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Prefeasibility Report for Setting up of Diagnostic Centre at District Hospital Dharwad

Karnataka Infrastructure Development
Department Project

Submitted by



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Submitted to

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Executive Summary

Laboratory diagnostic service is required for providing effective diagnosis of the disease suffered by the patient, measure the quantum of medicines to be provided, quantify the extent of cure effected, identify the medical sensitivities of the patient to avoid wrong/under/over medication resulting in adverse effects and to extend the research and development capabilities of the medical process.

District hospitals providing secondary medical care are supposed to have a certain bandwidth of lab tests as per the availability of specialties and the type of medical care to be provided as per IPHS norms, but most hospitals in India are not equipped to this extent. This shortage of essential medium to high-end diagnostic service severely handicaps the effectiveness of service delivery at the hospital and results in unwanted referrals resulting in overloading of patients in higher delivery centre.

This objective of this project is to establish district diagnostic centers at district hospitals of Gulbarga, Dharwad and Uttara Kannada districts of Karnataka on PPP mode. The partner is expected to provide diagnostic service for the district hospital, the partner can establish as many collection centre at taluka hospitals in the district and provide services. For services not available at the district hospital, the partner shall procure the same from the market for the government at the agreed prevailing market rates.

The proposed project will be offered on Own, Operate and Transfer mode (OOT) to the successful bidder, the bid variable being the fractional cost of CGHS rates for diagnostic services that the bidder charges the government for providing the service. The partner can service the patients referred by the private doctors also but at government rates.

The service provider will be responsible for investing in the requisite equipments and manpower as per the terms of reference, operating the centre, providing the service and adhering to the laws and regulations that govern the process.

This project shall be verified for its success and ability to meet the specified objectives at the end of every year. Upon successful achievement of the objectives, the project may be replicated across the state following the same model or modifying it as per the requirement.

Chapter 1 – Introduction

Project idea

1.1 Basis for selection of this project

The public healthcare service delivery in Karnataka follows the national pattern and consists of different levels of public healthcare institutions, starting from the bottom of the pyramid of healthcare facilities and going to the top, an integrated; step up referral system with a network of sub-centers, primary health centers, community health centers, taluka hospitals, district hospitals, and medical college hospitals. Patients are provided advanced level of curative, surgical, and diagnostic services as they move up the hierarchy. Primary healthcare delivery is provided at PHC and CHC where the patients are treated for minor sickness, basic specialties, and minor surgeries. District hospitals provide secondary medical care, delivering service in General Medicine, Obstetrics and Gynaecology, Orthopaedics, Ophthalmology, ENT, Dental, Laboratory and Radio diagnosis.

The Government of Karnataka in its commitment to improve the health and well-being of the people has provided extensive resources to the primary and secondary level public health facilities; one of the major components of the same is access to high-end diagnostic service.

Medical diagnosis has evolved from visual and aural observation, tasting of body fluids, primitive testing with basic chemicals and heat to advanced atomic level measurements at present. Medical diagnosis presents a truer picture of the nature of disease, status of penetration of the disease, degree of cure and the health of the cellular components of the body. Medical treatment procedures have become highly dependent on diagnostic service to provide measured, accurate and effective treatment, 80% of the medical treatment is dependent on proper diagnostic service.

The branches of medical diagnosis is widely divided into two, anatomical pathology and clinical pathology. Anatomical pathology includes histopathology, cytopathology, electro microscopy etc and Clinical pathology includes, microbiology, bio chemistry, haematology, genetics, reproductive biology etc, each of these sub sections have further specialized fields of study which offer an in depth view of the disease and the body.

