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Cost Analysis of the French Medical Institute for Children (FMIC)

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EXECUTIVE SUMMARY

Background: Cost analysis is an essential tool relating the inputs of resources in monetary terms to the outputs of services provided by the hospital. Fundamentally, effective analysis of hospital performance requires the existence of both timely and accurate cost and output data. In most developing countries (including Afghanistan) however, these basic ingredients are lacking due to poor information systems and/or other sources of data, resulting in health expenditures being substituted for actual costs in analyzing hospital costs. The primary rationale for this study is to provide a basis on which to compare costs of individual departments and services within the French Medical Institute for Children (FMIC) as a private hospital and use them in case of outsourcing services in public hospitals. The report thus gives details of the unit costs for various services from outpatient care to various inpatient services in considering future models of public-private partnerships for health care delivery.

Method: The study uses step-down method to track the costs of inputs uses to find out the unit costs of each service at FMIC. The hospital is divided into three cost centers (departments): general, ancillary (intermediate) and clinical. The general cost centers provide services to ancillary and clinical cost centers. The ancillary cost centers provide services to clinical departments and patients. A clinical department provides services directly to patients.

Results: Total costs of FMIC are presented in two different scenarios, with and without the costs of the welfare fund. Overall results indicate that the total cost of FMIC with welfare fund during the study period was \$ 15,701,841, while, without welfare fund was \$ 12,068,561. Figures' breakdown in this study represents hospital cost with welfare funding. On average, inpatient services at FMIC hospital cost \$413 per occupied bed per year. The total cost per inpatient admission is approximately \$1,858. The average cost per outpatient visit is \$ 105. Considering the cost centers, large proportion of costs goes to general cost centers that account for 43% of the hospital's total cost. The second big proportion goes to clinical departments that account for 33% of the total costs. Ancillary departments account for the lowest proportion of total costs that is 23%. Human resources, facility management, Radiology and laboratory beside welfare fund of the hospital composite the major components of the hospital costs.

Recommendations: The study provides some useful insights into the cost and income across the FMIC. In particular it provides an understanding of the relationship of costs to the different mixes of services. Considering the per capita Gross Domestic Product (GDP) of Afghans at USD 715, cost of services across the outpatient and inpatient departments are high. In order to reduce average unit cost of services, it is recommended to increase the number of OPD and IPD services delivered. Furthermore, findings indicate, that utilization indicators of the hospitals such BOR and ALOS differ from the proposed levels recommended by the MoPH, which may be the source of inefficiency in the hospital. FMIC should consider areas where ALOS can be decreased from 4.5 day to 3 days and similarly, BOR should be increased to 80-85 percent. As a result, average cost of service per admission could decrease.

In order to avoid any confusion and enhance an accountable and transparent mechanism in implementing the welfare fund, the formation of an independent body is strongly recommended to closely monitor the welfare fund management.

ABBREVIATIONS

AKDN	Agha Khan Development Network
ALOS	Average Length of Stay
BOR	Bed Occupancy Rate
CEO	Chief Executive Officer
ENT	Ear, Nose and Throat
FMIC	French Medical Institute for Children
GDP	Gross Domestic Product
GoIRA	Government of the Islamic Republic of Afghanistan
HEF	Health Equity Fund
HEFD	Health Economics and Financing Directorate
HMIS	Health Management Information System
HOSPICAL	Hospital Cost Allocation Tool
HPP	Health Policy Project
IPD	Inpatient Department
ISO	International Organization for Standardization
MoPH	Ministry of Public Health
MSH	Management Sciences for Health
NGO	Non-Governmental Organization
OPD	Outpatient Department
OSR	Outside Referral
PPP	Public Private Partnership
USAID	United States Agency for International Development

I. INTRODUCTION

Background

In almost every country, the delivery of health services involves some sort of public-private partnership (PPP). In many countries, the delivery of health services is often contracted to a for-profit or not-for-profit entity using public funds. Additionally, even where public facilities are involved, the procurement of drugs and equipment or diagnostic testing often involves sourcing from the private sector. Although intrinsically it is believed that the public sector is less efficient than the private sector, studies have shown varying degrees of quality in the delivery of services by both. In Australia, studies have shown that public hospitals operate more efficiently than private hospitals after adjusting for case mix (Duckett and Jackson, 2000, p. 439). Furthermore, a systematic literature review identified and compared 149 for-profit and not-for-profit health facilities in the US and found that 88 non-profit facilities performed better in terms of cost, outcomes of care, access, and mission; 43 studies found no difference, and 18 found for-profit facilities to perform better. (Rosenau and Linder, 2003, pp. 219--241)

The concept and implementation of PPP in the delivery of health services in developing countries is complex and remains not as well understood as other mechanisms of contracting by the public sector. In Afghanistan, there is a need to better understand the different models of PPP in the provision of hospital services to have a clearer picture of the costs, quality, flexibility, and complexity of the types of options that may thrive in the country. The French Medical Institute for Children (FMIC) is currently the longest functioning PPP hospital for children in Afghanistan. This report presents the first cost analysis study on an operational PPP hospital. The results will support policymakers to better understand the costs of operating a PPP similar to FMIC and how their investments have provided better care for children, especially the most vulnerable.

French Medical Institute for Children

A memorandum¹ of agreement was signed on October 8, 2006, and renewed in 2009, by the Government of the Islamic Republic of Afghanistan (GoIRA), the Government of France; Agha Khan Development Network (AKDN) (including the University in Karachi, Agha Khan Health Services and other relevant entities within AKDN), La Chaîne De L'Espoir and Enfants Afghanistan. This memorandum identifies different domains of cooperation amongst aforementioned parties and the GoIRA. Issues like autonomy of the FMIC in terms of healthcare service provision, staffing, training, fundraising by FMIC are all fully discussed in the memorandum. Furthermore, responsibilities of GoIRA in terms of providing welfare fund, tax exemption of the Institute are also part of the agreement.

