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# **A Report on Costing Essential Package of Health Services Primary Health Care Facilities in Sindh**

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## **Sindh**

Costing Report

January, 2014



## **Acknowledgement**

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## LIST OF ACRONYMS USED

<b>BHU</b>	Basic Health Unit
<b>CD</b>	Communicable Diseases
<b>CMW</b>	Community Midwife
<b>DHIS</b>	District Health Information System
<b>DISP</b>	Dispensary
<b>DOH</b>	Department of Health
<b>EPHS</b>	Essential Package of Health Service
<b>GoS</b>	Government of Sindh
<b>HSDS</b>	Health Services Delivery System
<b>HSS</b>	Health Sector Strategy
<b>LHW</b>	Lady Health Worker
<b>MCH</b>	Mother and Child Health
<b>MH</b>	Maternity Home
<b>MNCH</b>	Maternal and Neonatal Child Health
<b>NCD</b>	Non-Communicable Diseases
<b>PHC</b>	Primary Health Care
<b>RHC</b>	Rural Health Centre
<b>RHC-C</b>	Rural Health Centre with C-Section Services

## **SECTION 1: CONTEXT**

### **1.1 INTRODUCTION**

The Government of Sindh (GoS) is committed to provide health care coverage to every member of the society in general and poor masses in particular for improving the overall health status of its population. In this regard the Department of Health (DoH) Sindh is actively working towards health sector reforms and setting the future directions over the next eight years through the recent Sindh Health Sector Strategy (HSS) 2012-2020. The DoH Sindh, in post devolution scenario, is keen to address major issues related to health services under the umbrella of health sector strategy with the agenda to improve the health status of the people in the province. In this context, development of EHSP for PHC is significantly important as starting point for the result oriented implementation plans on Health Services Delivery System (HSDS) and budgetary processes based on the basic theme/concept of Medium Term Budget Framework (MTBF).

The Health Sector Strategy document 2012-2020 for the province of Sindh under the section “Strengthen district health systems” the strategic action is about formulation of a package at the first level health care facility with required resources for needs of rural disadvantaged districts inclusive of the key priority needs. This includes: MNCH, family planning, nutrition, screening of key communicable diseases (CD) and resource identification in terms of minimum staffing levels, diagnostic requirements, drug formulary, and equipment requirements and costing. The HSS also points towards formulation of health package for need of low income urban population, which requires key priority needs such as: a) MNCH, nutrition and family planning, b) screening and treatment of non-communicable diseases (NCD) such as hypertension, diabetes, breast and cervical cancers, etc. and c) screening of communicable diseases (CD) such as tuberculosis, malaria, hepatitis, STIs, HIV and prevention such as immunization.

It is therefore imperative to develop Essential Health Service Delivery Package at PHC level, including infrastructure, human resources, other supplies and financing (costing) required for implementing the package. The costed EHSP will guide the DoH for not only making appropriate resource allocation but track the utilization efficiency and standardizing the health services. In addition, the package will serve as planning and management tool for DoH, assessing the progress for improvement and in situation such as out sourcing of services.



## 1.2 APPROACH TO THE ASSIGNMENT

### **Literature Review**

Extensive literature review was carried in order to learn the current best practices in costing service package. Proposed package was studied in depth in order to list the services being provided at different levels of health care and resource required in turn. Literature review was also conducted to extract the standard treatment guidelines currently being implemented in country for the services proposed in the EHSP by PHS.

### **Meetings**

Discussions were carried out with team leader on the proposed EHSP and other stakeholders in the DOH in order to have insight into resources required to implement the proposed package and to obtain service data to estimate the case load at RHC and BHU.

### **Analysis**

Cost analysis is based on the best available data for both costs and services. Best market estimates were taken for establishing costs of different equipment and supplies required. For establishing assumptions mini-Delphi method was used where required.

## 1.3 CUSTOMISED COSTING MODEL

In order to meet requirements of this assignment separate costing sheet was designed for each level of health care under consideration. The model was tested comprehensively for formulas and accuracy of results reported. The model is capable of producing following:

- Unit cost estimates for major services offered at different levels of primary health care.
- Estimate costs for an average facility (RHC and BHU).
- Make scenario based projections for cost estimates.
- Aid decision making for pricing health services.
- Provide other useful information for health planners, decision and policy makers.

## 1.4 NOTE TO THE READER

- As with any costing study this study also uses assumptions in many instances, the cost estimates presented in this report are valid as long as the assumptions are valid.
- Estimates for overall costing at RHC and BHU level are dependent on the accuracy of DHIS data provided.
- All the facility based estimation is based on an average facility, while determining costs for specific facilities, actual service data should be used.

- Where required data was annualized using **[(reported data/no. of months reported) x 12 months]**.
- It is worth mentioning that this is a costing study and NOT a cost effectiveness analysis. Some interventions might be less costly but not cost effective and vice versa.

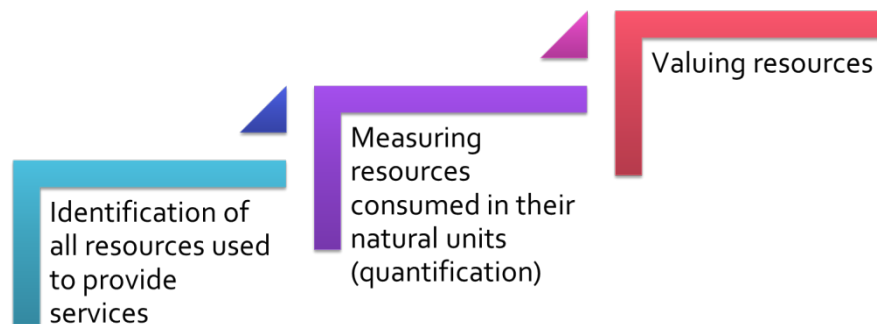
## SECTION 2: DETAILED COSTING METHODOLOGY

Both necessity and interest in the estimation of the costs of EPHS are increasing worldwide. It is important for the policy makers, planners, implementers and the academics to be aware of the different purposes for which cost estimates are required. The different purposes of costing include (1) projecting the financial and fiscal implications of the health sector plan in order to assess the sustainability of the programs, (2) investigating the technical efficiency of delivery of services through assessment of the impact of organizational and management changes, (3) identifying the allocative efficiency of the program by incorporating unit and marginal cost analyses into an assessment of the program's impact on health status (i.e.; the ratio of costs to health benefits, or DALYs gained).

### 2.1 CONCEPTUAL FRAMEWORK FOR COSTING

The overall approach used is a 3 step process. This includes (a) identification of all resources used to provide health services at defined health facilities, (b) measuring resources consumed in their natural units (quantification) and (c) valuing resources<sup>1</sup>.

Figure 1: Conceptual Framework for Costing EPHS in Sindh



Source: Author

A distinction is usually made between two types of costing approaches: bottom up and top down. As the name implies bottom up costs are derived by calculating the individual unit costs of an activity at the facility level and then aggregated through consensus or survey. Top down costs are obtained by taking aggregated expenditures of budgets and then apportioning them by level and activities by using allocation factors. A bottom up costing method will often quite accurately describe per patient use of medicines, supplies and lab investigations. For overhead costs, however, such as maintenance and utilities, methods of estimating costs through apportionment will be required below the health facility level to the user. Measuring such items accurately maybe expensive and yield insufficient additional

<sup>1</sup>Mahmood Afeef (2012). "Methodology for costing family planning services and Value for Money (VfM) analysis".IPPF, 2012.

information to be cost effective. In light of this, this costing exercise uses a combination of bottom up accounting and top down allocations.

The proposed methodology focuses on evaluating the economic cost of health interventions, which measures the resource flow or the total value of resources used to deliver health services<sup>2</sup>.

## **2.2 COST CLASSIFICATIONS**

Costs that are incurred in producing a service can be classified in several different ways. Costs can be classified as direct and indirect costs, fixed and variable, capital and recurrent and common costs. These costs are briefly explained below.

### **2.2.1 Direct Cost and Indirect Costs**

Direct costs are referred to as those costs which can be clearly and directly linked to the provision of services. For example the cost of medicines used in providing health services or the salary paid to doctors in a clinic. Costs which cannot be directly related to a service are known as indirect costs, these costs are incurred to support the main service provision activities. These can include costs of monitoring activities, utilities or salaries of accounts and administration staff.

### **2.2.2 Fixed Costs and Variable Costs**

Costs that do not change in total with the change in level of activity<sup>3</sup> are classified as fixed costs. Fixed costs remain constant up to a certain level of activity. Variable costs are those which are directly proportional to change in level of activity e.g. costs of vaccines will increase/decrease with the increase/decrease in number of children immunized.

### **2.2.3 Capital Costs and Recurrent Costs**

Capital costs are defined as the annual cost of resources that have a life expectancy of more than one year, e.g. buildings, vehicles and equipment. Whereas, recurrent costs are defined as costs associated with inputs that are consumed in one year or less.

### **2.2.4 Joint Costs (common costs) and Non Joint Costs**

While costs are allocated amongst different services produced, it is important to distinguish between joint costs or non-joint costs. Joint costs are those which are incurred for a specific set of services being delivered and not for one specific service or a particular client, e.g. cost of a nurse/midwife who is providing a number of services e.g. antenatal care, normal deliveries, treating child diseases etc. In case the management decides to discontinue

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<sup>2</sup> This costing methodology is limited to evaluating the cost of providing services to the population and excludes the cost to the household for seeking health care.

<sup>3</sup> Level of activity here refers to number of patients.

antenatal services, cost of nurse will still be incurred. On the other hand, non-joint costs are those which are incurred for performing a particular service, e.g. cost of vaccines, syringes used to vaccinate a child.

## **2.3 METHODOLOGY: UNIT COST OF SERVICES**

This section of the document describes the methodology used for determining the unit cost of services. In order to estimate the cost of needed or projected numbers of services, the model uses proportion of current population using health services together with catchment population figures to estimate the number of each type of service needed. Diagnosis and treatment standards are based on current standard medical protocols being implemented in the province and WHO guidelines. Final estimates are derived by combining services required and cost of delivering the services. Figures for fixed operating costs have been derived by using certain assumptions which are laid down in this document. A reality check was also made to ensure the reasonableness of the estimates produced. Estimates produced by this model were compared against current allocations.

