8.3 at Dirama health post.

Figure 1: Number of visits and total cost per MCH services in USD in 2012



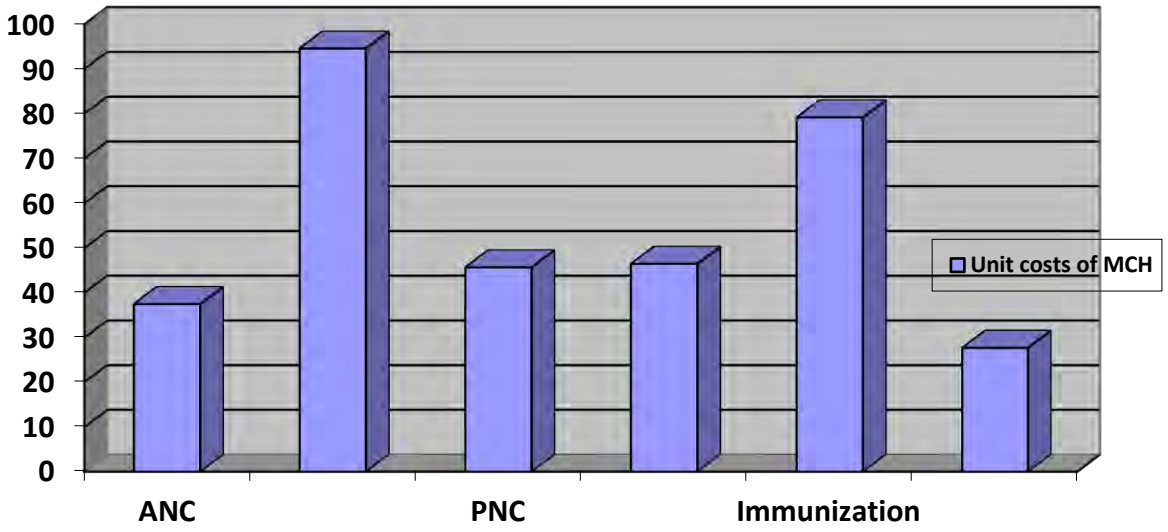
The total visits for FP were 9161; the unit cost per FP visit was USD 1.3 at Butajira health center and USD10.7 at Sharshara Machmana health post.

There were 2,135 visits for immunization of children aged under-one year. The unit cost per immunization visit was USD 13 at Butajira health center and USD 18 at Dirama health post. There were 1,328 visits at Butajira while there were only 591 visits for immunization at Sharshara Bido health center. Among the health posts Sharshara Machmana and Dobena health post were found to have similar unit costs of USD 16.6 per immunization visit.

The unit cost per under-five visit was USD1.3 at Sharshara Bido health center and USD 4.2 US at Butajira health center.

There were 1,458 visits for under-five at Butajira health center while there were 1,690 under-five visits at Sharshara Bido health center. The unit cost per under-five was USD 6.8 per under-five visit at Dirama health post while it was USD 3.3 at Ellie health post.

Figure 2: **Unit costs per each MCH service visits in USD in 2012.**



Sensitivity analysis

The results from the sensitivity analysis show that using different discount rate for the capital costs from 3% to 5% has changed the unit cost of the MCH services on average by 11.6%. On the other hand, increasing the average number of the ANC, Delivery and immunization visits by 10% has lower impact on the unit costs. For instance, increasing the number of ANC visits by 10% (from 453 to 498.3) resulted in a 9.4% reduction in cost per ANC visit (from USD5.3 to USD4.8), and increasing deliveries by 10% (from 203 to 223.3) reduced the unit cost per delivery by 9.3% (from USD18.3 US to USD16.6) and similar reduction for the immunization services. This shows changing the discount rate of the capital costs from 3% to 5% at the primary health care facilities helps to reduce unit costs leading to optimal utilization of the resources.