FMIC was formally inaugurated in 2006, and began providing pediatric surgical care, including general and orthopedic surgery. FMIC was soon providing services in pediatric medicine, cardiology, neurosurgery, cardiac surgery, pediatric plastic surgery and anesthesia. It is now an 83 bed hospital which also includes 15 intensive care beds. The hospital is equipped with state-of-the art CT scanning facilities, general radiology and ultrasound. It houses a pharmacy, a well-equipped laboratory and

¹ Memorandum was provided to the Health Economics and Financing by International Relations Directorate of MoPH.

four operating theatres. FMIC also has Tele-medicine links with the Agha Khan University in Karachi, Bamyan and Badakhshan Provincial Hospital in Afghanistan and Khorog General Oblast Hospital in Tajikistan.

At present, a Patient Welfare programme is being run by French Medical Institute for Children (FMIC) which is a PPP model in a collaborative way wherein the facility managed by Agha Khan Development Network (AKDN) and funded by MoPH, French Non-Governmental Organization (NGO) and AKDN, as the facility is striving to be sustainable through its own revenue generation. FMIC receives a specific amount of funds² from the GoIRA to provide welfare services to families with an income less than 10,000 Afs (US\$200) per month. Besides, government of France and some other entities also contribute to the welfare fund. Indigent patients requesting for welfare support to meet their expenses for hospitalization/inpatient treatment at FMIC, will be financially supported through the Hospital's Patient Welfare Program, provided they meet the hospital's eligibility criteria for welfare support. There are different eligibility criteria for Inpatient and Outpatient Welfare.³

FMIC mainly provides inpatient and outpatient services. However, Outside Referral (OSR) is another type of service that is being provided. OSRs are related to those patients that visit non-FMIC doctors and they are prescribed laboratories tests and imagery procedures at FMIC.

II. OBJECTIVES

The objective of this study is to provide costing data on FMIC, which is a certified tertiary hospital. Findings will be used by the MoPH to indicate the costs of quality services at a private hospital providing specialty services with a welfare fund. Cost presentations might be used to purchase services if PPP schemes are considered in the future.

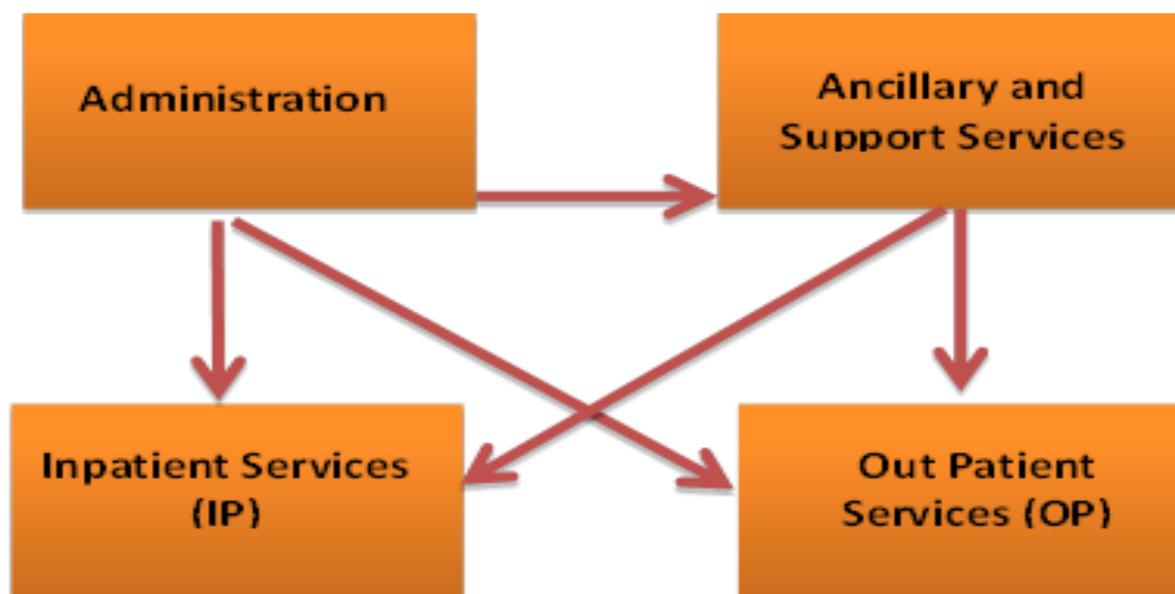
III. METHOD

The cost analysis is conducted from the hospital management prospective. The study applied to the step-down method to track the costs of inputs to find out the unit costs of each service at FMIC Hospital. The hospital is divided into three cost centers (departments): general, ancillary (intermediate) and clinical. The general cost centers provide services to ancillary and clinical cost centers. The ancillary cost centers provide services to clinical departments and patients. A clinical department provides services directly to patients. Figure 1 shows the step-down cost allocation from general to ancillary and clinical cost centers.

² FMIC Memorandum between the GoIRA and French Medical Institute for Children, Page 6

³ Inpatient and outpatient welfare fund is provided to all indigent patients whose household income does not exceed 10,000 AF per month. Exceptions might be considered if the number of household member is higher than six people.

Figure1. Framework for step-down cost accounting approach



Study Site and Period

FMIC is located in the 3rd district of Kabul city. The study examines the costs and efficiency indicators from FMIC for January 1st to December 31st, 2012.