### **2.3.1 Identify which services are to be included in the unit costing exercise.**

After in-depth discussions with the DOH, a list of services was identified to be costed at each level of health care provision under the purview of EPHS<sup>4</sup>. This list was drawn from the technical package of essential health services.

### **2.3.2 Determine the major cost driver in primary level health care provision.**

In order to allocate indirect costs (salaries of indirect workers<sup>5</sup> and operational expenditure), it is important to determine the major cost driver. After discussions and consulting international literature, it was decided that the time consumed by direct health workers<sup>6</sup> for delivering services will best represent the major cost driver.

### **2.3.3 Identifying cost components to be included under each unit cost.**

Each unit cost was divided into five sub-components comprising of:

- a. Salaries of direct workers: Required human resource was taken as laid down under the EPHS. Each category of health worker was assigned a Basic Pay Scale (BPS) in accordance with the DOH rules. Per minute salary was calculated for each health

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<sup>4</sup>Rural Health Centre, Rural Health Centre C, Basic Health Unit, Basic Health Unit 24 hours, Lady Health Worker and Community Midwife.

<sup>5</sup> Indirect workers here refer to staff not directly involved in the provision of health services, e.g. peon, guard, computer operator.

<sup>6</sup> Direct workers here refer to health staff involved directly in provision of health care services, e.g. medical officer/ women medical officer or medics, nurse, midwife, laboratory technician.

worker directly involved in the provision of health care. To determine the cost of salaries for each intervention/service, per minute salary of each health worker was multiplied by the minutes<sup>7</sup> consumed in that service.

- b. Medicines, Supplies and Lab investigations:** Each service to be costed was studied in detail and a list of required medicines, dosage, supplies and lab investigation was prepared. This list was in accordance with the national applicable treatment protocols. DOH Sindh procurement prices were used to determine the cost of medicines and supplies. Where prices were not available from the government procurement cell median price form *International Drug Price Indicator Guide*<sup>8</sup> was used. Lab investigation costs were determined after detailed discussion with laboratory technician working in the public health sector. Prices for medicines, supplies and vaccines were further adjusted for inflation, transportation costs and wastage.
- c. Salaries of indirect workers:** These categories of workers were also taken as laid down in the EPHS. As these are not involved directly in provision of health services, the question addressed was how to allocate cost of these workers to the final service being costed. As discussed earlier, it was decided to use time consumed by the direct health workers to allocate the cost of indirect workers to each service. A charge out rate (indirect workers salary as a proportion of direct workers salary) for allocating indirect workers cost to each costed service was calculated.

**Table 1: Allocation of Indirect Salaries to Service**

Details	RHC with C-Section	RHC	MH	BHU	DISP	MCH
Charge out Rate	26%	26%	55%	61%	67%	28%

**Source:** Calculations by author

**Note:** CMW and LHW don't have any indirect workers involved

- d. Operational costs:** Delivering services in a static health facility or at the community level requires operational costs as well in addition to salary of workers, medicines, supplies and lab investigation. For each level of health care services offered under the EHSP, operational costs were calculated separately. Table below presents the line items included in the operational cost at each level.

<sup>7</sup>This was taken from the estimates available by WHO and UNFPA for Pakistan.

<sup>8</sup> Management Sciences for Health in Collaboration with WHO, 2011.

Table 2: Line Items Included in Operation Cost Estimation

Line Items	RHC-C	RHC	BHU	MH	DISP	MCH	LHW	CMW
Electricity	✓	✓	✓	✓	✓	✓	✗	✗
Communications	✓	✓	✓	✓	✓	✓	✗	✗
Stationery and printing	✓	✓	✓	✓	✓	✓	✓	✓
Other stores	✓	✓	✓	✓	✓	✓	✓	✓
R&M: Building	✓	✓	✓	✓	✓	✓	✗	✗
R&M: Ambulance	✓	✓	✗	✓	✗	✗	✗	✗
R&M: Equipment	✓	✓	✓	✓	✓	✓	✓	✓
Depreciation of equipment	✓	✓	✓	✓	✓	✓	✓	✓
Depreciation of ambulance	✓	✓	✗	✓	✗	✗	✗	✗

Operational cost is also classified 'indirect cost' as it is difficult and not cost effective to track back the consumption to each service, a similar approach (like for indirect salaries) was adopted to allocate the costs to each service unit. A charge out rate (operational cost as a proportion of direct workers salary) for allocating operational cost to each costed service was calculated.

Table 3: Allocation of Operational Cost to Services

Details	RHC-C	RHC	BHU	MH	DISP	MCH	LHW	CMW
Charge out Rate	21%	17%	25%	19%	14%	13%	15%	87%

Source: Calculations by author

- e. **Management overheads:** Technical support and supportive supervision in a district is often provided by the district health authorities and central administration. In order to make sure that the unit costs fully reflect the costs of administration, monitoring and other technical support provided, an analysis of administration cost was prepared using the budget and expenditure report<sup>9</sup>, which reported 10% administration cost as proportion of total expenditure. In this costing report 10% has been used as district administration cost for RHC with C-Section, RHC, BHU, Maternity Home, Dispensary and Maternal and Child Health Centre. For LHW and CMW the management overhead rate used in this report is 15%.

<sup>9</sup>Health Budget and Expenditure analysis (2008-09 to 2012-13), District Governments in Sindh, 2012-13, Technical Resource Facility.

### 2.3.4 Sum of all the costs.

Last step was to sum all the costs obtained under section 2.3.3 (a-e) in order to obtain the unit cost for each service. Table below presents a summary of all the components for calculating unit cost with example of ANC provided at RHC level.

**Table 4: Unit Cost for ANC at RHC (package of 4 visits)**

Components	Detail	Cost (PKR)
<b>Salaries: direct</b>	Per minute salary of health worker x time spent by each category of health worker	377
<b>Drugs, Lab, Supplies</b>	Standard treatment protocol x unit price of (drugs + supplies + lab investigations)	582
<b>Salaries: Indirect</b>	Direct Salaries x charge-out rate	96
<b>Operational Cost</b>	Direct Salaries x charge-out rate	81
<b>Administration cost</b>	Sum of (salaries direct + drugs + lab + supplies + operational cost) x % administration cost	114
<b>Total Unit Cost</b>		<b>1,250</b>

## 2.4 METHODOLOGY: STANDARD COST OF DELIVERING HEALTH SERVICES (EHSP) AT RHC AND BHU

This section of the document describes the methodology used for determining the total costs of delivering health services as envisaged under EHSP at an average RHC and BHU.

### 2.4.1 Develop Salary Sheet

A list of all health staff for each level of health care with respective numbers (quantity), BPS and salary (including allowances) was prepared. This was used to calculate the annual salary requirement at each level.

### 2.4.2 Cost of Medicines, Vaccines, Supplies and Lab investigations.

Unit costs already developed under section 2.3.3.b were used. In order to calculate the total requirement for an average facility (BHU/RHC), unit cost of drugs, supplies, lab, vaccines were multiplied by number of people utilizing the service<sup>10</sup>.

### 2.4.3 Operational Cost.

Operation cost estimates developed in section 2.3.3.d of this document were used as such for each level of health care facility. (See *Table 2: Line Items Included in Operation Cost Estimation*)

Table below presents the total cost for an average RHC/BHU for illustrative purposes only.

<sup>10</sup> This information was taken from DHIS cell DOH, Sindh for last one year and adjusted for under reporting and non-compliance.



**Table 5: Cost Components of a Typical Health Facility**

Details	PKR
Salaries	X
Cost of Medicines, Supplies and Lab Investigation	X
Cost of Immunization	X
Operational Costs	X
<b>Total Costs of the Facility</b>	<b>X</b>

## 2.5 DATA SOURCES

In costing exercise such as this one huge amount of data is required. Not only amount of data but different types of data are required including epidemiology, service statistics, health system parameters, demography, coverage and economics (both micro and macro). Similar types of data sets were used in costing of services in Sindh. Table below gives a brief of key data sources that were used in the exercise.

**Table 6: Key Data Sources**

Data	Source
<b>Demography</b>	<ul style="list-style-type: none"> <li>– Projections based on Population Census of 1998.</li> <li>– Pakistan Demographic Health Survey, 2008.</li> <li>– Pakistan Living Measurement and Standards Survey 2013.</li> </ul>
<b>Standard treatment guidelines</b>	<ul style="list-style-type: none"> <li>– Standardised medical protocols, DOH, Government of Pakistan.</li> <li>– Guidelines for management of common illnesses, WHO 2011.</li> <li>– Use of essential medicines (adopted for Pakistan), WHO.</li> <li>– Integrated management of pregnancy and childbirth (adopted for Pakistan), WHO, 2009.</li> <li>– Use of multiple micro nutrient powders for home fortification of foods consumed by infants and children 6–23 months of age, WHO, 2011.</li> <li>– Daily iron and folic acid supplementation in pregnant women, WHO, 2012.</li> <li>– Vitamin A supplementation in infants and children 6–59 months of age, WHO, 2011.</li> <li>– Essential interventions, commodities and guidelines, for Reproductive, Maternal, Newborn and Child Health, A</li> </ul>

	Global Review, WHO, Agha Khan University, PMNCH, 2011.
<b>Cost of Medicines, Vaccines, Supplies</b>	<ul style="list-style-type: none"> <li>– Government of Sindh record of latest procurements and market check.</li> <li>– International Drug Price Indicator Guide, MSH in collaboration with WHO, 2011.</li> <li>– UNICEF Supply section, 2012</li> </ul>
<b>Cost of Equipment</b>	<ul style="list-style-type: none"> <li>– Local market survey.</li> <li>– Costing deployment of CMWs, MNCH Program, 2010</li> <li>– UNICEF Supply section, 2012</li> </ul>
<b>Cost of Lab investigations</b>	– Information gathered from public health sector Lab technicians.
<b>Service Statistics</b>	– District Health Information System, DOH, Sindh.