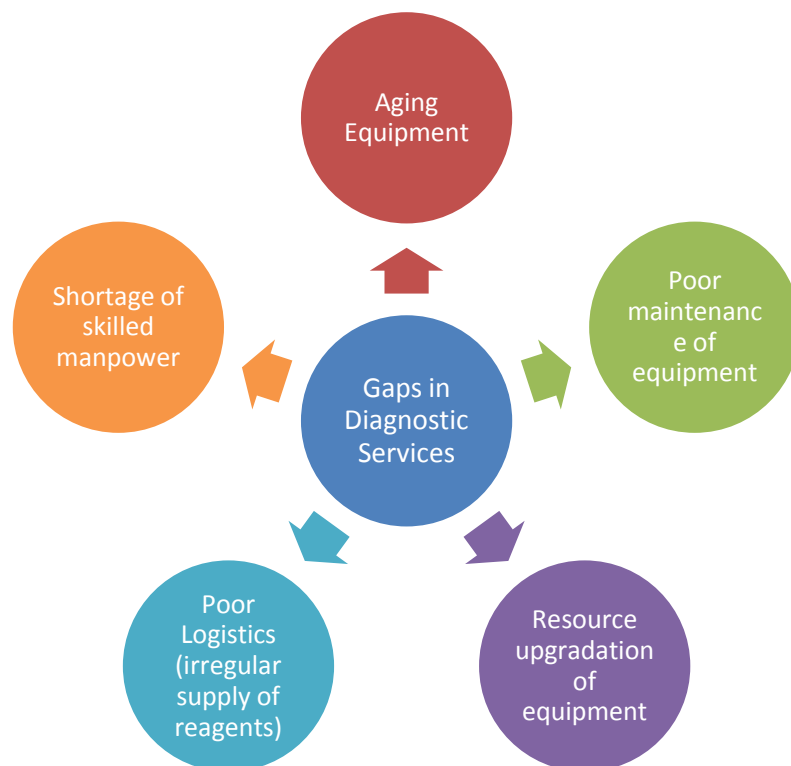
While the advantages medical diagnosis is well documented and proved in medical treatment efficacy, it is also equally costly to provide for high-end diagnostics. Diagnostic centres originally associated as a part of hospitals have branched out as a separate business, so as to economise the service and provide a wide spectrum of service. A laboratory diagnostic service has to be mandatorily approved by a qualified pathologist in India.

District Hospitals are secondary level health care providers in India with basic specialties, though IPHS has laid down norms with respect to the number of specialties, types of treatments, and requirement for diagnostic services, most states in India are not able to adhere to the same for want of one or more factors. It is observed in most public hospital laboratories of Karnataka that the diagnostic

centres are not adequately equipped with equipment, technology, and manpower. Factors that influence the inadequate availability of diagnostic services are,

1. Non availability of modern automatic and semi automatic equipments which increase efficiency of the output
2. High capital cost of high-end equipments required for advanced tests
3. Shortage of skilled manpower for operating the diagnostic centre
4. Insufficient supply chain and logistics of consumables and other chemicals required for the service
5. Inadequate resources to meet the diagnostic load of the hospital
6. Lack of standard operating procedures for sample collection, management, testing, reporting, patient management and infection control
7. Inadequate bio medical waste management practices

Major Gaps in Diagnostic Services



These lacunae in the system adversely effects the efficiency and operation of the hospital by,

1. Delaying the treatment procedure
2. Restricting the treatment capacity of the medical practitioners
3. Absence of proper diagnostics may lead to judgmental errors on the condition of the patients
4. Everyone is immune or counter reactive to certain drugs and chemicals, lack of diagnostic service may adversely affect the treatment out comes

5. Inhibits the continuity of medical treatment
6. De-motivates the medical practitioners as they are not able to extend to their fullest capacity

Hence, the government of Karnataka decided to pilot a project on operating district diagnostic centre on PPP mode to bring in the efficiency and resources of private players. Gulbarga, Dharwad, and Uttara Kannada districts have been selected for the pilot project, upon successful operation and ratification of the same, other district hospitals might be considered for further PPP options.

1.2 Why PPP for this project?

Diagnostics forms a **critical input** for medical treatment. It comprises of two major fields: **Laboratory Diagnostics and Imaging**. In India, 60-70 per cent of medical treatments are based on laboratory diagnostic tests, thus making it one of the most indispensable segments in the healthcare industry. Diagnostics may not completely aid in curing the disease but can go a long way in this direction.

Innovation and up gradation forms the critical element in this business. The paradigm shift towards improved quality, error-free services, and the need to ensure patients' satisfaction has prompted laboratories to adopt novel technologies such as automation and point-of-care in order to reduce their expenses. Advances in nanotechnology and genomics have enhanced the role of diagnostics in the healthcare market. This advancement in technology is helping Diagnostics segment to keep up with current medical practices.