Data Collection

Data were collected by the Health Economics and Financing Directorate (HEFD) of the MoPH. After providing an official letter and meeting with the leadership of the hospital, the HEFD team was directed to the management team of the hospital to get the required data. A series of tables were developed to collect the data related to costs of inputs and basic hospital information. The following table shows data type and sources with detailed explanations.

Table 1. Data Requirements

Area	Data Requirements
General Hospital Data	<ul style="list-style-type: none"> • Hospital organization and cost centers • Structure of administrative, ancillary and clinical departments • Total number of beds and breakdown by department
Utilization	<ul style="list-style-type: none"> • Utilization statistics broken down by department <ul style="list-style-type: none"> ○ Total number of visits for all outpatient departments ○ Total number of admissions, hospitalization days, discharges and deaths for inpatient departments
Staffing	<ul style="list-style-type: none"> • Complete staff list for facility, including name, function, level, payment source • Determination of cost center associated with each staff • Detailed salary breakdown for each staff, including base salary, allowances, insurance, etc.

Area	Data Requirements
Expenditure	<ul style="list-style-type: none"> • Total number of admissions, hospitalization days, discharges and deaths for inpatient hospitals • Total hospital expenditure, broken down by detailed line item <ul style="list-style-type: none"> ○ Expenditures on drugs, salaries, capital costs, other recurrent expenditures • Drug expenditure broken down by ancillary or clinical department
Ancillary Department Statistics	<ul style="list-style-type: none"> • For each ancillary department, the cost or quantity of ancillary department services broken down by clinical department

Data Analysis

The Hospital Cost Allocation Tool (HOSPICAL) was used to analyze the information. HOSPICAL is a Microsoft Excel based tool developed by Management Sciences for Health (MSH). The tool adopts the step-down costing approach and finds the total costs and unit costs of each department including the inpatient and outpatient units.

Data were classified into groups related to human resources; drugs and other recurrent medical supplies; food; laundry and cleaning; utilities and other recurrent costs; training and quality assurance, laboratory; imagery; welfare fund; and depreciation costs.

Human Resources: Human resources costs were allocated to general, ancillary and clinical departments based on the proportion of staff time given to each department. The data related to the distribution of staff time were collected from the hospital management team. Allocation of staff to different departments was identified by FMIC management.

Drugs and other recurrent medical supplies: The costs of drugs and other medical supplies were allocated to pharmacy unit of ancillary departments. Then, costs were allocated to clinical departments based on the percentage of usage. The data on usage of drugs by clinical departments were collected from the records of medical unit.

Laundry, cleaning, utilities and other recurrent expenditures: These costs were allocated to general departments. Then, the costs of general departments were allocated to ancillary and clinical departments.

Training and Quality Assurance: Quality assurance and training consist of a considerable amount of expenses. All their expenses are allocated to the clinical management and training cost centers.

Laboratory and Imagery: Expenses related to laboratory and imagery are allocated to laboratory and imagery cost centers, respectively.

Welfare fund: The welfare fund is included as a portion of total hospital expenditures. Therefore, welfare funds were distributed among different OPD clinics and IPD based on utilization.

Capital: Depreciation costs of buildings and equipment are all calculated on a straight line method. They are included in the study and allocated to specific cost centers.

IV. KEY ASSUMPTIONS

Human Resources:

Capital cost: The FMIC put an estimated 25 years life for buildings and 10 years for medical equipment. The depreciation costs (annual cost) of capitals are calculated with a straight line method.

Welfare Fund: The FMIC mainly spend welfare fund in outpatient and inpatient departments. It is distributed among different clinical services on basis of their utilization rate. Outside referral gets the highest welfare fund due to its higher utilization than other clinics.

Other expenditure: Some other miscellaneous expenses that were given as an aggregate amount but related to outpatient clinics were allocated to different outpatient visits on basis of their utilization.

V. RESULTS

The results of the analysis are organized into four categories: overall statistics, utilization, human resources and expenditures.

A. Overall Statistics

FMIC has two inpatient wards (Medicine and Surgery), and Outpatient departments such as, medicine; surgery; cardiac; Ear, Nose and Throat (ENT); dental and corporate clinic. Although outpatient wards accept adult patients too, only children are admitted into inpatient wards for treatment. There is an exclusive type of service that is named OSR. This category of service provides laboratory, imaging and pharmacy for patients that are referred from other facilities.

The following table includes overall statistics of the FMIC hospital.

Table 2. Overall Statistics

Number of Hospital's Active Beds	83
Number of Staff	563
Inpatient Admission	4,825
Inpatient Discharged	4,654
Inpatient Deaths	166
Outpatient visits	83,684
OSR ⁴	120,269

FMIC mainly has a total number of 83 beds in two inpatient departments, 42 beds in surgery department and 41 in internal medicine department.

Welfare statistics include 3,612 inpatients⁵ and 42,177 outpatients. The majority of outpatients benefitting from the welfare fund were adults for radiology, laboratory, and consultations. Thus, 74.8 percent of inpatient admissions 50.4 percent of outpatient visits were welfare fund recipients.

⁴ OSR means Outside referrals, these volumes are not the spin off volumes from IPD and OPD, these are related to those patients who visited Non-FMIC doctors and they prescribed to do their laboratory test and radiology procedures from FMIC.