## SECTION 3: COSTING RESULTS

This section of the document presents the results for unit costing and overall financial requirement for an average BHU and RHC.

### 3.1 UNIT COST OF SERVICES

This section presents the unit cost of services as defined under the EPHS at RHC-C, RHC, BHU, Maternity Home, Dispensary, Maternity Home, LHW and CMW. These estimates have been prepared in accordance with the methodology as defined under section 2.3 of this document, using data sources detailed under Table 6 of this document. Table below presents the services for which unit cost exercise was carried. Service with (✘) symbol means that the particular service is not being provided (as per EPHS) at that level of health care.

Table 7: Services Included for Unit Costing

Services	CMW	LHW	MCH	DISP	MH	BHU	RHC	RHC-C
Antenatal Care (4 visits)	✓	✓	✓	✓	✓	✓	✓	✓
Delivery Care	✓	✘	✓	✘	✓	✓	✓	✓
Cesarean Section	✘	✘	✘	✘	✘	✘	✘	✓
Postpartum (including 2 PNC visits)	✓	✓	✓	✓	✓	✓	✓	✓
Postpartum Hemorrhage	✘	✘	✘	✘	✘	✘	✘	✓
Newborn Care	✘	✘	✘	✘	✓	✓	✓	✓
Child: Pneumonia	✘	✘	✓	✓	✓	✓	✓	✓
Child: Wheeze	✘	✘	✓	✓	✓	✓	✓	✓
Child: Ear infection	✘	✘	✓	✓	✓	✓	✓	✓
Child: Diarrhea (no dehydration)	✓	✓	✓	✓	✓	✓	✓	✓
Child: Diarrhea (some dehydration)	✘	✓	✓	✓	✓	✓	✓	✓
Child: Dysentery	✘	✘	✓	✓	✓	✓	✓	✓
Child: Fever	✓	✓	✓	✓	✓	✓	✓	✓
Fully Immunised Child	✘	✓	✓	✘	✓	✓	✓	✓
Family Planning: Condoms	✓	✓	✓	✓	✓	✓	✓	✓
Family Planning: Pills	✓	✓	✓	✓	✓	✓	✓	✓
Family Planning: Injection	✓	✓	✓	✓	✓	✓	✓	✓
Family Planning: IUD	✘	✘	✓	✓	✓	✓	✓	✓
Family Planning: Implants	✘	✘	✘	✘	✓	✘	✓	✓
Family Planning: Female Sterilisation	✘	✘	✘	✘	✘	✘	✘	✓
Endemic Communicable	✘	✓	✓	✓	✓	✓	✓	✓

Services	CMW	LHW	MCH	DISP	MH	BHU	RHC	RHC-C
Disease: Common cold and cough								
Endemic Communicable Disease: Acute Bronchitis	x	x	✓	✓	✓	✓	✓	✓
Endemic Communicable Disease: Pneumonia	x	x	x	x	✓	✓	✓	✓
Endemic Communicable Disease: GI Problems	x	x	✓	✓	✓	✓	✓	✓
Endemic Communicable Disease: TB Diagnosis	x	x	x	x	✓	✓	✓	✓
Endemic Communicable Disease: TB Treatment	x	x	x	x	✓	✓	✓	✓
Endemic Communicable Disease: Malaria	x	x	x	✓	✓	✓	✓	✓
Endemic Communicable Disease: Typhoid	x	x	x	x	✓	x	✓	✓
Endemic Communicable Disease: Sexually Transmitted Infections	x	x	✓	x	✓	✓	✓	✓
Endemic Communicable Disease: Trachoma	x	x	x	x	✓	x	✓	✓
Endemic Communicable Disease: Urinary Tract Infection	x	x	x	x	✓	✓	✓	✓
Nutrition: Vitamin A Supplementation (children)	x	x	x	x	✓	x	✓	✓

Table below presents the summary of unit costs of services as detailed in Table 7.

Table 8: Summary of Unit Costs

Services	CMW	LHW	MCH	DISP	MH	BHU	RHC	RHC-C
Antenatal Care (4 visits)	476	960	1,004	1,141	1,441	1,142	1,250	1,744
Delivery Care	280	-	977	-	1,286	706	1,272	2,873
Cesarean Section	-	-	-	-	-	-	-	17,463
Postpartum (including 2 PNC visits)	221	477	494	588	697	515	561	837
Postpartum Hemorrhage	-	-	-	-	-	-	-	14,191
Newborn Care	-	-	-	-	440	314	342	525
Child: Pneumonia	-	-	312	394	315	418	408	432
Child: Wheeze	-	-	138	181	143	196	186	200
Child: Ear infection	-	-	195	238	200	253	243	258
Child: Diarrhea (no dehydration)	34	138	107	128	195	124	133	225
Child: Diarrhea (some dehy)	-	179	147	168	235	164	173	266
Child: Dysentery	-	-	157	200	163	215	206	220
Child: Fever	34	104	143	186	184	249	227	242
Fully Immunised Child	-	4,176	3,859	-	3,910	3,931	3,863	3,940

Services	CMW	LHW	MCH	DISP	MH	BHU	RHC	RHC-C
Family Planning: Condoms	117	178	170	191	223	171	175	245
Family Planning: Pills	117	216	189	218	276	194	206	314
Family Planning: Injection	85	185	159	188	264	188	193	302
Family Planning: IUD	68	-	141	174	273	177	187	318
Family Planning: Implants	-	-	-	-	-	-	167	559
Family Planning: Female Sterilisation	-	-	-	-	-	-	-	2,120
Endemic Communicable Disease: Common cold and cough	-	129	99	129	105	141	131	141
Endemic Communicable Disease: Acute Bronchitis	-	-	99	129	105	141	131	141
Endemic Communicable Disease: Pneumonia	-	-	-	-	282	368	359	380
Endemic Communicable Disease: GI Problems	-	-	147	191	153	205	196	210
Endemic Communicable Disease: TB Diagnosis	-	-	-	-	225	256	277	254
Endemic Communicable Disease: TB Treatment	-	-	-	-	4,872	4,441	4,522	5,162
Endemic Communicable Disease: Malaria	-	-	-	445	452	519	487	511
Endemic Communicable Disease: Typhoid	-	-	-	-	-	-	531	559
Endemic Communicable Disease: Sexually Transmitted Infections	-	-	335	-	335	410	412	434
Endemic Communicable Disease: Trachoma	-	-	-	-	-	-	550	572
Endemic Communicable Disease: Urinary Tract Infection	-	-	-	-	213	261	238	252
Nutrition: Vitamin A Supplementation (children)	-	-	-	-	-	-	30	31

Figure below shows a comparison of cost of some selected services between different levels of health care.

Figure 2: Unit Cost of Selected Services

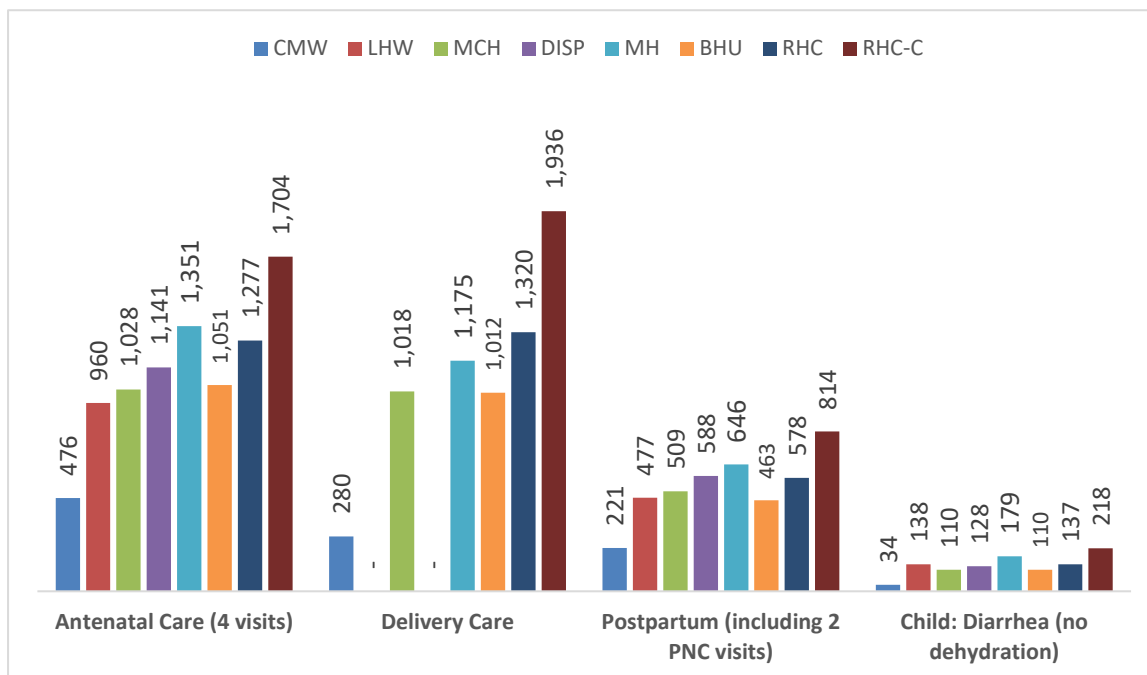


Figure above shows a relationship between cost of treatment/service and place of treatment. As the level of health care facility increases so does the cost. This is mainly due to two reasons, (a) some of the services are not provided at the lower levels (e.g. antenatal care provided by CMW/LHW doesn't account for cost of lab investigation) and (b) with the increase in level of health facility (where the service is provided) indirect costs in form of overheads also increase.

### 3.1.1 Unit Costs of Services by Level of Health Care.

Tables and data presented in this section show unit cost of services by level of health care and components. These components have already been detailed under section 2.3.3 of this document.