Diagnostics is a **capital intensive** segment of Healthcare and requires efficient management systems to make it financially sustainable. The main reason for the capital intensive nature is the non-availability of equipments in the country. The Indian equipment industry is in its nascent stage compared to the global players that leaves the facility provider with few options to choose among. Most of the time, facility provider ends up importing the equipment and bears a high cost in order to maintain quality standards. Facility provider also incurs additional running cost of consumables and maintenance. To survive and succeed in these challenging conditions, it is imperative for government to look for ways to adapt and implement new strategies. In today's competitive environment, revenues per test are continually falling, thereby requiring Diagnostic centers to increase their productivity for survival.

To bridge the gap between the existing and expected level of Diagnostic services, Government of Karnataka has come up with projects on Regional Diagnostic Centers to be implemented on Public Private Partnership mode. With the introduction of private service, providers in Diagnostics following improvements are expected:

1. Population of the given district can avail high-end Diagnostic services at government-approved rates.
2. Private service provider will invest the capital and ensure the maintenance of equipments.
3. Private service provider will also recruit the manpower and train them to deliver desired level of quality services.
4. With introduction of private player, Diagnostic centers are expected to work more efficiently as the risk is shared by both government and private partner
5. Sample collection centers at sub districts will ensure district hospitals have equitable coverage.

Government Initiative in Healthcare PPP

In the section 5.6 of the Karnataka Integrated State Health Policy 2004, Karnataka government has proactively identified the potential role of private sector in the healthcare delivery to the public.

Few goals declared in the policy also highlight the GOK's intent for PPP:

1. To establish **equity in delivery of quality health care**
2. To **encourage greater public private partnership** in provision of quality health care in order to better serve the underserved areas
3. To **strengthen health infrastructure**

This planned strategy of having PPP is most suitable for this project as state intends to bring the diagnostic service affordable and available.

1. GoK is evolving its role from that of provider to that of a regulator to ensure fair and transparent healthcare delivery to its citizens. This transformation requires the government to not only provide a transparent governance system but also partner with private organizations
2. The operation is a service delivery excellence intensive model, and private diagnostic centers pioneer this across the country, a PPP contract would bring in both the private sector efficiency and bring down the cost of service delivery
3. PPP in diagnostics service is an established model across the country and there are ample examples to emulate
4. Diagnostics is both capital and operation cost intensive equipment, offering the service on state government funds puts additional strain on the public exchequer operating within a limited fiscal space
5. Delay in reporting of problems in the hard & soft healthcare infrastructure lead to bigger and un-reparable problems.

The PPP model has been designed on the following guiding principles,

1. **Cost effectiveness:** For sustainable partnership, the diagnostic centre must be viable and at the same time affordable.
2. **Comprehensive coverage:** Services must cover all the basic categories of standard diagnostic tests like pathology, clinical pathology, bio-chemical, haematological, microbiological, serological, and radiological.
3. **Acceptable Quality:** The operating procedures prescribed by the Government, must be followed for good quality testing accompanied with compliance monitoring and timely reporting
4. **Upward and Downward Linkage:** Non-standard and special tests to be made
5. Available through seamless linkages with designated referral laboratory. Similarly, samples for testing would also be collected from taluka hospitals via collection centre

The mutual benefit arising out of the project is described as below,

S No	Stakeholder	Benefit from PPP model
1	Benefit to Government	<ol style="list-style-type: none"> 1. Better quality diagnostic services to the masses 2. Reduction in fixed costs on diagnostic services 3. Better utilization of resources
2	Benefit to Community	<ol style="list-style-type: none"> 1. Increase accessibility to improved quality of diagnostic services at low or free of cost
3	Benefit to Private Partner	<ol style="list-style-type: none"> 1. Reduced business risk 2. A sizeable client base 3. Availability of ready infrastructure 4. Lower initial investment

1.3 Objectives of the project

PPPs combine the varied skills and resources of partners in innovative ways and allow for the sharing of benefits, risks, and responsibilities. Therefore, the government looks increasingly to PPP as a model to:

1. Provide Diagnostic service by tapping the expertise of the private sector
2. Speedier diagnosis, reduced incidence of complications due to delays in diagnosis
3. Improved ability of the public health system to respond to health needs of the people
4. Increased confidence of the community in public health services and improved
5. Utilisation of Rural Hospital /Block Primary Health Centres services
6. Increased access of people to improved quality of diagnostic services at affordable costs
7. Reduction in upstream treatment costs of complicated conditions resulting in financial savings to the government, which can be channeled to preventive healthcare
8. Mobilize private capital to speed up the delivery of infrastructure and services and eliminate subsidies
9. Enable efficient use of Diagnostic service by improving the identification of long-term risks and their allocation, while maintaining affordable tariffs
10. Provide higher quality of services
11. Access best practices
12. Enable regular maintenance and upgrades

Approach & Methodology, studies, surveys including data collection, analysis

A primary research was carried out to,

- Study and understand the operations of the selected district of the state and identify their needs
- Assess the availability of Diagnostic services for the district population with the public and private facilities
- Assess the business environment in terms of market dynamics, pricing competition, regulations
- Discussions with key stakeholders in the location, to ascertain the market opportunities in the selected regions and the expectations of clientele
- A detailed sensitivity analysis on the base case projections with respect to the key drivers affecting revenue, streams of business and capital cost.

Based on the detailed research and modeling, the ideal pricing structure for the diagnostic service has been proposed.

Secondary research

We supplemented the primary survey with secondary research focused on similar PPP models across the country, operating models of diagnostic centers and pricing of services

Chapter 2 - Sector Profile

Industry Overview

In India, majority (70-80 per cent) of medical treatments are based on laboratory diagnostic tests, thus making it one of the most promising sectors in the healthcare industry. In India, the medical diagnostics industry accounts for almost 10 per cent of the healthcare sector's revenues. With the growth in income and health insurance coverage, there is an increasing demand for better healthcare services among the growing population of the country. The sector's growth will be driven by the country's growing middle-class, which can afford quality healthcare.

Healthcare diagnostics is growing at the rate of 15-20 per cent per annum. The major driver for this growth is the wide gap of 70-80 per cent cost-advantage that Indian companies have over different countries. Today, patients from neighboring countries in Asia are coming to India to receive specialized medical treatment. India is now meeting international standards at a cost advantage compared to developed countries.

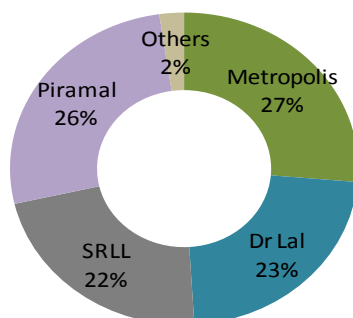
In addition to this, the vast difference in costs between Western countries and India, the country is being seen as the preferred destination for quality health solutions. This has been reflected by increasing medical tourism.

The Indian diagnostic market is broadly divided into equipment and services. The service sector is found to be largely unorganized, with a large presence of players located at the regional or city level. However, a clear and structured format is being established to have better regulations and proper definition for the market. The use of advanced and cutting-edge technologies in understanding a disease prognosis has further strengthened the sophistication level of participants in the sector.

Key Players in Diagnostic Market

In the primarily diagnostics segment, the top-four corporate players by sales include Metropolis, Dr Lal Pathlab, Super Religare and Piramal Diagnostics (now a subsidiary of Super Religare). This section profiles some of the large corporate diagnostic services providers in India.

Share of Major Corporate Players



Peer Comparison (2009-2010) – Corporate Diagnostic Service Providers

	Equity (Rs Million)	Sales (Rs Million)	Presence	Tests processed daily (No.)	Tests types (No.)	Patients screened per year	Doctors
Metropolis	0.1	2,000*	125 cities	170,000	4,000	4 million	50,000
Super Religare	619.9	1,690	450 cities	34,000	4,000	4 million	50,000
Piramal Diagnostics	-	2,000	80 cities	11,000	NA	4 million	NA
Dr Lal Path Labs	51.9	1,720	39 cities	12,000	1,650	5 million	100,000
Quest Diagnostics	1,655.0	NA	National capital region (14 centres)	NA	Globally 3,000	NA	900
Medinova	94.6	122	Four cities	NA	NA	3 million	NA
Thyrocare	0.5	-	1,000	50,000	132	NA	NA