B. Utilization

The hospital utilization indices, such as Bed Occupancy Rate (BOR) and Average Length of Stay (ALOS), illustrate patterns of utilization. Not all factors affecting hospital utilization are necessarily linked to efficiency or service quality, utilization data is nevertheless an important starting point for identifying inefficiencies; best practices and opportunities for improving service delivery. This section highlights two key utilization indices, as indicated above. BOR and ALOS are important efficiency indicators for hospitals, but there is no standard rate which can be applicable to all hospitals due to differences in the treatment nature and context of hospitals. However, Based on Health Management Information System (HMIS) of Afghanistan the normal BOR is between 80-85 percent. The following table shows hospital BOR and ALOS during the study period.

Table 3. FMIC hospital BOR and ALOS

Hospitalization Days	21,708
BOR	72%
ALOS	4.5 Days
Surgery Ward ALOS	4.9 Days
Medicine Ward ALOS	4.1 Days

FMIC has a BOR of 72 percent, which is lower than the recommended 85 percent. Similarly, it is found that ALOS is extended in both inpatient departments though extension of ALOS in surgery ward reasonable due to admission of complicated cases. Pediatric hospitals tend to have higher ALOS, particularly in surgery as shown here. When compared to national public hospitals, Indira Gandhi Pediatric Hospital was found to have an overall ALOS of 4.2 days. (Salehi and Foshanji et al., 2012) The MoPH recommended ALOS is 3 days for hospitals, however, varying types of services and patient mix will affect the ALOS across facilities. Possible reasons for extended ALOS at FMIC hospital may include:

- Patients admitted for diagnostic tests remain in the hospital until the results are received before undergoing medical or surgical treatments.
- An absence of standard practices and protocols for the same cause of admission creates variations in treatment among the physicians of the same department.

C. Human Resources

Human resources consume a major proportion of the hospital budget. Efficient management of human resources can improve the overall efficiency of a hospital. Staffing of FMIC is mainly studied in five main categories described in Table 4:

Table 4 shows the number of staff in each of the abovementioned categories.

⁵ There were also 870 Kate Project Welfare Fund patients who receive 20% coverage through the welfare fund but are not 100% covered.

Table 4. Number of Staff

Staff category	Description	Number	% of Total
Doctor	Includes all medical doctors working in outpatient and inpatient departments. In addition, dentists are included in this category.	67	12%
Nurse	Includes all nurses who graduated either from the school of nursing or from the high institute of nursing.	159	28%
Pharmacist	Considered technician/skilled personnel: Includes personnel with a university degree or a special skill. They include lab technicians, dietitians, pharmacists and drivers for vehicles or ambulances.	12	2%
Technician	Same as above	71	13%
Support Staff	Considered unskilled personnel: Includes all personnel working as janitors and messengers	188	33%
Admin/Finance	Includes personnel performing administrative work. Most personnel in this category are working in the overhead department while very little work in the clinical management cost center.	65	12%
Total Staff		562	100%

The table below shows staffing ratios at FMIC Hospital.

Table 5. Hospital Staffing Ratios

Indicators	Ratio
Doctor to Nurse	1.1 : 2
Doctor to Bed	1.3 : 2
Nurse to Bed	2.3 : 2

It is worth to mention that there is no standardized ratio among number of doctors, nurses, and beds at the international level. It depends on the context of countries and specifically the types of services provided at the hospital. However, the number of doctors and nurses employed at FMIC can serve a larger population of clients if the hospital is expanded.

D. Costs

Understanding cost of services at FMIC hospital helps the MoPH to understand the cost of quality services in an ISO 9001: 2008 certified hospital⁶ similar to FMIC.

⁶International Organization for Standardization (ISO) certification refers to the approval bestowed by accreditation bodies upon companies that meet the ISO standards
<http://www.fmhc.org.af/AboutUs/QualityandSafetyPolicy/Pages/cert.aspx>

Total Cost

Total cost of FMIC is indicated in two different scenarios, cost with welfare and without welfare fund. The total cost of hospital was US\$15,701,841 with welfare and US\$12,068,561 without welfare. The tables provide total costs of the hospital given the two different scenarios.

Cost by Cost Centers

Costs were allocated to three main cost centers: general, ancillary and clinical costs.

Table 6. Hospital Costs by Cost Centers

Category	Cost with Welfare fund (USD)	% of Total	Cost without Welfare fund (USD)	% of Total
Cost of General Departments	6,829,414	43%	6,829,414	57%
Cost of Ancillary Departments	3,684,687	23%	3,684,687	31%
Cost of Clinical Departments	5,187,740	33%	1,554,460	13%
Total Hospital Costs	15,701,841	100%	12,068,561	100%

The above table shows total cost breakdown of the hospital in two scenarios: cost with welfare fund and cost without welfare fund. The largest proportion of cost in both scenarios goes to the general departments. This could be due to the inclusion of all direct and indirect costs of administration, support staff, maintenance, cleaning and food. The second largest proportion of cost with the welfare fund goes to the clinical departments, but it goes to the ancillary departments if welfare fund is not considered in the calculations. Table 6 explicitly reveals that welfare fund has been totally directed towards the clinical departments.

Human resources, recurrent expenditures, and capital costs are major components of the hospital costs. Within the total recurrent costs, maintenance and utility, guest house compose a large proportion of recurrent expenditure amongst others. The following table shows the proportion of each component.

Table 7. Hospital Total Cost Breakdown by Budget line

Category	Cost (USD) with welfare fund	% of Total Costs	Cost (USD) without welfare fund	% of Total Cost
Total Staff Costs	4,748,120	30%	4,748,120	39%
Total Recurrent Costs	9,858,741	63%	6,225,461	52%
Total Capital Costs	1,094,980	7%	1,094,980	9%
Total Hospital Costs	15,701,841	100%	12,068,561	100%

Recurrent Costs: The recurrent costs include expenditures of kitchen, laundry, pharmaceuticals, transportation and other recurrent utilities. Table 7 indicates breakdown of recurrent costs.