Table 9: Unit Cost of Services at RHC-C

Services	Total Cost per Case		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies & Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	16.9	1,744	640	582	164	171	187
Delivery Care	27.9	2,873	1,559	191	399	417	308
Cesarean Section	169.5	17,463	9,598	971	2,458	2,565	1,871
Postpartum (including 2 PNC visits)	8.1	837	370	183	95	99	90
Postpartum Hemorrhage	137.8	14,191	7,396	1,403	1,894	1,977	1,521
Newborn Care	5.1	525	239	105	61	64	56
Child: Pneumonia	4.2	432	219	52	56	59	46
Child: Wheeze	1.9	200	115	3	29	31	21
Child: Ear infection	2.5	258	115	55	29	31	28
Child: Diarrhea (no dehydration)	2.2	225	108	37	28	29	24
Child: Diarrhea (some dehydration)	2.6	266	108	73	28	29	28
Child: Dysentery	2.1	220	115	21	29	31	24
Child: Fever	2.4	242	137	8	35	37	26
Fully Immunised Child	38.3	3,940	114	3,344	29	30	422
Family Planning: Condoms	2.4	245	82	94	21	22	26
Family Planning: Pills	3.0	314	124	91	32	33	34
Family Planning: Injection	2.9	302	135	64	35	36	32
Family Planning: IUD	3.1	318	161	40	41	43	34

Services	Total Cost per Case		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies & Lab	Salaries: Indirect	Operational Cost	Management Overhead
Family Planning: Implants	5.4	559	290	57	74	78	60
Family Planning: Female Sterilisation	20.6	2,120	1,069	264	274	286	227
Endemic Communicable Disease: Common cold and cough	1.4	141	80	4	21	21	15
Endemic Communicable Disease: Acute Bronchitis	1.4	141	80	4	21	21	15
Endemic Communicable Disease: Pneumonia	3.7	380	184	58	47	49	41
Endemic Communicable Disease: GI Problems	2.0	210	115	12	29	31	22
Endemic Communicable Disease: TB Diagnosis	2.5	254	137	18	35	37	27
Endemic Communicable Disease: TB Treatment	50.1	5,162	846	3,321	217	226	553
Endemic Communicable Disease: Malaria	5.0	511	148	231	38	40	55
Endemic Communicable Disease: Typhoid	5.4	559	252	115	65	67	60
Endemic Communicable Disease: Sexually Transmitted Infections	4.2	434	184	106	47	49	46
Endemic Communicable Disease: Trachoma	5.6	572	150	283	38	40	61
Endemic Communicable Disease: Urinary Tract Infection	2.4	252	102	69	26	27	27
Nutrition: Vitamin A Supplementation (children)	0.3	31	9	14	2.24	2	3



Table 10: Unit Cost of Services at RHC

Services	Total Cost per Case		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies & Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	12.1	1,250	377	582	96	81	114
Delivery Care	12.4	1,272	657	191	168	141	116
Postpartum (including 2 PNC visits)	5.5	561	223	183	57	48	51
Newborn Care	3.3	342	140	105	36	30	31
Child: Pneumonia	4.0	408	217	52	56	47	37
Child: Wheeze	1.8	186	113	3	29	24	17
Child: Ear infection	2.4	243	113	55	29	24	22
Child: Diarrhea (no dehydration)	1.3	133	57	37	15	12	12
Child: Diarrhea (some dehydration)	1.7	173	57	73	15	12	16
Child: Dysentery	2.0	206	113	21	29	24	19
Child: Fever	2.2	227	135	8	35	29	21
Fully Immunised Child	37.5	3,863	114	3,344	29	24	351
Family Planning: Condoms	1.7	175	44	94	11	9	16
Family Planning: Pills	2.0	206	65	91	17	14	19
Family Planning: Injection	1.9	193	76	64	19	16	18
Family Planning: IUD	1.8	187	89	40	23	19	17
Family Planning: Implants	1.6	167	65	57	17	14	15
Endemic Communicable Disease: Common cold and cough	1.3	131	78	4	20	17	12

Services	Total Cost per Case		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies & Lab	Salaries: Indirect	Operational Cost	Management Overhead
Endemic Communicable Disease: Acute Bronchitis	1.3	131	78	4	20	17	12
Endemic Communicable Disease: Pneumonia	3.5	359	182	58	47	39	33
Endemic Communicable Disease: GI Problems	1.9	196	113	12	29	24	18
Endemic Communicable Disease: TB Diagnosis	2.7	277	159	18	41	34	25
Endemic Communicable Disease: TB Treatment	43.9	4,522	537	3,321	138	115	411
Endemic Communicable Disease: Malaria	4.7	487	144	231	37	31	44
Endemic Communicable Disease: Typhoid	5.2	531	250	115	64	54	48
Endemic Communicable Disease: Sexually Transmitted Infections	4.0	412	182	106	47	39	37
Endemic Communicable Disease: Trachoma	5.3	550	148	283	38	32	50
Endemic Communicable Disease: Urinary Tract Infection	2.3	238	100	69	26	21	22
Nutrition: Vitamin A Supplementation (children)	0.3	30	9	14	2.24	2	2.71

Table 11: Unit Cost of Services at BHU

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	11.1	1,142	248	539	150	101	104
Delivery Care	6.9	706	224	189	136	92	64
Postpartum (including 2 PNC visits)	5.0	515	142	183	86	58	47
Newborn Care	3.0	314	90	105	54	37	29
Child: Pneumonia	4.1	418	163	52	98	67	38
Child: Wheeze	1.9	196	87	3	53	36	18
Child: Ear infection	2.5	253	87	55	53	36	23
Child: Diarrhea (no dehydration)	1.2	124	38	37	23	15	11
Child: Diarrhea (some dehydration)	1.6	164	38	73	23	15	15
Child: Dysentery	2.1	215	87	21	53	36	20
Child: Fever	2.4	249	109	8	66	44	23
Fully Immunised Child	38.2	3,931	114	3,344	69	47	357
Family Planning: Condoms	1.7	171	31	94	18	12	16
Family Planning: Pills	1.9	194	42	91	25	17	18
Family Planning: Injection	1.8	188	53	64	32	22	17
Family Planning: IUD	1.7	177	60	40	36	25	16
Endemic Communicable Disease: Common cold and cough	1.4	141	62	4	37	25	13

Endemic Communicable Disease: Acute Bronchitis	1.4	141	62	4	37	25	13
Endemic Communicable Disease: Pneumonia	3.6	368	137	58	83	56	33
Endemic Communicable Disease: GI Problems	2.0	205	87	12	53	36	19
Endemic Communicable Disease: TB Diagnosis	2.5	256	109	14	66	44	23
Endemic Communicable Disease: TB Treatment	43.1	4,441	360	3,313	218	147	404
Endemic Communicable Disease: Malaria	5.0	519	120	231	72	49	47
Endemic Communicable Disease: Sexually Transmitted Infections	4.0	410	137	96	83	56	37
Endemic Communicable Disease: Urinary Tract Infection	2.5	261	83	69	51	34	24

Table 12: Unit Cost of Services at Maternity Home

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	14.0	1,441	433	511	237	129	131
Delivery Care	12.5	1,286	529	191	290	158	117
Postpartum (including 2 PNC visits)	6.8	697	244	183	134	73	63
Newborn Care	4.3	440	160	105	88	48	40
Child: Pneumonia	3.1	315	127	52	69	38	29
Child: Wheeze	1.4	143	69	3	38	21	13
Child: Ear infection	1.9	200	69	55	38	21	18
Child: Diarrhea (no dehydration)	1.9	195	76	37	42	23	18
Child: Diarrhea (some dehydration)	2.3	235	76	73	42	23	21
Child: Dysentery	1.6	163	69	21	38	21	15
Child: Fever	1.8	184	87	8	47	26	17
Fully Immunised Child	38.0	3,910	114	3,344	62	34	355
Family Planning: Condoms	2.2	223	58	94	32	17	20
Family Planning: Pills	2.7	276	86	91	47	26	25
Family Planning: Injection	2.6	264	95	64	52	29	24
Family Planning: IUD	2.6	273	113	40	62	34	25
Endemic Communicable Disease: Common cold and cough	1.0	105	49	4	27	15	10

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Endemic Communicable Disease: Acute Bronchitis	1.0	105	49	4	27	15	10
Endemic Communicable Disease: Pneumonia	2.7	282	107	58	59	32	26
Endemic Communicable Disease: GI Problems	1.5	153	69	12	38	21	14
Endemic Communicable Disease: TB Diagnosis	2.2	225	101	18	55	30	20
Endemic Communicable Disease: TB Treatment	47.3	4,872	600	3,321	329	180	443
Endemic Communicable Disease: Malaria	4.4	452	97	231	53	29	41
Endemic Communicable Disease: Sexually Transmitted Infections	3.3	335	107	106	59	32	30
Endemic Communicable Disease: Urinary Tract Infection	2.1	213	67	69	37	20	19

Table 13: Unit Cost of Services at Dispensary

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	11.1	1,141	279	506	188	64	104
Postpartum (including 2 PNC visits)	5.7	588	185	183	125	42	53
Child: Pneumonia	3.8	394	161	52	108	37	36
Child: Wheeze	1.8	181	85	3	57	19	16
Child: Ear infection	2.3	238	85	55	57	19	22
Child: Diarrhea (no dehydration)	1.2	128	42	37	28	10	12
Child: Diarrhea (some dehydration)	1.6	168	42	73	28	10	15
Child: Dysentery	1.9	200	85	21	57	19	18
Child: Fever	1.8	186	85	8	57	19	17
Family Planning: Condoms	1.9	191	42	94	28	10	17
Family Planning: Pills	2.1	218	56	91	38	13	20
Family Planning: Injection	1.8	188	56	64	38	13	17
Family Planning: IUD	1.7	174	65	35	44	15	16
Endemic Communicable Disease: Common cold and cough	1.3	129	59	4	40	14	12
Endemic Communicable Disease: Acute Bronchitis	1.3	129	59	4	40	14	12
Endemic Communicable Disease: GI Problems	1.8	191	85	12	57	19	17