Brief Profile of Major Private Players

Company	Labs	International presence	Specialised/ Esoteric tests
Metropolis	55 labs, 350 collection centres	Bangladesh, Mauritius, Nepal, Africa, Seychelles, South Africa, Sri Lanka, UAE	NA
Super Religare	Five clinical reference labs, 50 satellite labs, 1,000 collection centres	UAE, Kuwait, Saudi Arabia, Oman, Bahrain, UK, SAARC and South East Asian region	Specialised/ tertiary tests form 50% of business. Super specialty tests include molecular diagnostics, cytogenetics, clinical chemistry, histopathology, microbiology and genomics tests
Piramal Diagnostics	105 diagnostic centres, and 100 collection centres	-	Esoteric tests performed at Centres of Excellence. There are six such centres for Microbiology & Immunology, Histopathology, Molecular Biology, Haematology, Cytogenetics, and High-end

				imaging
Dr. PathLab	Lal	60 labs and 1,000 collection centres	Saudi Arabia, Sri Lanka, Kuwait, Nepal, Bangladesh	NA
Quest Diagnostics		Lab in Gurgaon	Global player	India - total 300 tests, of which 120 are routine and 200 are specialised tests; Esoteric tests referred to labs in the US
Medinova		25 franchises and 31 collection centres	-	NA
Thyrocare		Lab in Mumbai, 600 collection centres, 570 franchises	NA	Tie-up with Genome Biotech for molecular diagnostics

IMaCS interacted with few players in the above list to know their willingness to serve in remote districts of Karnataka. They showed interest in the idea provided it has good business prospects and also full commitment & support from state government.

Regional profile

Dharwad district has a wide spread network of small scale private laboratories, where the level of automation and the bandwidth of tests available is very limited, hence there is a dearth for high end diagnostic service. Local private laboratories lack the capability to provide comprehensive quality lab services as per the NABL standards.

In December 2007, Bangalore ranked 2nd among the 593 districts in the country in terms of existence of health facilities. Bangalore rural district stood at an impressive 67. Ten districts in Karnataka have below-100 ranking as shown in the table below,

District	Rank
Belgaum	211
Bellary	247
Bidar	243
Bijapur	302
Chikmanglur	52
Chitradurga	135
Dakshina Kannada	47
Davangaere	114
Dharwad	112

Gadag	194
Gulbarga	333
Hassan	39
Haveri	146
Kodagu	72
Kolar	81
Koppal	339
Mandya	95
Mysore	80
Raichur	355
Shimoga	46
Tumkur	101
Udupi	35
Uttara Kannada	99

Table 2.1: Ranking of districts of Karnataka on the basis of existence of Health Facilities

According to McKinsey survey report, commissioned by the Confederation of Indian Industry in March 2011, Karnataka's GDP grew at 8.7% between 2005 and 2010. The report predicts South India could spearhead the country's growth over the next few years with its GDP projected to hit \$500 billion by 2016 and close to \$650 billion by 2020.

GOK's intense focus on providing quality healthcare to the state population, its proactive approach on PPP model and increasing per capita income make Karnataka an ideal place for investment in this segment.

Key Issues

The key issues in setting up high-end diagnostic centers are,

1. High cost of capital equipments
2. Limited availability of trained clinical and para clinical manpower – Pathologists are in short across the country, most laboratories are run by qualified lab technicians
3. Complex process to scale up because of the variety of tests and intricacies in logistics management of consumables and chemicals
4. The business needs close tie-up with medical practitioners who provide the captive market to the laboratories
5. Requires rigorous infrastructure set up
6. Regular maintenance of equipments as the running time of machines is high
7. High cost of associated employee salary
8. Power supply, procurement of supplies adds to cost