Table 8. Recurrent Costs Breakdown

Expenditure item	Amount in USD	% of Total
Administrator Professional Services	686	0.01%
Consulting Clinics, Surgery	12,493	0.13%
Consulting Clinics, Medicine	35,594	0.36%
Consulting Clinics, Cardiac	2,774	0.03%
Consulting Clinics, ENT	2,114	0.02%
Consulting Clinics, Dental	612	0.01%
Consulting Clinics, Corporate	756	0.01%
Finance	672,235	6.82%
Facilities Management	901,983	9.15%
Food Services	190,833	1.94%
General Director and Chief Executive Officer's (CEO) Office	93,247	0.95%
Guest House	402,352	4.08%
Human Resources	58,818	0.60%
Information Technology	113,454	1.15%
Laboratory	509,729	5.17%
Marketing	30,998	0.31%
Medical Coordinator Office	411,322	4.17%
Medicine	5,955	0.06%
Materials Management & Administration	49,803	0.51%
Nursing Services	690,463	7.00%
Post Graduate Medical Education	42,302	0.43%
Pharmacy	728,445	7.39%
Quality Assurance	22,116	0.22%
Radiology	1,060,815	10.76%
Surgery	28,641	0.29%
Surgery (IPD1) Welfare	1,415,702	14.36%
Medicine (IPD2) Welfare	1,372,364	13.92%
Surgery Clinic Welfare	115,520	1.17%
Medicine Clinic Welfare	329,140	3.34%
Cardiac Clinic Welfare	25,652	0.26%
ENT Clinic Welfare	19,546	0.20%
Dental Clinic Welfare	5,657	0.06%
Corporate Clinic Welfare	6,990	0.07%
OSR Welfare	342,710	3.48%
Capacity Building	156,920	1.59%
Total	9,858,740	100%

Cost breakdown shows that OPD and IPD welfare are the main cost drivers; while, visiting clinics gets the lowest share of costs. Facility management with US\$901,908 (9%) constitutes a big portion of recurrent expenditures. Based on international standards maintenance cost of hospital ranges from 10-15 percent of total recurrent cost. (Mills, 1990, pp. 107--117) Therefore, FMIC has a reasonable cost for facility management. It is important to mention that in the second scenario, welfare funds are not included in the recurrent costs.

Cost by Services

At FMIC hospital, the majority of costs go to the inpatient departments. Amongst the outpatient departments, internal medicine clinic gets the highest portion of costs. OSR patients who are referred to FMIC for delivering laboratory and imagery services consume a considerable cost. The following table shows the proportion of costs driven by these two units.

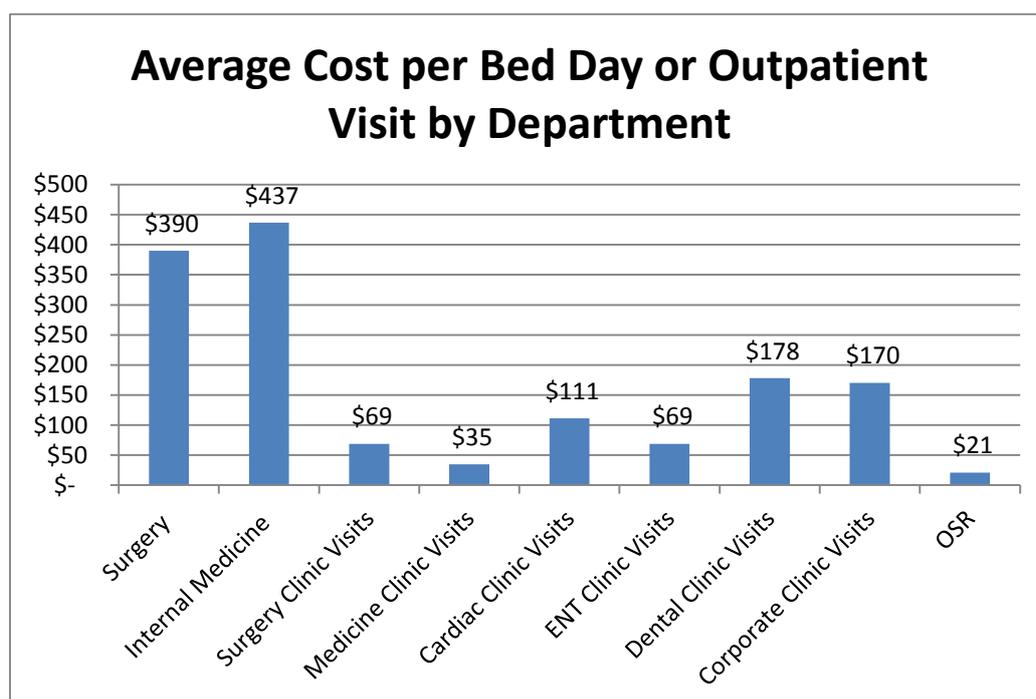
Table 9. Hospital Costs by Clinical Services

Clinical Services	Cost with Welfare fund (USD)	% of Total
Surgery (IPD1)	4,687,274	29.9%
Medicine (IPD2)	4,237,092	27.0%
Surgery Clinic Visits	1,322,047	8.4%
Medicine Clinic Visits	1,921,860	12.2%
Cardiac Clinic Visits	476,054	3.0%
ENT Clinic Visits	224,433	1.4%
Dental Clinic Visits	167,251	1.1%
Corporate Clinic Visits	198,430	1.3%
OSR	2,467,401	15.7%
Total	15,701,842	100.0%

Average Unit cost of Services

Average unit cost of services at FMIC provides evidence for the MoPH to understand the cost of a specific service in a certified tertiary hospital. Internal medicine with US\$437 presents the highest cost per bed per day in the inpatient department. ALOS in the internal medicine department is 4.1 days. Consequently, average cost per admission at internal medicine ward is US\$1,791. Cost per admission at surgery ward is US\$1,911. The below table shows average unit cost of clinical services at FMIC

Figure2. Average cost per Bed Day or Outpatient Visit by Department



E. Revenue source and its implication

As a private for-profit hospital, FMIC has various revenue sources. Table 11 shows different sources with their monetary amounts from the study period.