Table 6: Sensitivity analysis

Variables	Capital cost (USD)	Total cost (USD)	ANC cost (USD)	Delivery cost (USD)	Immunization cost(USD)	ANC unit cost (USD)	Delivery unit cost (USD)	Immunization unit cost (USD)
Discount rate								
3%	4827.1	4103.4	2430.4	3720.7	4902.4	5.3	18.3	13.7
5%	5245	4521.4	2848.4	4138.7	5320.4	6.3	20.4	14.9
Change in %	7.9	9.2	14.6	10	7.8	15.8	10.3	8
Using average ANC visit = 453						5.3		
10% increase in ANC visit = 498.3						4.8		
Change in percent=						9.4		
Using average Delivery visit = 203							18.3	
10% increase in delivery visit = 223.3							16.6	
Change in percent							9.3	
Using average immunization visit = 356								13.7
10% increase in immunization visit = 391.6								12.5
Change in percent								9.2

Marginal cost

The average cost per unit is high for the delivery and postnatal care, the marginal cost of assisting one delivery was USD 96.6 while it was USD 2.4 for ANC. As the economies of scale dictate, the average and marginal cost become decreasing as the number of MCH services clients increase. Costs are lower because you can take advantage of discounts for high number of service utilization, make full use of health staff and materials and engaged specialized labor.

Table 7: Marginal cost of MCH services

Type of services	Number of visits	Total fixed cost	Total variable cost	Total cost	Average cost	Marginal cost
PNC	1156	57074.2	4863.2	61937.4	53.6	49.4
Delivery	1217	57074.2	10760.3	67834.5	55.7	96.6
ANC	2770	57074.2	7028.2	64102.4	23.1	2.40
Immunization	2135	57074.2	14178.7	71252.9	33.8	11.26
Under five	3540	57074.2	5068.4	62142.6	17.5	6.48
FP	9161	57074.2	11209	68283.2	7.4	1.09

Chapter Five: Discussion

This study analyzed the costs associated with running maternal and child health services in primary health care facilities in Butajira district. This study therefore provides empirical evidence to health center managers and policy makers on the costs of MCH services. This can help to assess how well resources are used in different primary health care facilities.

The study followed the basic principles and steps of costing health care services recommended by World Health Organization (WHO). Though various methods are used in costing health care services, the differences reflect different decision situations and the research objective and not due to disagreement on methodology and concepts.

The study result showed that there is a variation in costs across the selected health facilities. This results from differences in number of clients visited each health facilities and available resources. The average cost of operating MCH services in a health facility in this study was higher than the national average spending on health per capita of USD16.61 in 2011[4]. Furthermore, in comparison with cost studies in other settings, the annual cost of running MCH services included in this study is higher. The total cost of running MCH services in Butajira is similar with study in Burkina Faso with USD63,818 [23], which is about half of the total cost in this study. However, since the Burkina Faso study was conducted 10 years ago, the cost difference could be due to increment in staff salaries, general price increases resulting from the depreciation of the Ethiopian Birr relative to the US dollar over the period (62 % depreciation between 2000–2010) and higher gross domestic product per capita in Ghana ($3,100 US) than Burkina (USD1,500)[23].

The total cost of MCH services in this study is higher than costs in primary health care in Thailand, accounted USD 44,513.3, but the share of the capital and recurrent cost indicated 23.62 % and 76.38 % respectively which is similar with this study[31].

Medical supplies cost emerged as the most significant (40%) of the total cost of MCH services followed by the personnel cost (32%). Study in primary health care in Malawi revealed that 33 % of total costs were spent on salaries and wages, which is similar with this study that was 32 % of the total cost[28].

But the proportion of cost of medical supplies in this study was 10 % higher than the Malawian study which is 30 % of the total MCH services. This is inconsistent with other public primary health care cost studies in Guinea, where personnel cost constitute above 60 % of the total cost[22].

In this study personnel cost comprised a small %age of total costs in the health posts due to few number (two health extension workers) of staff and low level qualification.

The costs attributed to ANC, delivery and PNC show variation among the health facilities, and the results indicated that the number of client‘s or utilization rate for ANC was higher for delivery and PNC at the health facilities. Similar findings have been reported in other studies. The total ANC, delivery and PNC costs represent a 42.6 % of the total cost. FP and immunization were found to be half (48 %) of the total costs of MCH services. High cost of Vaccines and FP methods could be a good reason for this cost. Unit cost per ANC, delivery and PNC differ as well among the six health facilities.

The average unit cost per ANC visit is much higher than observed in other cost studies. For example, while the unit cost per ANC visit in this study was USD 5.1, the unit cost per ANC visit was estimated as USD2.21 in Uganda, USD3.23 in Malawi, and USD2.97 in Ghana. However, unit cost per delivery in this study was estimated as USD15.5 –which is high when compared with USD2.71 in Uganda, USD10.22 in Malawi and USD7.66 US in Ghana[23],[28],[1].