Chapter 3 - Market Assessment

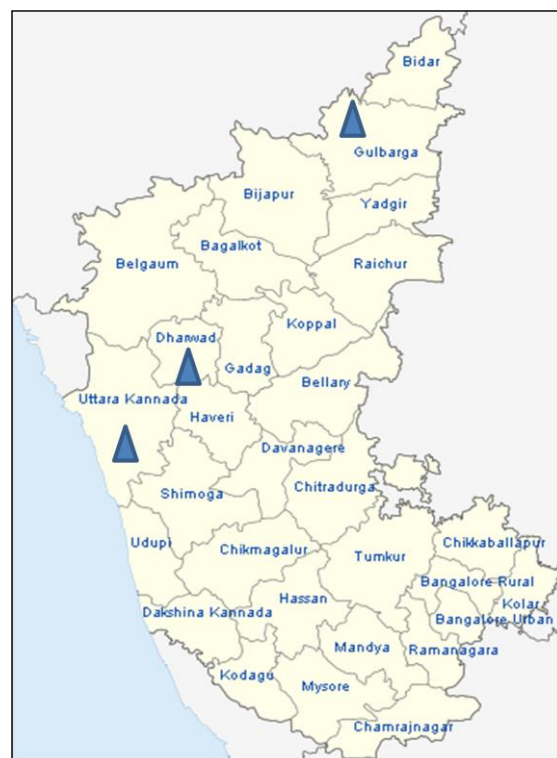
The need for high-end diagnostic service is dependent on availability of medical treatment facilities that support such service. Dharwad has one district hospital providing secondary treatment, two medical colleges, and one dental college. There are several laboratories, but they lack the technology, automation, and scale required to provide high-end diagnostic service. The number of patients who would require diagnostic service at the district hospital level has been worked out in the project financials part of this report.

Chapter 4 - Project

Description of the Project

GOK is planning to provide district diagnostic centers on PPP at the district hospitals of Gulbarga, Dharwad, and Uttara Kannada.

1. The diagnostic centers will be located in the District hospital premises. The centre will take over the operations of the existing district laboratory, upgrade it to provide all tests available as per the contract, and provide the necessary equipments for the test as required.
2. The partner shall employ two pathologists per district who will provide the interpretation of results and will be in charge of the day to day operations of the centre.
3. The partner shall also employ adequate number of administrative staff, lab technicians, lab attendants and cleaning staff for optimal operation of the diagnostic centre.
4. The partner shall establish the district hospital centre as a hub and can have collection centers in as many public hospitals in the district including Taluka Hospitals
5. The diagnostic centers shall serve both the patients from the district hospital, referrals sent from Taluka Hospital
6. In addition the centre shall serve patients referred by private practitioners, but the charges will be same as for government patients.
7. The partner shall comply with the agreed turn-around time for each test so that the operational efficiency is maintained high



8. The partner shall maintain optimal supply chain of diagnostic centre consumables and chemicals, and shall not run out of stock at any point
9. The partner shall collect the minimum charges prescribed by the government for availing diagnostic services from the beneficiaries and submit it with the government. The government shall reimburse the partner for the number of cases served at agreed rates as per the annuity.
10. The partner shall adhere will all the existing Clinical Establishment Act & Rules, Bio Medical Waste norms and other norms of the land

Components of the project

For setting up of a district diagnostic centre in a district hospital the requirements are as follows,

- a) Space for diagnostic service – 3000 sqft to 4000sqft of built up space for providing all the necessary variety of test, sample collection, waste disposal, rest room, cleaning and store room
- b) Requisite number of semi automatic, fully automatic and manual equipments as it needs for the service mix
- c) Sample collection set up
- d) Patient waiting area
- e) Computerisation, networking of equipments and installation of a Lab Management Information System for integrating sample collection, test results recording, data base management and delivery of results
- f) Consumables and chemicals as required

Services/ Items to be provided by the Government

General Provisions

Administrative responsibilities, required space, provision of water and electrical power required for running the project.

Professional and other support services

Prescription for required investigations, response to the generated test results, co-ordination between departments IPD/OPD for sample collection, testing and reporting shall be ensured by the Government.

Services/Items to be provided by the Partner

Infrastructure Works

The partner shall execute the work of modifying the existing civil and electrical infrastructure to facilitate and establish Diagnostic Centre. The partner shall put in place logistics and cold-chain system to collect samples from Taluka hospitals

Diagnostic Equipments

The partner shall provide, install, maintain and operate necessary equipments including fully auto analyser, semi auto analyser, incubator, distilled water plant, glucometer, elisa reader cum analyser, blood gas analysis equipments, haematology analyser, refrigerators, bio safety cabinet, RO plant, histopathology equipments etc as required by the agreed list of tests. The partner is responsible for comprehensive maintenance and standby of equipments in case of breakdown of machine in any of the centres to ensure uninterrupted service.