Table 10. Hospital Revenue Sources

REVENUE ITEM	SOURCE OF FUNDING	AMOUNT (USD)	% of Total
Room and Nursing Revenue	Individual	669,596	4%
Inpatient Revenue	Individual	3,167,897	20%
Outpatient and OSR Revenue	Individual	5,152,853	33%
Grants Utilization (Other than GoIRA)	La Chaine De L'Espoir, Roshan, The Agha Khan and others	5,289,919	34%
GoIRA Funding	Government of Afghanistan	1,247,600	8%
Other Revenue	Miscellaneous	173,980	1%
Total Revenue		15,701,845	100%

The largest proportion (US\$5,152,853) of revenue comes from grants and charities. GoIRA provides US\$1,000,000 in cash and US\$247,600 in exemptions for the cost of utilities such as water, and electricity.

VI. LIMITATIONS

Limitations of the study include the following:

- The HOSPICAL tool provides costs for cost centers but not by clinical service. This limits the ability to interpret findings for the use and application of introducing case-mix payments.
- As a private hospital, certain levels of cost data were not shared openly. Availability of disaggregated data posed a limitation resulting in various assumptions to be made, such as with human resources. The cost per position was not provided, rather only at aggregated levels.
- A price list per service was not made readily available by FMIC, limiting the interpretation of findings.

VII. DISCUSSION AND CONCLUSION

HEFD conducted a costing practice of a number of hospitals based in Kabul city. This report presents core findings of cost and efficiency analysis of FMIC, the first PPP facility included in the series of cost analysis studies.

Total operating costs of FMIC from 1st January to 31st December 2012 were allocated to direct and indirect cost centers. These cost centers are categorized as general, ancillary and clinical departments from which clinical and ancillary are direct cost centers while general department is considered as indirect cost center. The general and ancillary departments such as administration, maintenance, pharmacy and laboratory provide support to clinical departments including inpatient and outpatient.

Overall, twenty functional direct and indirect cost centers were identified at FMIC. General departments composed of seven centers, ancillary composed of four and clinical departments composed of nine cost centers.

Thirty six major categories of expense channels were identified to determine hospital total costs, including staff salaries, hospital finance and facility management, imagery and laboratory, pharmaceuticals, welfare fund, quality assurance, medical equipment and other miscellaneous recurrent expenditures.

The general cost is the major cost driver with 43 percent contribution to the total cost of the hospital. The breakdown of staff costs within the departments indicate that the cost of staff in clinical departments is the highest while clinical and ancillary compose 36 percent and 26 percent of costs, respectively. Likewise, physicians and nurses staff cost are the two highest, technicians and other skilled and non-skilled staff are the two consequent cost drivers. Human resource ratios were comparable to those found in national hospitals, with greater efficiency in the doctor to nurse ratio at FMIC. However, doctor and nurse to bed ratios tend to be higher than those found at other public hospitals.

Recurrent cost of hospital is mainly composed of cost incurred by general departments, pharmacy and imagery, inpatient and outpatient departments and welfare fund. However, recurrent cost such as guest house, finance and Information technology also constitute big amounts. Average cost of drugs per hospitalization day is US\$33.5. This estimate does not include prescription drugs purchased by

patient out of pocket. The average cost per bed day at surgery ward is US\$390 and internal medicine is US\$437. Average cost of OPD visit per patient is US\$105. Maintenance and utilization costs of FMIC hospital is US\$901,908, substituting 9 percent of total recurrent cost of the hospital. Based on international standards, maintenance costs of hospitals ranges from 10-15 percent of total recurrent cost. (Mills, 1990, pp. 107--117)

Compared to the Kabul National Hospital study, these costs are significantly higher, particularly when compared with the largest public children's hospital, Indira Gandhi Pediatric Hospital. This may be due to greater utilization at the public hospital since more costs are offset. However, the cost per OPD visit per patient for Indira Gandhi was found to be US\$3.73. FMIC provides higher level inpatient services compared to public facilities; however, when compared to internal medicine, the cost per bed per day for inpatient care at Indira Gandhi was found to be US\$16. The average cost per bed day in tertiary hospitals ranged from US\$13.14 in Mali to US\$47.80 in Indonesia to US\$197.66 in the United Arab Emirates, with an 80 percent bed occupancy rate excluding food and drugs. (Adam and Evans et al., 2003, p. 3) Greater understanding between these significant cost differences is needed for the MoPH to pursue more PPP models similar to FMIC. Differences would be better informed with the price lists for services at FMIC, which could be compared with feasibility studies for other PPP model hospitals proposed by the MoPH.

Average bed occupancy rate is 72 percent in the hospital. According to Afghanistan Health Management Information System report, (80-85%) bed occupancy rate is normal and considered fully efficient. (MoPH, 2010) The ALOS in the hospital is 4.5 days. It's slightly above the normal range of ALOS 2.5 – 3.5 days. (MoPH, 2010) However, this is likely due to the surgical ward.