As the number of ANC visits or deliveries increases, the economies of scale dictate that the unit costs will tend to be less[22].

Literature from Thailand shows that costs of community MCH unit costs are lower than this study. This might be due to high utilization rate for the MCH services in Thailand[31].

Study done in Ethiopia on immunization of children during the Child Health Days indicated that at an average cost per child per one round was USD0.56[32], which is very lower than unit costs in this study and that of other countries. This might be related to the lower cost vaccination during the campaign days rather than routine vaccination activities. Comparison of unit cost among health care facilities or countries is difficult, because unit cost estimates are influenced by number of clients served, nature and components of intervention (clinical, preventive or mixed), type of infrastructure, supplies and drug used, and salaries allocated for health providers. Secondly, the methodologies applied by researchers to calculate cost are not identical, and

comparison becomes vague. In using and comparing the cost information presented in this study, it is essential to keep in mind that different studies use different methods and inputs in costing similar interventions, and many important MCH care lack cost information.

There are a number of cost studies of MCH services in the literature; however, there is little consistency in the costing methods used making

5.2 Limitation of the Study

The small sample size of the study of six primary health care facilities in this study: two health centers, and four health posts become one and major limitation. Because the sample size is small, no statistical tests of the costs of providing MCH services were conducted and may not be generalizable to other regions in the country.

Record keeping and health information systems at the health facilities were poor and could affect the study findings. In some instances, we had to rely on estimations, which could lead to either over-estimation or underestimation.

As few studies have published data on the costs of MCH services, it is difficult to meaningfully compare pre-existing data to this study results. This difficulty is also due to the period of data collection, differences in costing methods, differences in prices and resources across settings and general differences in the economic environment.

Despite these challenges, the methodology used in this study is applicable across various settings, and the results are relatively reliable and may serve as a starting point for future cost studies.

Chapter six: Conclusions and recommendations

6.1: Conclusions

This study has shown that the unit costs of services provided in primary health care facilities in the district level can be estimated. The method of cost analysis used is easily reproducible, at least up to the first stage of allocation.

It is hoped that this study will provide a basis for further work of a similar nature. The results obtained in studies of this sort will provide useful information on the cost of various services in other primary health care unit setting.

This type of cost information should provide a sound background for the formulation of performance budgets. This paper has also indicated the utilization pattern and volume of different services provided in the primary health care facilities. The results show that the cost per unit of activity depends mainly on the intensity of use of the resources.

Comparisons between complexes can thus be made on a sound basis. This method of cost analysis can also be used in analyzing activities in the private health sector. So that a complete picture of costs incurred on a particular service can be obtained. Medical supply costs were the major cost category of the health facilities followed by the personnel cost.

Butajira health center was a health center with high over all total costs and number of MCH clients. The four health posts were found to share small amount of total cost.

Among the MCH services immunization and FP were found to have higher total cost of all MCH services.

In this study high unit cost of delivery and child immunization services also explained.

The study provided useful information that could be used for cost effectiveness analyses of MCH services, as well as for policy makers to make appropriate decisions regarding the allocation and sustainability of health care resources.

6.2 Recommendations

- Since the total costs for MCH services were lower at the health post level, clients should be encouraged to obtain services there provided that service quality is acceptable.

- There should be allocation of additional resources for the health post level services as they are accessible to the local communities.

- The health care facilities cost datasets should be used to further explore the concept of economies of scale and scope in service provision.

- A separate study needs to be undertaken to establish how allocated budgets for health care have affected equity in health services and quality in health services.

- Further research using the cost estimates and the project impacts on health outcome needs to be undertaken for a cost effective analysis of MCH services.

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Annex II: Standard health facility questionnaire

General guide line for the questionnaire on cost estimation of primary health care units

1. The questionnaire will be used to data from randomly selected two health centers and two health posts in Butajira woreda . The data collection will include the following departments in the facilities.