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Endemic Communicable Disease: Malaria	4.3	445	94	226	63	21	40



Table14: Unit Cost of Services at Mother and Child Health Centre

Services	Total Cost per Service		Component Wise Cost (PKR)				
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Salaries: Indirect	Operational Cost	Management Overhead
Antenatal Care (4 visits)	9.8	1,004	279	511	78	45	91
Delivery Care	9.5	977	485	189	135	79	89
Postpartum (including 2 PNC visits)	4.8	494	185	183	51	30	45
Child: Pneumonia	3.0	312	161	52	45	26	28
Child: Wheeze	1.3	138	85	3	24	14	13
Child: Ear infection	1.9	195	85	55	24	14	18
Child: Diarrhea (no dehydration)	1.0	107	42	37	12	7	10
Child: Diarrhea (some dehydration)	1.4	147	42	73	12	7	13
Child: Dysentery	1.5	157	85	21	24	14	14
Child: Fever	1.4	143	85	8	24	14	13
Fully Immunised Child	37.5	3,859	114	3,344	32	19	351
Family Planning: Condoms	1.7	170	42	94	12	7	15
Family Planning: Pills	1.8	189	56	91	16	9	17
Family Planning: Injection	1.5	159	56	64	16	9	14
Family Planning: IUD	1.4	141	65	35	18	11	13
Endemic Communicable Disease: Common cold and cough	1.0	99	59	4	17	10	9
Endemic Communicable Disease: Acute Bronchitis	1.0	99	59	4	17	10	9

Endemic Communicable Disease: GI Problems	1.4	147	85	12	24	14	13
Endemic Communicable Disease: Sexually Transmitted Infections	3.2	335	144	96	40	23	30

Table 15: Unit Cost of Services by LHW

Services	Total Cost per Service		Component Wise Cost (PKR)			
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Operational Cost	Management Overhead
Antenatal Care (4 visits)	10.1	960	384	393	57	125
Postpartum (including 2 PNC visits)	5.0	477	216	167	32	62
Child: Diarrhea (no dehydration)	1.4	138	72	37	11	18
Child: Diarrhea (some dehydration)	1.9	179	72	73	11	23
Child: Fever	1.1	104	72	8	11	14
Fully Immunised Child	44.0	4,176	249	3,344	37	545
Family Planning: Condoms	1.9	178	53	94	8	23
Family Planning: Pills	2.3	216	84	91	13	28
Family Planning: Injection	1.9	185	84	64	13	24
Endemic Communicable Disease: Common cold and cough	1.4	129	96	2	14	17

Table 16: Unit Cost of Services by CMW

Services	Total Cost per Service		Component Wise Cost (PKR)			
	USD	PKR	Salaries: Direct	Medicines, Supplies&Lab	Operational Cost	Management Overhead
Antenatal Care (4 visits)	5.0	476	20	367	17	71
Delivery Care	2.9	280	30	182	26	42
Postpartum (including 2 PNC visits)	2.3	221	11	167	10	33
Child: Diarrhea (no dehydration)	0.4	34	4	22	3	5
Child: Fever	0.4	34	4	22	3	5
Family Planning: Condoms	1.2	117	3	94	2	17
Family Planning: Pills	1.2	117	4	91	4	17
Family Planning: Injection	0.9	85	4	64	4	13
Family Planning: IUCD	0.7	68	13	35	11	10

### 3.2 ESTIMATING TOTAL COST AT RHC AND BHU

In order to estimate the overall cost implications of implementing the EHSP at BHU and RHC, an estimation exercise was carried out. This exercise used the estimates that had been already developed under unit costing for medicines, vaccines, supplies and lab investigations. Standard staffing and equipment were taken as proposed under the EPHS for each of the facility. For detailed note on methodology please see section 2.4 of this document.

Facility wise data regarding service utilization was obtained from DHIS cell of DOH, Sindh. Based on discussions with the DHIS officials, data was further adjusted for under reporting and non-compliance. Estimates produced at facility level assume that this information is reliable. In order to make the mode more robust, sensitivity analysis (+/- 7.5%) was performed.

One of the key factors in estimating the total costs at facility level is the catchment population. Due to alarming growth in population during the last decade, catchment area of health facilities has increased significantly as compared to original catchment areas, when most of these facilities were built. To give policy makers different scenarios, estimates were produced using 5 different catchment population figures for RHCs and 4 different catchment population figures for BHUs.

#### 3.2.1 COST ESTIMATES: RHC

Table below presents the cost estimates for RHC.

Table 17: Cost Estimates RHC

Catchment Population	30,000	75,000	125,000	175,000	190,000
Expenditure Categories	PKR	PKR	PKR	PKR	PKR
Salaries	19,503,272	19,503,272	19,503,272	19,503,272	19,503,272
Medicines, Supplies, Lab	1,517,842	3,794,605	6,324,342	8,854,078	9,612,999
Immunisation	414,688	1,036,720	1,727,867	2,419,014	2,626,359
Operating Expenditure	3,188,796	3,242,796	3,302,796	3,362,796	3,380,796
<b>Total</b>	<b>24,624,598</b>	<b>27,577,393</b>	<b>30,858,276</b>	<b>34,139,160</b>	<b>35,123,425</b>
<b>Sensitivity: +7.5%</b>	<b>26,471,442</b>	<b>29,645,697</b>	<b>33,172,647</b>	<b>36,699,597</b>	<b>37,757,682</b>
<b>Sensitivity: -7.5%</b>	<b>22,777,753</b>	<b>25,509,088</b>	<b>28,543,906</b>	<b>31,578,723</b>	<b>32,489,168</b>

Using the proposed human resource, capacity utilization was also calculated based on the average workload for each doctor and lady health visitor. For details of operational expenditure please see annex c. Table below lays down the additional facilities that may be required for at different levels of population coverage

Table 18: Additional Facilities – RHC

Catchment Population	30,000	75,000	125,000	175,000	190,000
Additional Facilities	634	178	56	4	(6)

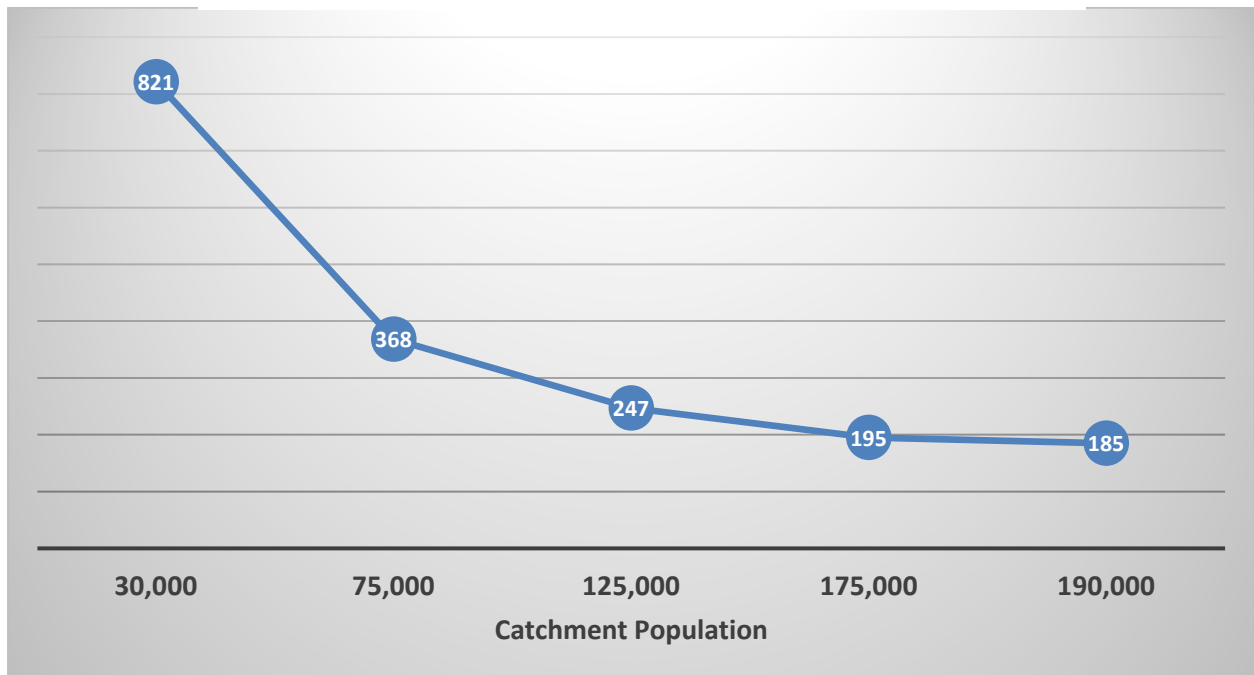
Cost estimates were also analysed by fixed and variable costs, in order to determine the behaviour of overall costs with the increase in catchment population. Table below presents the breakdown of overall cost by fixed and variable.

Table 19: Cost Estimates by Variable and Fixed Cost – RHC

Catchment Population	30,000	75,000	125,000	175,000	190,000
Variable Cost (PKR)	1,968,530	4,921,325	8,202,209	11,483,093	12,467,358
Fixed Cost (PKR)	22,656,067	22,656,067	22,656,067	22,656,067	22,656,067

Figure below presents the total cost per capita, which is showing a decline with the increase in catchment population.

Figure 3: Total Cost Per Capita (PKR) – RHC



### 3.2.2 COST ESTIMATES: BHU

Table below presents the cost estimates for BHU.