The welfare fund supports a large number of patients utilizing services at FMIC. Although criteria for qualifying for this benefit has been set, it is not clear how the provider is made accountable by the welfare fund donors for ensuring that the most poor are identified and treated under the welfare fund. A more clear and transparent process for welfare patients is needed in order for the MoPH to expand this model of revenue generation and protection for the poorest households.

VIII. RECOMMENDATIONS

Recommendations of this study are mainly in two parts specific to cost and utilization indicators.

Cost related recommendations: It is found that cost of services is much higher than the per capita Gross Domestic Product (GDP) of Afghans which was estimated at USD 715 in 2011/2012. (*Afghanistan Statistical Yearbook, 2011/2012*) In order to reduce the average unit cost of services, it is proposed to increase the number of services delivered by increasing utilization in OPD and IPD. This would result in economies of scale and thereby decreasing the unit costs.

Utilization Indicators of the Hospital: Utilization indicators of the hospital such as BORs, ALOS could influence the cost of services. FMIC has an average ALOS of 4.5 days which is higher than the proposed range (2.5 – 3.5 days) of MoPH. Similarly, MoPH suggests 80-85 percent as a normal BOR, while FMIC shows a BOR lower than the normal range. However, it should be reminded that utilization indicators of a hospital may vary by type of services provided and context of the hospital. An increase in the utilization of indicators of the hospitals would reduce average unit costs of services across FMIC and the hospital has enough potential to scale up its services with the current inputs.

Welfare fund of the Hospital: User fee could be an obstacle between the poor and access to healthcare services. According to Noirhomme and Meessen et al, results of many studies indicate that user fees in the health sector exclude the poorest quintile from accessing quality health services. Therefore, it is recommended to introduce user fee with caution and take appropriate measures to protect the poor. On the other hand, Health Equity Fund (HEF) can improve beneficiaries' access to healthcare services by paying on behalf of poor families. To successfully implement HEF and get better result from this mechanism, it is important to think about an accountable and transparent system. (Noirhomme and Meessen et al., 2007, pp. 246--262)

Thus, in order to improve accountability of the provider and transparency in the implementation of HEFs, a separation of functions is recommended for the distribution of HEFs. Purchasing of health services and beneficiary identification shouldn't be the sole responsibility of a health care provider. In addition, there should be clear guiding principles established for managing HEFs. Noirhomme and Meessen et al identified these principles as “(1) good knowledge of the socio-economic conditions of the population; (2) minimal managerial capacity of the people who identify indigents; (3) no conflict of interest towards patients or providers, so they are not subject to pressure; (4) accountable to the funder; and (5) guarantee a presence at hospital level order to avoid conflicts of interest.” (Noirhomme and Meessen et al., 2007, pp. 246--262)

As GoIRA finances US\$1,000,000 annually to FMIC for the purpose of the HEF, an independent body is strongly recommended to manage the welfare fund. Additionally, more evidence on the effectiveness of the HEF at FMIC is needed to fully understand its design, management, and implementation to serve as a potential model for the future as the MoPH considers other health financing and revenue generation options at public tertiary hospitals.

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ANNEX 1: DEFINITIONS

Allocation of Costs: The assignment of costs to different cost centers or departments according to estimated use of resources (in terms of space, number of staff, cost, number of bed days and admission etc.) by those cost centers.

Average Length of Stay (ALOS): average length of one inpatient hospitalization stay. It is calculated by dividing the total number of bed days by the total number of discharges (including deaths).

Bed Day: a day during which a person is confined to a bed and in which the patient stays overnight in a hospital. Day cases (patients admitted for a medical procedure or surgery in the morning and released before the evening) should be excluded. It should be based on a head count that is performed at the same time each day.

Bed Occupancy Rate (BOR): the number of bed days occupied by patients as a percentage of the total available bed days in the hospital. BOR is calculated by dividing the number of occupied bed days for the period by the number of available bed days for the period, and expressing the result as a percentage. An “ideal” BOR is 85%.

Cost-Center: a program or a department within a hospital.

1. **General Cost Center:** Managerial, administrative, and financial activities that support but do not directly provide patient care services. For example, administration, maintenance and utilities, transport, kitchen, social services, clinical management, etc.
2. **Ancillary Cost Center:** Medical support activities indirectly required to deliver a clinical service. For example, central store, pharmacy, blood bank, family planning, vaccination, radiology, Operation Theater, laboratory, physical therapy, etc.
3. **Clinical Cost Center:** Direct medical activities pertaining to the production of clinical services.

Step-down Costing: This is a process of allocating general and ancillary costs to clinical cost centers to get a fully loaded unit cost per visit and per bed day. The allocation is based on a proportional distribution of those costs. It is a two-step allocation. In the first step, the costs of general departments are assigned to inpatient, outpatient and ancillary cost centers based on a certain allocation factor. In the second step, the costs of ancillary services are allocated to inpatient and outpatient cost centers according to their service utilization figures.

Unit Cost per Bed Day: the total (direct and indirect) cost of producing inpatient services divided by the total number of bed days for a given timeline. Note that it is very difficult to get a unit cost per bed day by diagnosis (e.g., peritonitis) because hospitals include many complex diagnoses. For this reason, the final result of the step-down process is the unit cost per bed day by department.

Unit Cost per Outpatient Visit: the total cost (direct and indirect) of producing outpatient services divided by the number of outpatient visits for a given timeline.