I. Antenatal II. Delivery III. Family Planning IV. Postnatal V. Child illnesses VI. immunization

The following data will be collected at each five departments

- Cost of human power both technical and administrative. The personnel cost include salaries and incentives. The number of health personnel at each department will be first listed and their salaries and incentives can be obtained from pay roll from finance section.
- Cost of medical and other equipments: first the number and type of the equipments should be listed. Their cost can be obtained from finance or logistic section of the health center or from Pharmaceutical fund and supply agency (PFSA). Or use current market price of the equipment with their depreciation cost.
- Cost of medical supplies: type and number of supplies used at each department should be listed and their cost can be found from logistic section or we can use current market price.
- Cost of building or rooms used: can be found by taking the cost of the same building built by the government or taking rent of the same room in butajira and calculate for the cost based on depreciation and interest rate.
- Cost of vehicles: used by the departments based on the kilo meters travelled and fuels used for the departments.
- Cost of utilities (water, electricity, cleaning). These costs can be calculated based on the room size of each department in relation with the whole health center total area by dividing the total yearly cost of the each utility (share of departments). Cost of equipments and building maintenance within the departments: listing of type of equipment and frequency of maintenance should be done. Their cost can be obtained from logistic section

Questionnaire to assess the costs of MCH services in PHCC in Butajira district in 2012.

1. **Back ground Information** **Code: 01** Date of data collection: ----------

1.1 Type of facility: health center------ health post-------

1.2 Name of the Health facility: ----------Year of establishment ----------

1.3 Location of facility: Region ---------- Zone--------- Woreda----------Kebele----------

1.4 Catchment total Population: Total -------- Female---------- Male---------Women of child bearing age--------U-5 children-------

1.5 Total budget of the facility for the year 2012/2005----------

2. Human resource for heath

2.1 Total number of professional staff:---------- Total salary: --------- Average salary: ----------

2.2 Professional staff by profession: Ho:-------Nurses-------- Midwifes-------

Lab technicians---------- Pharmacists/Druggists----------Other/specify------

2.3 Total number of administrative staff: ---------- Total salary:--------- Average salary:---------

2.4 Administrative staff by job category: Management: --------- Finance-------- HR--------

Cleaners ---------- Guards --------- Drivers ---------- Others specify ----------

Note: management include: manager, secretary, and related

2.5 Does the health center have vehicles? Yes---- No------- If yes how many---------

2.6 What are the types of vehicles? 1. Four wheel ------- 2. Motor bike ------ 3. Cycles --------

2.7 Is there any vehicle specifically assigned to MCH services? Yes ----- No-----

2.8 If yes, indicate 1. How many in number ----- 2. Types--------

2.9 Distance traveled in 2005 in kilometer: ---------- 2.10 Cost of fuel: ----------

2.11 Type of building material---------- Total number of rooms in the facility: --------

2.12 Total size of the rooms in meter square: ----------

2.13 Total water consumption in 2005 in meter cube---------- total payment ----------

2.14 Total electricity consumption in 2005 in kilowatt ---------- Total payments ----------

Key informant Interview at ANC department

1. How many full time staffs were assigned to ANC department in 2012? ----------
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department daily on average? ----------
5. How many pregnant women visited the department in 2012/2005? ----------
6. How many of them tested for HIV/AIDS? ----------
7. Does the department have its own vehicle allocation program? Yes--- No-----
8. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess the cost of laboratory tests done for ANC

S.No	Type of test	Quantity/Number	Unit cost	Total cost
1	Stool microscopy test			
2	Urine test			
3	Blood count			
4	Blood test,			
5	Malaria test			
6	Pregnancy test			
7	VDRL test			
8	HIV test			
9	Other test/specify			
	Total			
Comment on lab test				

Table 2: Check list to assess the cost of human resource in ANC department

S.No	Type of staff	Number	Total cost	Unit cost (salary)
1	Nurse			
2	Mid wife			
3	Health assistant			
4	Health Extension Worker			
5	Others			
6	Total			
Comment				

Table 3: check list to assess the costs of medical items in ANC department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable, eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Provider	Unit cost (Market price)	Total cost
1	Weighing scale-adult						
2	Blood pressure machine						
3	Refrigerator						
I	Kerosene						
II	Electric						
4	Exam couch						
5	Light-gyn exams						
6	IUCD kit						
7	Fetal Stethoscope						
8	Stethoscope(s)						
9	Thermometer(s)						
10	Other equipments						
	Total						
	Comment						

Table 4: Check list to assess the cost of trainings in ANC department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
Total						

Table 5: Check list to assess the cost of duty work in ANC department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 6: Check list to assess the cost of fuel in ANC department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
3						
4						
Total						

Table 7: Check list to assess costs of stationary items in ANC department

S.No	Items	Quantity	Life span	Year of service	Unit cost	provider	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
5	Table						
6	Others						
Total							
	Comment						

Provider: 1. Public 2. NGO.