Computerisation and LMIS

The partner shall provide and install computers to network the diagnostic equipments for seamless recording of test results generated. The computers shall be integrated with a Lab Management Information System which shall track, update and report the status of diagnostic tests, consumables and chemicals used for the same.

Bio Medical Waste Management

The partner shall arrange for necessary certification of the diagnostic centre under Bio Medical Waste Management and Handling Rules 1998. The following shall be the duties of the partner in respect to BMW management,

1. Collection of bio medical waste as the diagnostic centre premises
2. Instruction of patients regarding handling of BMW waste
3. Display of IEC material regarding BMW collection and handling at the diagnostic centre premises
4. Temporary storage of BMW waste
5. Treatment of infected water and chemicals using Hypo Chlorite solution or equivalent before discharging into the waste stream
6. Collection, sterilisation and disposal of sharps, needles, broken glass etc
7. Usage of proper coloured bins and bin liners
8. Tagging of BMW waste as per category
9. Classification and recording of waste collection regularly

The disposal of the BMW from the hospital premises shall be as per the existing systems in the district hospital, the partner shall deliver the BMW at transport-able condition with proper tagging at the common collection centre located in the hospital premises every day or as per the agreed terms.

Ancillary equipments

The partner shall provide and maintain all ancillary equipments like the Weighing scale, BP apparatus, Stethoscopes, Ph meter, TDS meter, autoclave, test tube, ESR tube, tube stands, cell counter etc. required for proper operation of the system.

The partner shall provide the backup power requirements for 90 minutes to the machines to have uninterrupted diagnostic service.



The partner shall provide facilities for the disposable equipments and patient belongings as per the standard requirements

The partner shall arrange for proper Biomedical Wastes collection as per Karnataka State Pollution Control Board norms and shall provide all the necessary infrastructure supports that are required.

Summary of Commitments

S.No.	Private Provider	Government of Karnataka
1	Commitment to service all samples generated	Assurance that all investigations generated in hospital will be services by Private service provider
2	Commitment to Turn Around Time (TAT) for various investigations	Provision of space
3	Procure and operate / maintain required lab equipments and LIMS	Provision of utilities (water, power, AC)
4	Basic renovation of the facility provided by GoK	Provision of BMW disposal
5	Set up collection centres at taluka hospitals identified	Security of premises
6	Lab operations (including provision of consumables and salary)	

Description of the District Hospital Dharwad

Dharwad District is an administrative district of the state of Karnataka in southern India. The administrative headquarters of the district is the town of Dharwad. Dharwad is the administrative seat of the district of the same name. The municipality covers 191 km². Dharwad is located 425 km northwest of Bangalore and 421 km south of Pune, on the main highway between Bangalore and Pune in Maharashtra. Dharwad district is situated in the Western sector of the northern half of Karnataka State. The District encompasses an area of 4263 km². The District lies approximately about 800 mts above the sea level and is bounded on the North by the District of Belgaum, on the East by the district of Gadag, on the South Haveri and on the West by Uttara Kannada district. All these districts which surround Dharwad district belong to Karnataka State itself.

The Nanjundappa Committee based on various socio-economic indicators assessed the development of 175 talukas in the state of Karnataka.

Backward Talukas of Dharwad District

Taluka	Rank	CCD Index
Navalgund	63	0.99
Kundgol	77	0.95
Kalghatgi	124	0.84

(Source: http://www.dharwad.nic.in/dwd_profile.htm)



District HQ	Dharwad Town
Area	4265 square kilometres
Region	Western sector of Northern Karnataka
Population	1846993
Population Density	434 inhabitants per square kilometre
Population growth over decade	15.13%
Literacy Rate	80.30%
Sex Ratio	967
Focus Economic Sectors	Agro & Food processing, IT, Automobile Components, Engineering, Electrical Goods, Agricultural Implements, Machine tools, Electrical, Steel Furniture, Textiles
Talukas	Dharwad, Hubballi, Kundgol, Navalgund, Kalghatgi
Medical & Health Science Colleges in Dharwad District	<ul style="list-style-type: none"> •District Hospital, Dharwad •Karnataka Institute of Medical Sciences (KIMS) •SDM college of Engg., Medical & Dental Sciences
Taluk Hospitals with bed Strength	Taluk Level Hospital Navalgund (100) Taluk Level Hospital Kundgol (100) Taluk Level Hospital Kalghatgi (100)
Number of PHC	32
Number of CHC	3