Table 20: Cost Estimates BHU

Catchment Population	10,000	15,000	20,000	25,000
Expenditure Categories	PKR	PKR	PKR	PKR
Salaries	2,592,440	2,592,440	2,592,440	2,592,440
Medicines, Supplies, Lab	444,095	666,143	888,190	1,110,238
Immunisation	88,862	133,293	177,724	222,154
Operating Expenditure	612,492	618,492	624,492	630,492
<b>Total</b>	<b>3,737,889</b>	<b>4,010,368</b>	<b>4,282,846</b>	<b>4,555,325</b>
<b>Sensitivity: +7.5%</b>	<b>4,018,231</b>	<b>4,311,145</b>	<b>4,604,059</b>	<b>4,896,974</b>
<b>Sensitivity: -7.5%</b>	<b>3,457,547</b>	<b>3,709,590</b>	<b>3,961,633</b>	<b>4,213,675</b>

Using the proposed human resource, capacity utilization was also calculated based on the average workload for doctor and the lady health visitor. For details of operational expenditure please see annex c. Table below lays down the additional facilities that may be required for 100% population coverage.

Table 21: Additional Facilities – BHU

Catchment Population	10,000	15,000	20,000	25,000
<b>Additional Facilities</b>	<b>1,393</b>	<b>633</b>	<b>254</b>	<b>26</b>

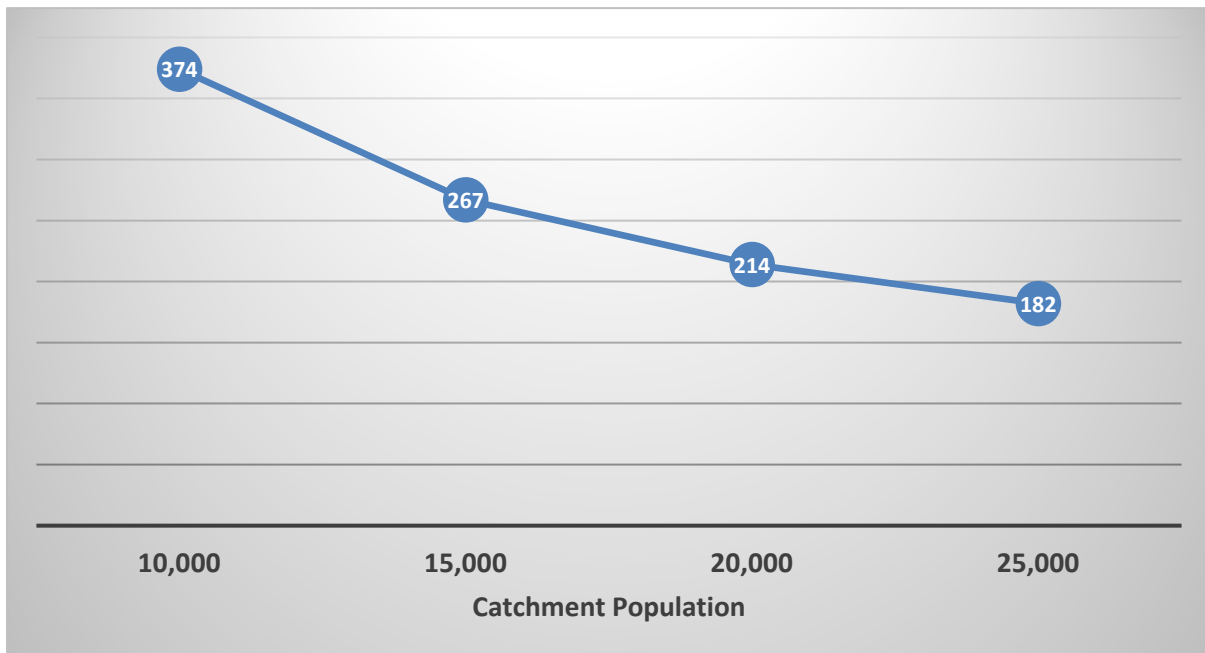
Cost estimates were also analysed by fixed and variable costs, in order to determine the behaviour of overall costs with the increase in catchment population. Table below presents the breakdown of overall cost by fixed and variable.

Table 22: Cost Estimates by Variable and Fixed Cost – BHU

Catchment Population	10,000	15,000	20,000	25,000
<b>Variable Cost (PKR)</b>	544,957	817,435	1,089,914	1,362,392
<b>Fixed Cost (PKR)</b>	3,192,932	3,192,932	3,192,932	3,192,932

Figure below presents the total cost per capita, which is showing a decline with the increase in catchment population.

Figure 4: Total Cost Per Capita – BHU



### 3.3 SCENARIO BASED PROJECTIONS

An additional module was developed and attached to the costing model with the purpose to help planners, decision and policy makers to make projections on simulated data. This can be done by changing 3 key parameters built in the model, providing ‘what if’ analysis. Following three key parameters can be changed in the model to develop scenarios.

- (a) Increasing coverage by x% at different catchment population.
- (b) Increase/Decrease salaries by x%
- (c) Increase/Decrease operational costs by x%

The model assumes that increasing coverage levels will bring in more economies of scale. To factor this assumption reduction in cost of medicines, vaccines and supplies were made by different levels of increasing coverage. Table below sets out the level wise reduction used in the costing model.

Table 23: Economies of Scale

Increase in level of coverage	Reduction in variable costs
5%	0.50%
10%	0.75%
15%	1.00%
20%	1.25%
30%	1.50%
35%	1.75%



40%	2.25%
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These three parameters can be adjusted in different ways to project results. A hypothetical scenario was modelled to project the results. Table below presents the parameters that were used to make the projections at BHU and RHC.

**Table 24: Parameters used for Scenario Projections**

Parameter	RHC	BHU
Increase in coverage	+20%	+15%
Change in salaries	-15%	-5%
Change in operational cost	-20%	-10%

Source: Author

Note: (+)/(-) represents increase/decrease respectively

Estimates for RHC using the parameters laid down in table 23 are produced below. This is a simulation exercise; user can change these parameters in the model to develop user defined scenarios.

**Table 25: Scenario Based Cost Estimates: RHC**

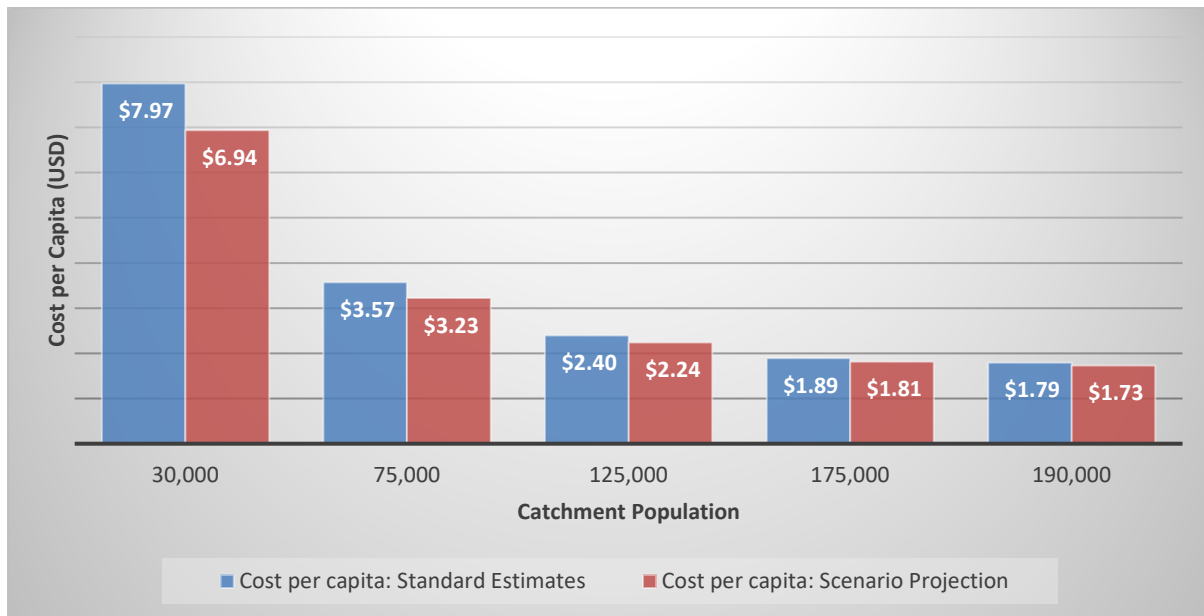
Catchment Population	30,000	75,000	125,000	175,000	190,000
Expenditure Categories	PKR	PKR	PKR	PKR	PKR
Salaries	16,577,781	16,577,781	16,577,781	16,577,781	16,577,781
Medicines, Supplies, Lab	1,798,643	4,496,607	7,494,345	10,492,083	11,391,404
Immunisation	491,405	1,228,514	2,047,523	2,866,532	3,112,235
Operating Expenditure	2,565,436	2,630,236	2,702,236	2,774,236	2,795,836
<b>Total</b>	<b>21,433,266</b>	<b>24,933,138</b>	<b>28,821,885</b>	<b>32,710,632</b>	<b>33,877,256</b>
<b>Sensitivity: +7.5%</b>	<b>23,040,761</b>	<b>26,803,123</b>	<b>30,983,527</b>	<b>35,163,930</b>	<b>36,418,051</b>
<b>Sensitivity: -7.5%</b>	<b>19,825,771</b>	<b>23,063,153</b>	<b>26,660,244</b>	<b>30,257,335</b>	<b>31,336,462</b>

**Table 26: Scenario Based Cost Per Capita: RHC**

Catchment Population	30,000	75,000	125,000	175,000	190,000
Cost Per Capita	PKR	PKR	PKR	PKR	PKR
Variable Cost	78	78	78	78	78
Fixed Cost	658	263	158	113	104
<b>Total Cost per Capita</b>	<b>PKR 714</b>	<b>PKR 332</b>	<b>PKR 231</b>	<b>PKR 187</b>	<b>PKR 178</b>
	<b>\$6.94</b>	<b>\$3.23</b>	<b>\$2.24</b>	<b>\$1.81</b>	<b>\$1.73</b>

Figure below presents the comparison between standard estimates and scenario based projections. Figure also presents the relationship between increase in utilization rates and reduction in cost per capita.

**Figure 5: Cost Per Capita and Utilisation Rates Comparison for Standard Estimates and Scenario based projections - RHC**



Estimates for BHU using the parameters laid down in table 23 were developed which are produced below. This is a simulation exercise; user can change these parameters in the model to develop user defined scenarios.