Table 8: Check list to assess costs of stationary items in ANC department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 9: Check list to assess of cost of utilities and medical supplies in ANC department

S.No	Utility Type of utility	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies Type of medical supply			
1	Linens			
2	Towel			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9	Other			
10				
11				
Total				

Table 10: Check list to assess costs of equipment maintenance ANC department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 11: Check list to assess of cost of rooms in ANC department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard	Unit cost (Market price)	Total cost
1	ANC room area						
2	ANC Waiting area						
	Total						
	Average						

Building standard: 1. Concrete 2. Brick 3. Other

Questionnaire to assess the costs of MCH services in PHCC in Butajira district in 2012.

Key informant Interview at Postnatal (PNC) department

1. How many full time staffs were assigned to PNC department in 2012? ----------
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department daily on average? ----------
5. How many pregnant women visited the department in 2012/2005? ----------
6. How many of them get TT vaccine? ----------? Total cost--------Average cost---------
7. Does the department have its own vehicle allocation program? Yes--- No-----
8. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess the cost of human resource in PNC department

S.No	PNC department human power	Quantity	Unit cost	Total cost
S.No	Type of staff	Quantity	Unit cost (salary)	Total cost
1	Nurse			
2	Mid wife			
2	Health assistant			
4	Health Extension Worker			
5	Others			
6	Sub total			
7	Average salary			
Comment				

Table 2: check list to assess the costs of medical items in PNC department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable, eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

Provider: 1. Public 2. NGO

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Provider	Unit cost	Total cost
1	Weighing scale-adult						
2	Blood pressure machine						
3	Refrigerator						
I	Kerosene						
II	Electric						
4	Exam couch						
5	Light-gyn exams						
6	IUCD kit						
7	Stethoscope(s)						
8	Thermometer(s)						
9	Other equipments						
	Total						
	Comment						

Table 3: Check list to assess the cost of trainings in PNC department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Total					

Table 4: Check list to assess the cost of duty work in PNC department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 5: Check list to assess the cost of fuel in PNC department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
3						
4						
Total						

Table 6: Check list to assess costs of stationary items in PNC department

S.No	Items	Quantity	Life span	Year of service	provider	Unit cost	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
5	Table						
6	Others						
Totall							
	Comment						

: 1. Public 2. NGO

Table 7: Check list to assess costs of stationary items in PNC department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 8: Check list to assess of cost of utilities and medical supplies in PNC department

S.No	**Utility** **Type of utility**	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies **Type of medical supply**			
1	Linens			
2	wool			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9	Other			
10				
11				
Total				

Table 9: Check list to assess costs of equipment maintenance in PNC department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 10: Check list to assess of cost of rooms in PNC department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard	Unit cost (Market price)	Total cost
1	Room area						
2	Waiting area						
	Total						
	Average						

Questionnaire to assess the costs of MCH services in PHC in Butajira district in 2012.

Key informant Interview at delivery department

1. How many full time staffs were assigned to delivery department in 2012/2005? ----------
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department daily on average? ----------
5. How many women visited the department for delivery in 2012/2005? ----------
6. What is cost of the delivery activities? Total--------Average---------
7. Does the department have its own vehicle allocation program? Yes--- No-----
8. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess the cost of human resource in delivery department

S.No	Type of staff	Quantity	Unit cost (salary)	Total cost
1	Nurse			
2	Mid wife			
2	Health assistant			
4	Health Extension Worker			
5	Others			
6	Sub total			
7	Average salary			
Comment				

Table 2: Check list to assess the costs of medical items in delivery department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable, eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

Provider: 1. Public 2. NGO

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Provider	Unit cost price)	Total cost
1	Weighing scale-adult						
2	Weighing scale-child						
3	Blood pressure machine						
4	Refrigerator						
I	Kerosene						
II	Electric						
5	Exam couch						
6	Light-gyn exams						
7	IUCD kit						
8	Stethoscope(s)						
9	Thermometer(s)						
10	Delivery kit						
11	Suction						
12	Autoclave						
13	Other equipments						
	Total						
	Comment						

Table 3: Check list to assess the cost of trainings in delivery department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Total					
Comment					

Table 4: Check list to assess the cost of duty work in delivery department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 5: Check list to assess the cost of fuel in delivery department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
3						
Total						