ANNEX 2: FIGURES

Figure 1. Number of Staff by Staff Type

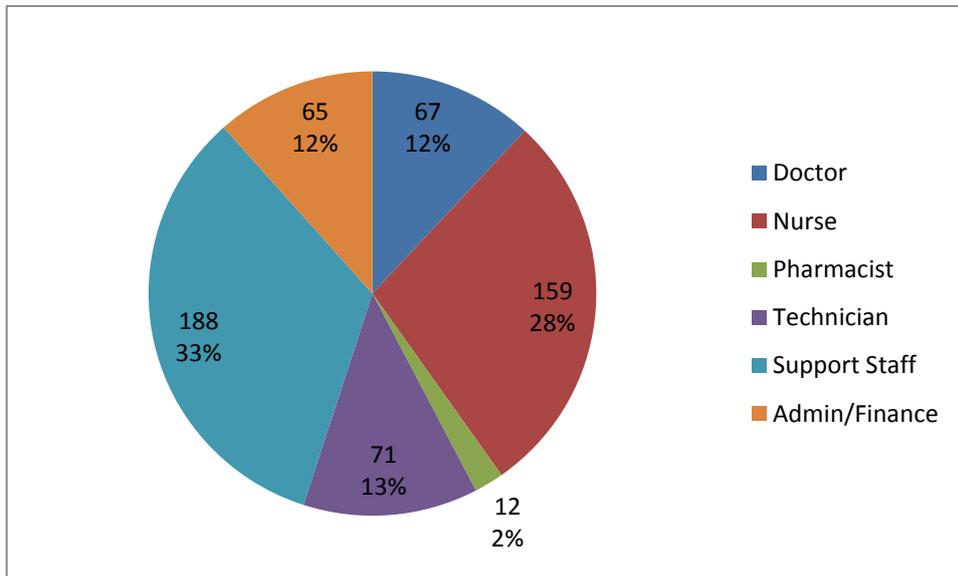


Figure 2. Hospital Total Cost Breakdown by Budget Line

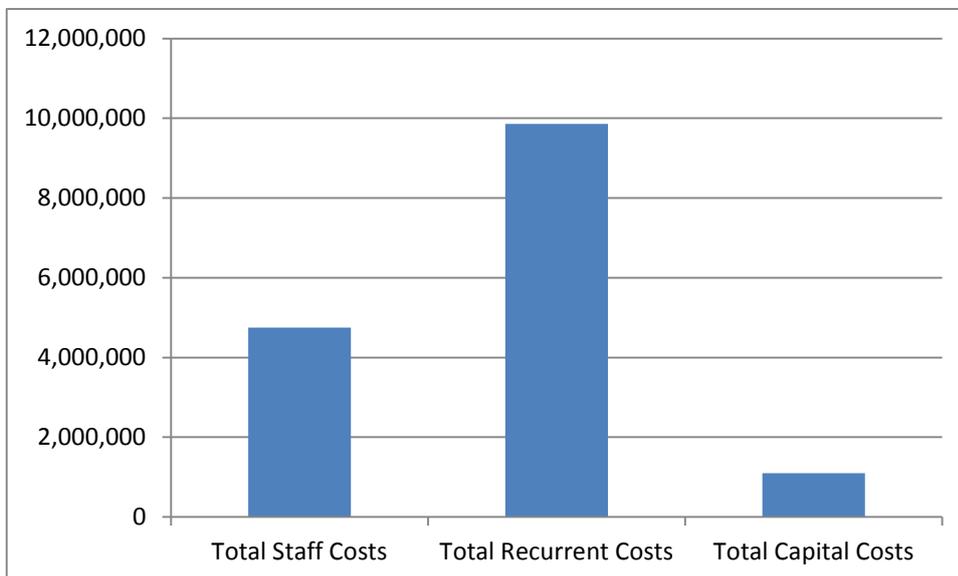


Figure 3: Hospital Revenue Sources

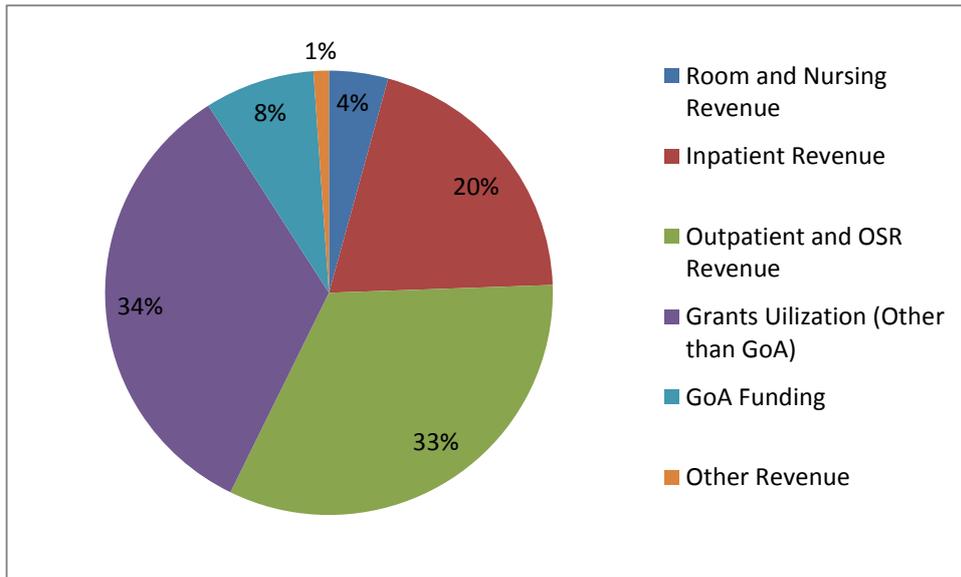


Figure 4. Average cost per bed day or outpatient visit