Table 27: Scenario Based Cost Estimates: BHU

Catchment Population	10,000	15,000	20,000	25,000
Expenditure Categories	PKR	PKR	PKR	PKR
Salaries	2,462,818	2,462,818	2,462,818	2,462,818
Medicines, Supplies, Lab	505,602	758,404	1,011,205	1,264,006
Immunization	101,169	151,754	202,338	252,923
Operating Expenditure	554,243	561,143	568,043	574,943
<b>Total</b>	<b>3,623,832</b>	<b>3,934,118</b>	<b>4,244,404</b>	<b>4,554,690</b>
<b>Sensitivity: +7.5%</b>	<b>3,895,620</b>	<b>4,229,177</b>	<b>4,562,734</b>	<b>4,896,291</b>
<b>Sensitivity: -7.5%</b>	<b>3,352,045</b>	<b>3,639,059</b>	<b>3,926,074</b>	<b>4,213,088</b>

Table 28: Scenario Based Cost Per Capita: BHU

Catchment Population	10,000	15,000	20,000	25,000
Cost Per Capita	PKR	PKR	PKR	PKR
Variable Cost	62	62	62	62
Fixed Cost	306	204	153	123
<b>Total Cost per Capita</b>	<b>PKR 362</b>	<b>PKR 262</b>	<b>PKR 212</b>	<b>PKR 182</b>
	<b>\$3.52</b>	<b>\$2.55</b>	<b>\$2.06</b>	<b>\$1.77</b>

Figure below presents the comparison between standard estimates and scenario based projections. Figure also presents the relationship between increase in utilization rates and reduction in cost per capita.

**Figure 6: Cost Per Capita and Utilisation Rates Comparison for Standard Estimates and Scenario based projections - BHU**



## SECTION 4: PRICING HEALTH SERVICES

Pricing health services is a key component of the broader activity of resource allocation and purchasing in health care systems. Four core policy questions relevant to resource allocation and purchasing decisions in health care are<sup>11</sup>:

1. For whom to buy (demand)?
2. What to buy, in which form, and what to exclude (supply)?
3. What price to pay and how to pay (prices and incentive regime)?
4. From whom to buy, at what price, and how much (factor and product markets)?

This section of the document deals with question number 3 and briefly looks at the different mechanisms available and suggests two options to act as a guide while contracting out health services.

From a public health view point, there are three essential objectives in pricing health services<sup>12</sup>:

- To ensure that providers are fairly reimbursed for their work.
- To ensure that the prices accurately reflect the costs of correctly provided services and promote systems
- To ensure that the pricing structure supports the practice of appropriate medicine

Purchasers in a variety of countries have experimented with alternatives. For all of different provider payment types, purchasers need to be able to approximate the true costs of the services that they are paying for, in order to rationally set their prices and predict their expected costs on an actuarial basis. Regardless of the type of provider payment mechanism employed, calculating the costs of specific health services or of packages of services requires a methodology for allocating indirect costs to the services that are directly consumed by patients and paid for by purchasers. This costing exercise is major step towards identifying costs associated with different treatments at different level of health care.

Following are the most common type of provider payment systems which are being used globally<sup>13</sup>:

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<sup>11</sup>Preker A and Harding A (2001). "Innovations in Health Care Delivery: Organizational Reforms within the Hospital Sector," World Bank HNP discussion paper, May 2001.

<sup>12</sup> Waters H and Hussy P (2004). "Pricing Health Services", World Bank HNP discussion paper, September 2004.

<sup>13</sup> Mahmood, Afeef (2010). "Punjab towards a Health Financing Reform: Issues and Options", Asian Development Bank, 2010.

### **Fee-for-Service (FFS)**

In FFS methods, the provider is reimbursed according to the number of services delivered. They may be either input-based or output-based. They are input-based if there is no fixed-fee schedule and if services are not bundled (that is, where health care services are not grouped into a higher aggregated unit). In this case, providers are permitted to bill purchasers for all costs incurred to provide each service. This is often called “retrospective cost-based” payment. The method can also be output-based if there is a fixed-fee schedule and services are bundled to some degree: the provider is paid the fixed fee for the predefined service regardless of the costs incurred.

### **Per-Diem**

In this approach, the provider is paid a set amount per-patient for each day that the patient is in the provider’s care. All services rendered during that day are covered under the same amount. The average per diem rate is usually easy and quick both to calculate and implement because it is typically based at first on the total historical annual hospital costs divided by the total number of bed-days. The rate may be adjusted to reflect characteristics of patients, clinical specialty, and variations in case mix across hospitals.

### **Diagnostic Related Groups (DRGs)**

DRG system is a patient classification system developed to classify patients into groups economically and medically similar, expected to have comparable hospital resource use and costs. Under DRGs providers are reimbursed at a fixed rate per discharge based on diagnosis, treatment and type of discharge. Therefore DRGs have a strong incentive for cost containment. As the remuneration refers to diagnoses and procedures, providers are motivated to deliver services as cost-effective as possible with the shortest possible length of stay. On the other hand, concerns about premature discharges, selection of low-cost patients and the increase of admissions should be dealt with. Therefore quality and monitoring measures are essential to avoid negative side effects<sup>14</sup>.

### **Capitation**

With capitation scheme providers are paid a fixed amount of money on the basis of number of patients for delivering a range of services. The predominantly tax-based health financing systems in Italy and the UK have adopted this payment method for general practitioners (GPs) to provide primary care to the population<sup>15</sup>. Under provision of services within the risk group, for which a particular flat-rate capitation amount is applicable, is a problem to be dealt

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<sup>14</sup> Technical brief cost containment, WHO, 2007.

<sup>15</sup> Ibid

with. Adjusted capitation payment according to patients' profile such as age and sex can help guaranteeing quality of service and equitable access, by stimulating GPs to accept and treat patients with various characteristics rather than shifting a number of them to specialists or hospitals.

### **Salary**

This is a payment method whereby medics/care providers are paid by the state. Under salary payment medics/care provider's income is not linked to output such as quantity of items or quality of services. Therefore, salaried doctors in the public sector are often associated with low motivation, low productivity and low quality of services. Recently, however, salaries are also being combined with capitation and performance based components to promote motivation as well as higher productivity and quality.

### **Global Budget**

The allocation of a payment fixed to a health care provider to cover the aggregate costs over a specific period to provide a set of services that have been broadly agreed on. A global budget may be based on inputs or outputs, or a combination of the two. Typically, providers have flexibility to make decisions about how to allocate funds across expenditure categories. One can first distinguish budgets for the whole health care system, and budgets for parts of it such as for ambulatory care, hospital care, pharmaceuticals etc. These are referred to as global and sectoral budgets, respectively. Still, hospitals can use other provider payments mechanisms, e.g. DRGs may well be used to remunerate specific hospital departments, all the while respecting a predetermined budget for the hospital as a whole. In this sense, budgets are different from other provider payment schemes: they are used more to allocate pre-determined amounts of money to providers, thereby setting the framework for the subsequent introduction of other provider payment schemes.

## **4.1 PROPOSAL TO SUPPORT PRICING DECISION**

This section is an attempt to lay down a framework to determine the likely price for contracting out health services to private sector. Final price will likely be negotiated based on the financial and technical proposals received. This exercise can help the government determine the likely outflow of financial resources at different levels of coverage.

The idea here is to divide the whole cost of contracting out into two parts, (i) cost of running and maintaining the facility, and (ii) cost of drugs, supplies, lab investigations and vaccines. Where former will be a fixed cost and transferred to the contracted party as lump sum to manage the health facility, which will include cost of:

- Salaries
- Utilities
- Other stores
- Fuel
- Repairs and maintenance

The (ii) part of the cost can be termed as variable cost<sup>16</sup> which can be transferred based on number of cases seen/treated and number of children fully immunized.

Cost estimates for both part (i) and (ii) will be based on the unit costing exercise conducted. Cost of equipment has not been included in pricing estimates, as it is being assumed that any missing equipment will be procured and provided by the government. Similarly cost of printing material and vaccine is also not being included in the pricing estimation for contracting out based on the assumption that these will be provided by the provincial government for standardization and quality assurance purposes. A special module has been developed in the costing model to aid decision makers on estimating a price for contracting out, using the methodology and assumptions defined in this section.

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<sup>16</sup> Weighted average cost.

## ANNEX A: BASIC PAY SCALE

BPS	PKR					
	Min Pay	Max Pay	Average Pay <sup>17</sup>	Allowances	Total Pay	
					Month	Annum
1	6,600	11,600	8,190	4,505	12,695	152,334
2	6,800	15,210	9,905	5,447	15,352	184,224
3	7,100	16,960	10,827	5,955	16,782	201,382
4	7,400	18,710	11,750	6,462	18,212	218,541
5	7,800	20,560	12,762	7,019	19,781	237,373
6	8,200	22,410	13,775	7,576	21,350	256,206
7	8,600	24,260	14,787	8,133	22,920	275,038
8	9,000	26,400	15,930	8,762	24,692	296,298
9	9,400	28,250	16,943	9,318	26,261	315,131
10	9,800	30,680	18,216	10,019	28,235	338,818
11	10,200	32,820	19,359	10,647	30,006	360,077
12	11,000	35,650	20,993	11,546	32,538	390,461
13	12,000	38,680	22,806	12,543	35,349	424,192
14	13,200	42,000	24,840	13,662	38,502	462,024
15	14,600	46,210	27,365	15,050	42,415	508,980
16	18,000	56,280	33,426	18,384	51,810	621,724
17	26,400	60,600	39,150	21,533	60,683	728,190
18	34,000	76,940	49,923	27,458	77,381	928,568
19	49,300	110,790	72,041	39,622	111,663	1,339,953

Source: Government of Pakistan

<sup>17</sup>Adjusted to 90% in order to reflect the actual scale being implemented in Sindh.