Table 6: Check list to assess costs of stationary items in delivery department

S.No	Items	Quantity	Life span	Year of service	Provider	Unit cost	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
5	Table						
6	Others						
Total							
	Comment						

Provider: 1. Public 2. NGO

Table 7: Check list to assess costs of stationary items in delivery department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 8: Check list to assess of cost of utilities and medical supplies in delivery department

S.No	**Utility** **Type of utility**	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies **Type of medical supply**			
1	Linens			
2	Towel			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9	Other			
10	Eye ointment			
11	Cord tie			
12	Oxytocine			
	Total			

Table 9: Check list to assess costs of equipment maintenance in delivery department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 10: Check list to assess of cost of rooms in delivery department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard (1^{st} $_{2}^{nd}$ $_{3}^{rd}$)	Unit cost (Market price)	Total cost
1	Room area						
2	Waiting area						
	Total						

Questionnaire to assess the costs of MCH services in PHCC in Butajira district in 2012.

Key informant Interview at FP department

1. How many full time staffs were assigned to FP department in 2012? ----------
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department daily on average? ----------
5. How many FP clients visited the department in 2012/2005? ----------
6. How many of them get FP methods? ----------? Total cost--------Average cost---------
7. Does the department have its own vehicle allocation program? Yes--- No-----
8. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess costs of Family planning methods in FP department

S.No	Methods administrated within the facility	Quantity/ Number	Unit cost	Total cost	Remark	
1	Pills					
2	Injection					
3	Condom					
4	IUD					
5	Implant					
6	Permanent methods					
	Total					
Comment						

Table 2: Check list to assess the cost of human resource in FP department

S.No	Type of staff	Quantity	Unit cost (salary)	Total cost
1	Nurse			
2	Mid wife			
2	Health assistant			
4	Health Extension Worker			
5	Others			
6	Sub total			
7	Average salary			
Comment				

Table 3: check list to assess the costs of medical items in FP department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable, eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Provider	Unit cost (Market price)	Total cost
1	Weighing scale-adult						
3	BP machine						
4	Refrigerator						
I	Kerosene						
II	Electric						
5	Exam couch						
6	Light-gyn exams						
7	IUCD kit						
8	Stethoscope(s)						
9	Thermometer(s)						
10	Other equipments						
	Total						
	Comment						

Provider: 1. Public 2. NGO

Table 4: Check list to assess the cost of trainings in FP department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Total					

Table 5: Check list to assess the cost of duty work in FP department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 6: Check list to assess the cost of fuel in FP department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
Total						

Table 7: Check list to assess costs of stationary items in FP department

S.No	Items	Quantity	Life span	Year of service	Provider	Unit cost	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
6	Table						
7	Others						
Total							
	Comment						

Provider: 1. Public 2. NGO

Table 8: Check list to assess costs of stationary items in FP department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 9: Check list to assess of cost of utilities and medical supplies in FP department

S.No	**Utility** **Type of utility**	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies **Type of medical supply**			
1	Linens			
2	wool			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9	Other			
10				
11				
Total				

Table 10: Check list to assess costs of equipment maintenance at FP department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 11: Check list to assess of cost of rooms for FP department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard (1^{st} 2^{nd} 3^{rd})	Unit cost (Market price)	Total cost
1	Room area						
2	Waiting area						
	Total						

Questionnaire to assess the costs of MCH services in PHCC in Butajira district in 2012.

Key informant Interview at under-five department

1. How many full time staffs were assigned to under-five department in 2012/2005? ----------
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department daily on average? ----------
5. How many under five children visited the department in 2012/2005? ----------
6. How many of them get treated? ---------- Total cost--------Average cost---------
7. How many of them were referred? ---------- Total cost--------Average cost---------
8. Does the department have its own vehicle allocation program? Yes------ No-------
9. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess the cost of illness at under 5 department

S.No	Type of illnesses	Quantity/ number of case	Total cost	Unit cost	
1	Malaria				
2	Pneumonia				
3	Diarrhea				
4	Malnutrition				
5	Other cases/specify				
Comment on child illness cost					

Table 2: Check list to assess the cost of human resource in under-five department

S.No	Type of staff	Quantity	Unit cost (salary)	Total cost
1	Nurse			
2	Mid wife			
3	Health assistant			
4	Health Extension Worker			
5	Others			
6	Total			
7	Average salary			
Comment				

Table 3: check list to assess the costs of medical items in under- 5 department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Provider	Unit cost (Market price)	Total cost
1	Weighing child scale-hanging						
2	Weighing child scale-ground						
3	Blood pressure machine						
4	Refrigerator						
5	Kerosene						
6	Electric						
7	Microscope.						
8	Exam couch						
9	Light-gyn exams						
10	IUC kit						
11	Stethoscope(s)						
12	Thermometer(s)						
13	Other equipments						
	Total						
	Comment						

Provider: 1. Public 2. NGO

Table 4: Check list to assess the cost of training in under 5 department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Total					

Table 5: Check list to assess the cost of non medical supplies in under five department

S.No	Items	Quantity	Life span	Year of service	Provider	Unit cost	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
5	Table						
6	Others						
Total							
	Comment						

Provider: 1. Public 2. NGO

Table 6: Check list to assess the cost of fuel in under 5 department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
3						
4						
Total						

Type of fuel: 1. Kerosene 2. Benzene

Table 7: Check list to assess the cost of duty under 5 department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 8: Check list to assess costs of stationary items in under 5 department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 8: Check list to assess of cost of utilities and medical supplies in under-five department

S.No	**Utility** **Type of utility**	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies **Type of medical supply**			
1	Linens			
2	wool			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9	Other			
10				
11				
Total				

Table 9: Check list to assess costs of equipment maintenance under 5 department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 10: Check list to assess of cost of rooms in under five department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard (1^{st} 2^{nd} 3^{rd})	Unit cost (Market price)	Total cost
1	Room area						
2	Waiting area						
3	Total						
	Average						

Table 11: Check list to assess the cost of laboratory tests done for under five children

S.No	Type of test	Quantity/Number	Unit cost	Total cost	Remark
1	Stool microscopy test				
2	Urine test				
3	Blood count				
4	Blood test,				
5	Malaria test				
6	Pregnancy test				
7	VDRL test				
8	HIV test				
9	Other test/specify				
	Total				
Comment on lab test					

Questionnaire to assess the costs of MCH services in PHCC in Butajira district in 2012.

Key informant Interview at Immunization department

1. How many full time staffs were assigned to immunization department in 2012/2005? -----
2. What is the salary of the department staff? Total ---------- average ----------
3. What is the average consultation time in minute for each client in the department? ------
4. How much hour do you work in the department on average? Daily-------- Weekly-------
5. How many under five children visited the department in 2012/2005? ----------
6. How many of them get vaccinated? ----------What is? Total cost--------Average cost--------
7. How many of them were referred? ---------- Total cost--------Average cost---------
8. Does the department have its own vehicle allocation program? Yes------ No-------
9. If yes, how often? Daily -------Weekly------ Bi weekly----------Other----------

Table 1: Check list to assess the cost vaccination in immunization department

S.No	Vaccination activities	Quantity in vial	Unit cost	Total cost	remark
1	Polio				
2	BCG				
3	Measles				
4	Penta				
5	PCV				
6	Vitamin A				
	Total				
Comment on cost of immunization					

Table 2: Check list to assess the cost of human resource in immunization department

S.No	Type of staff	Quantity	Unit cost (salary)	Total cost	Remark
1	Nurse				
2	Mid wife				
2	Health assistant				
4	Health Extension Worker				
5	Others				
6	Sub total				
7	Average salary				
Comment					

Table 2: Check list to assess the costs of medical items in immunization department

Note: if item is available, tick or write adjusted number available. If the item is only temporarily unavailable eg. Broken down, then mark as available. If the item has been unavailable for past 6 month or more, mark as unavailable.

S.No	Medical Equipments Type of equipment	Quantity	Life span	Year of service	Unit cost (Market price)	Total cost
1	Weighing child scale-hanging					
2	Weighing child scale-ground					
3	Freezer					
4	Refrigerator					
I	Kerosene					
II	Electric					
III	Solar					
5	Cold box					
6	Vaccine carrier					
7	Ice pack					
8	Sterilizer					
12	Autoclave					
11	Thermometer(s)					
12	Other equipments					
	Total					
Comment						

Table 3: Check list to assess the cost of trainings in immunization department

S.No	Type of training	Number of days	Number of participants	Unit cost	Total cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
Total					