## ANNEX B: SALARY DETAILS

### RHC- with C-Section: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
Medical Superintend and Women MO	2	19	1,339,953	111,663	558	9
Senior Medical Officer	2	18	928,568	77,381	387	6
Medical Officer/WMO	5	17	728,190	60,683	303	5
Staff Nurse	4	14	462,024	38,502	193	3
LHV	1	9	315,131	26,261	131	2
Ophthalmologist	1	18	928,568	77,381	387	6
Dispenser/dresser	4	6	256,206	21,350	107	2
Health Technician	2	9	315,131	26,261	131	2
Laboratory technician	1	9	315,131	26,261	131	2
X Ray technician	1	9	315,131	26,261	131	2
Dai	1	1	152,334	12,695	63	1
Dental Surgeon	1	17	728,190	60,683	303	5
Dental technicians	1	9	315,131	26,261	131	2
Anesthetist	1	18	928,568	77,381	387	6
Ambulance driver	2	4	218,541	18,212	91	2
Peons (naibqasid)	2	1	152, 334	12,695	63	1
Malhi	1	1	152,334	12,695	63	1
Chowkidar	2	1	152,334	12,695	63	1
Junior Clerk	1	5	237,373	19,781	99	2
Attendant	3	2	184,224	15,352	77	1
Ward servant	5	2	184,224	15,352	77	1
Sanitation worker	6	1	152,334	12,695	63	1

### RHC: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
Medical Superintend and Women MO	2	19	1,339,953	111,663	558	9
Senior Medical Officer	2	18	928,568	77,381	387	6
Medical Officer/WMO	5	17	728,190	60,683	303	5
Staff Nurse	4	14	462,024	38,502	193	3
LHV	1	9	315,131	26,261	131	2
Ophthalmologist	1	18	928,568	77,381	387	6
Dispenser/dresser	4	6	256,206	21,350	107	2
Health Technician	2	9	315,131	26,261	131	2
Laboratory technician	1	9	315,131	26,261	131	2

X Ray technician	1	9	315,131	26,261	131	2
Dai	1	1	152,334	12,695	63	1
Dental Surgeon	1	17	728,190	60,683	303	5
Dental technicians	1	9	315,131	26,261	131	2
Anesthetist	1	18	928,568	77,381	387	6
Ambulance driver	2	4	218,541	18,212	91	2
Peons (naibqasid)	2	1	152, 334	12,695	63	1
Malhi	1	1	152,334	12,695	63	1
Chowkidar	2	1	152,334	12,695	63	1
Junior Clerk	1	5	237,373	19,781	99	2
Attendant	3	2	184,224	15,352	77	1
Ward servant	5	2	184,224	15,352	77	1
Sanitation worker	6	1	152,334	12,695	63	1

### BHU: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
Medical Officer/WMO	1	17	728,190	60,683	303	5
Health Technician	1	9	315,131	26,261	131	2
Vaccinator	1	9	315,131	26,261	131	2
Midwife	1	6	256,206	21,350	107	2
Naib Qasid	1	1	152,334	12,695	63	1
Sanitation Worker	1	1	152,334	12,695	63	1
Malhi	1	1	152,334	12,695	63	1
Chowkidar	1	1	152,334	12,695	63	1
Attendant	2	2	184,224	15,352	77	1

### Maternity Home: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
WMO	3	17	728,190	60,683	303	5
Sister Nurse	1	16	621,724	51,810	259	4
LHV	2	9	315,131	26,261	131	2
Staff Nurse	2	14	462,024	38,502	193	3
Dispenser	1	6	256,206	21,350	107	2
Laboratory technician	1	9	315,131	26,261	131	2
OT Technician	3	9	315,131	26,261	131	2
midwife	2	6	256,206	21,350	107	2
OT Assistant	3	5	237,373	19,781	99	2
Storekeeper	1	6	256,206	21,350	107	2

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
Naib Qasid	2	1	152,334	12,695	63	1
Sanitation Worker	3	1	152,334	12,695	63	1
Malhi	1	1	152,334	12,695	63	1
Chowkidar	2	1	152,334	12,695	63	1
Aya	3	1	152,334	12,695	63	1
Driver	1	4	218,541	18,212	91	2
Attendant	2	2	184,224	15,352	77	1
Jr. Clerk	1	7	275,038	22,920	115	2

#### Dispensary: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
Medical Officer	1	17	728,190	60,683	303	5
LHV	1	9	315,131	26,261	131	2
Dispenser	1	6	256,206	21,350	107	2
Dresser	1	6	256,206	21,350	107	2
Midwife	1	6	256,206	21,350	107	2
Naib Qasid	1	1	152,334	12,695	63	1
Sanitation Worker	1	1	152,334	12,695	63	1
Chowkidar	1	1	152,334	12,695	63	1
Aya	1	1	152,334	12,695	63	1
Attendant	1	2	184,224	15,352	77	1

#### Mother and Child Health Centre: Staff Salaries

Categories	Number	BPS	Salary			
			Annum	Month	Hour	Minute
WMO	1	17	728,190	60,683	303	5
LHV	1	9	315,131	26,261	131	2
Dispenser	1	6	256,206	21,350	107	2
Midwife	1	6	256,206	21,350	107	2
Lab Technician	1	9	315,131	26,261	131	2
Vaccinator	1	9	315,131	26,261	131	2
Naib Qasid	1	1	152,334	12,695	63	1
Sanitation Worker	1	1	152,334	12,695	63	1
Chowkidar	1	1	152,334	12,695	63	1
Aya	1	1	152,334	12,695	63	1

**ANNEX C: OPERATIONAL EXPENDITURE DETAILS****RHC-C: Operational Expenditure**

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Electricity	46,967	563,598	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	2,750	33,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	15,000	180,000	Lump sum
Rent	35,000	420,000	Rent as replacement cost to construction
POL	15,600	187,200	40 kms average per day x no. of working days x petrol per km
Other Stores	25,223	302,675	As per EHSP supply list
Repairs and Maintenance	3,500	42,000	10% of rent
Vehicle Maintenance	5,000	60,000	15% of vehicle depreciation
Equipment Maintenance	13,730	164,760	7.5% of equipment depreciation
Depreciation	183,066	2,196,794	Useful life of assets is based on WHO-CHOICE study
<b>Total</b>	<b>345,836</b>	<b>4,150,027</b>	

**RHC: Operational Expenditure**

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Electricity	46,967	563,598	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	2,750	33,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	15,000	180,000	Lump sum
Rent	30,000	360,000	Rent as replacement cost to construction
POL	15,600	187,200	40 kms average per day x no. of working days x petrol per km
Other Stores	24,631	295,575	As per EHSP supply list
Repairs and Maintenance	3,000	36,000	10% of rent
Vehicle Maintenance	3,333	40,000	10% of vehicle depreciation
Equipment Maintenance	17,798	213,577	15% of equipment depreciation
Depreciation	118,654	1,423,846	Useful life of assets is based on WHO-CHOICE study
<b>Total</b>	<b>277,733</b>	<b>3,332,796</b>	

**BHU: Operational Expenditure**

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	

Electricity	9,585	115,020	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	750	9,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	5,000	60,000	Lump sum
Rent	15,000	180,000	Rent as replacement cost to construction
Other Stores	5,023	60,275	As per EHSP supply list
Repairs and Maintenance	1,500	18,000	10% of rent
Equipment Maintenance	1,653	19,836	10% of equipment depreciation
Depreciation	16,530	198,361	As per EHSP equipment list
<b>Total</b>	<b>55,041</b>	<b>660,492</b>	

#### Maternity Home: Operational Expenditure

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Electricity	32,589	391,068	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	2,750	33,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	15,000	180,000	Lump sum
Rent	30,000	360,000	Rent as replacement cost to construction
POL	15,600	187,200	40 kms average per day x no. of working days x petrol per km
Other Stores	7,325	87,900	As per EHSP supply list
Repairs and Maintenance	3,000	36,000	10% of rent
Vehicle Maintenance	5,000	60,000	15% of vehicle depreciation
Equipment Maintenance	6,281	75,377	15% of equipment depreciation
Depreciation	41,876	502,517	As per EHSP equipment list
<b>Total</b>	<b>159,422</b>	<b>1,913,062</b>	

#### Dispensary: Operational Expenditure

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Electricity	9,585	115,020	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	500	6,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	2,500	30,000	Lump sum
Rent	7,500	90,000	Rent as replacement cost to construction
Other Stores	833	10,000	As per EHSP supply list

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Repairs and Maintenance	750	9,000	10% of rent
Equipment Maintenance	1,325	15,904	20% of equipment depreciation
Depreciation	6,627	79,521	As per EHSP equipment list
<b>Total</b>	<b>29,620</b>	<b>355,445</b>	

#### Mother and Child Health Centre: Operational Expenditure

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Electricity	9,585	115,020	Average KW consumption per 8 employees (21.3) x no. of employees x Average rate per KW x no. of working hours
Communication	500	6,000	1 call per worker each day x total workers x working days x average x cost per call
Stationery and printing	2,500	30,000	Lump sum
Rent	7,500	90,000	Rent as replacement cost to construction
Other Stores	833	10,000	As per EHSP supply list
Repairs and Maintenance	750	9,000	10% of rent
Equipment Maintenance	1,325	15,904	20% of equipment depreciation
Depreciation	6,627	79,521	As per EHSP equipment list
<b>Total</b>	<b>29,620</b>	<b>355,445</b>	

#### LHW: Operational Expenditure

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Stationery and printing	2,000	24,000	Cost of forms, registers, slips, low cost IEC material etc.
Other Stores	800	9,600	As per EHSP supply list
Depreciation	479	5,750	Based on useful life defined by LHW program
<b>Total</b>	<b>3,279</b>	<b>39,350</b>	

#### CMW: Operational Expenditure

Expenditure Category	Cost (PKR)		Notes
	Monthly	Annual	
Stationery and printing	1,000	12,000	Cost of forms, registers, slips, low cost IEC material etc.
Other Stores	800	9,600	As per EHSP supply list
Depreciation	813	9,750	Useful life of assets is based on WHO-CHOICE study
<b>Total</b>	<b>2,613</b>	<b>31,350</b>	