Table 4: Check list to assess the cost of duty work in immunization department

S.No	Type of over time	Number of days	Number of participants	Rate of payment	Unit cost	Total cost
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						

Table 5: Check list to assess the cost of fuel in immunization department

S.No	Type of vehicle	Distances traveled in km	Type of fuel used	Amount of fuel in liters	Unit cost	Total cost
1						
2						
Total						

Table 6: Check list to assess costs of stationary items in immunization department

S.No	Items	Quantity	Life span	Year of service	Provider	Unit cost	Total cost
1	Computer						
2	Printer						
3	Photocopy						
4	Chair						
5	File cabinet						
5	Table						
6	Others						
Total							
	Comment						

Provider: 1. Public 2. NGO

Table 7: Check list to assess costs of stationary items in immunization department

S.No	**Stationary items**	Quantity	Unit cost	Total cost	Remark
1	Pen				
2	Pencil				
3	Notepad				
4	Printing				
5	Flip charts				
6	Register				
7	Marker				
8	Others				
	Total				
Comment					

Table 8: Check list to assess of cost of utilities and medical supplies in immunization department

S.No	Utility Type of utility	Quantity	Unit cost (Market price)	Total cost
1	Water consumption			
2	Electricity			
3	Cleaning			
4	Other cost			
	Medical supplies Type of medical supply			
1	Linens			
2	wool			
3	Cotton			
4	Gauze			
5	Antiseptics			
6	Slides			
7	Latex gloves			
8	Syringes			
9				
10				
11				
Total				

Table 9: Check list to assess costs of equipment maintenance immunization department

S.No	Type of equipment maintained	Frequency of maintenance	Unit cost	Total cost
1				
2				
3				
4				
5				
6				
7				
8				
10				
11				
12				
Total				
Comment				

Table 10: Check list to assess of cost of rooms in immunization department

S.No	Buildings	Size in m2	Life span	Year of service	Building standard (1^{st} $_{2}^{nd}$ $_{3}^{rd}$)	Unit cost (Market price)	Total cost
1	Room area						
2	Waiting area						
3	Total						
	Average						

Annex IV: Table of Annualization Facotrs

Discount rate

Useful life years	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
		11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926		
	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783		
	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577		
	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312		
	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993		
	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623		
	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206		
	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747		
	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247		
	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710		
	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139		
	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536		
	7.161	6.814	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904		
	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244		
	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559		
	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851		
	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122		
	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372		
	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604		
	8.950	8.365	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818		
	9.129	8.514	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870
21	21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017		
	9.292	8.649	8.075	7.562	7.102	6.687	6.312	5.973	5.665	5.384	5.127	4.891
22	22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201		
	9.442	8.772	8.176	7.645	7.170	6.743	6.359	6.011	5.696	5.410	5.149	4.909
23	23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371		
	9.580	8.883	8.266	7.718	7.230	6.792	6.399	6.044	5.723	5.432	5.167	4.925

24 24 21.243 18.914 16.936 15.247 13.799 12.550 11.469 10.529
9.707 8.985 8.348 7.784 7.283 6.835 6.434 6.073 5.746 5.451 5.182 4.937
25 25 22.023 19.523 17.413 15.622 14.094 12.783 11.654 10.675
9.823 9.077 8.422 7.843 7.330 6.873 6.464 6.097 5.766 5.467 5.195 4.948
26 26 22.795 20.121 17.877 15.983 14.375 13.003 11.826 10.810
9.929 9.161 8.488 7.896 7.372 6.906 6.491 6.118 5.783 5.480 5.206 4.956
27
27 23.560 20.707 18.327 16.330 14.643 13.211 11.987 10.935 10.027 9.237 8.548
7.943 7.409 6.935 6.514 6.136 5.798 5.492 5.215 4.964
28
28 24.316 21.281 18.764 16.663 14.898 13.406 12.137 11.051 10.116 9.307 8.602
7.984 7.441 6.961 6.534 6.152 5.810 5.502 5.223 4.970
29
29 25.066 21.844 19.188 16.984 15.141 13.591 12.278 11.158 10.198 9.370 8.650
8.022 7.470 6.983 6.551 6.166 5.820 5.510 5.229 4.975
30
30 25.808 22.396 19.600 17.292 15.372 13.765 12.409 11.258 10.274 9.427 8.694
8.055 7.496 7.003 6.566 6.177 5.829 5.517 5.235 4.979