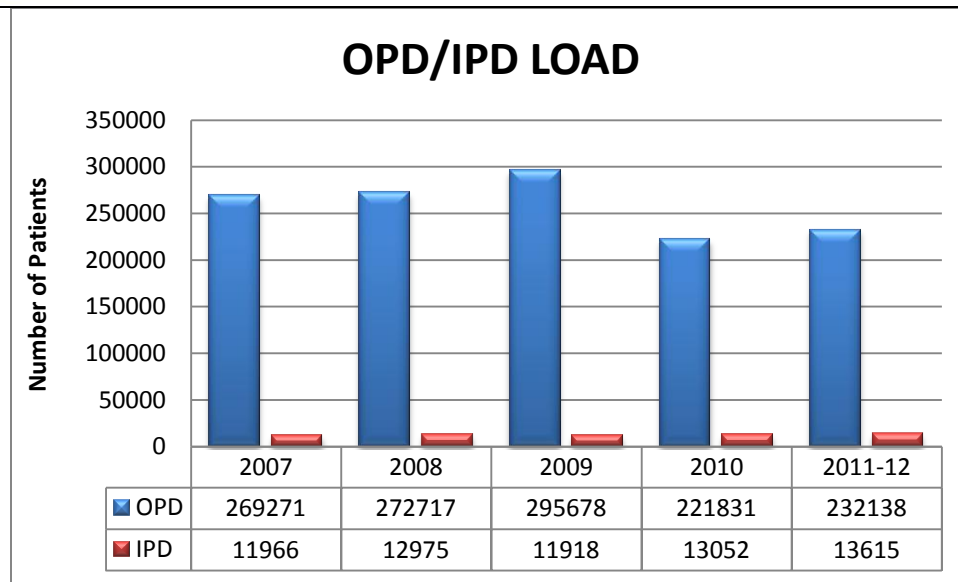
Source: <http://www.census2011.co.in/census/state/karnataka.html>
<http://www.advantagekarnataka.com/investment-information/district-profiles.php>
<http://nrhm-mis.nic.in/UI/RHS/RHS%202011/District-wise%20Health%20Centres.pdf>

Dharwad District Hospital

Dharwad District Hospital is currently a 250 bedded hospital started in 1852 with the European civil infrastructure then the renovations are made with time; majorly in the year of 2003 a new hospital was developed in the same premises to provide the comprehensive services under one roof. It is a multi-speciality hospital including Medicine, General Surgery, Orthopedics, Gynecology, E.N.T., Skin, Dental, Ophthalmologic, Geriatric, Physiotherapy services

Workload

The outpatient and inpatient load over the last last five years of the hospital is shown in the graph below



Speciality Departments in District Hospital Dharwad

The District Hospital of Dharwad is a multi-speciality hospital with following departments:

S No	DEPARTMENTS
1	Medical
2	Surgical
3	Gynecology
4	Orthopedic
5	Pediatric
6	Ophthalmologic
7	E.N.T
8	Skin
9	Dental
10	Psychiatric
11	Geriatric
11	Physiotherapy

Radiology Department of District Hospital in Dharwad

The following table shows the existing services available at Dharwad District Hospital



Service availability	Quality available	Manufacturer	Age of Equipment
300 MA X-Ray unit	1	Siemens India Ltd	15
500 MA X-Ray unit	1	KHSDP	15
100 MA X-Ray unit	1	Allengers Medical Product Pvt Ltd	15
600 MA LBD Mobile X-Ray unit	1	Wipro GE Medical System Ltd	15
Intra Oral X-Ray Machine	1	KONO-65	12
Ultrasound Machine	1	Aloka	14

User Charges for Services

The user charges levied by the District Hospital are shown in the table given below

Service Name	User Charges (Rupees)
X ray	50
USG	50

Staff in Radiology Department

The Radiology staff available in the District Hospital comprises of a Radiologist on contractual basis and a trained nurse for carrying out X-ray. Radiology Diagnostic Department of District Hospitals has the following staff members.

Staff	Number
Radiologist (contractual)	1
Trained Nurse (for X-Ray)	1

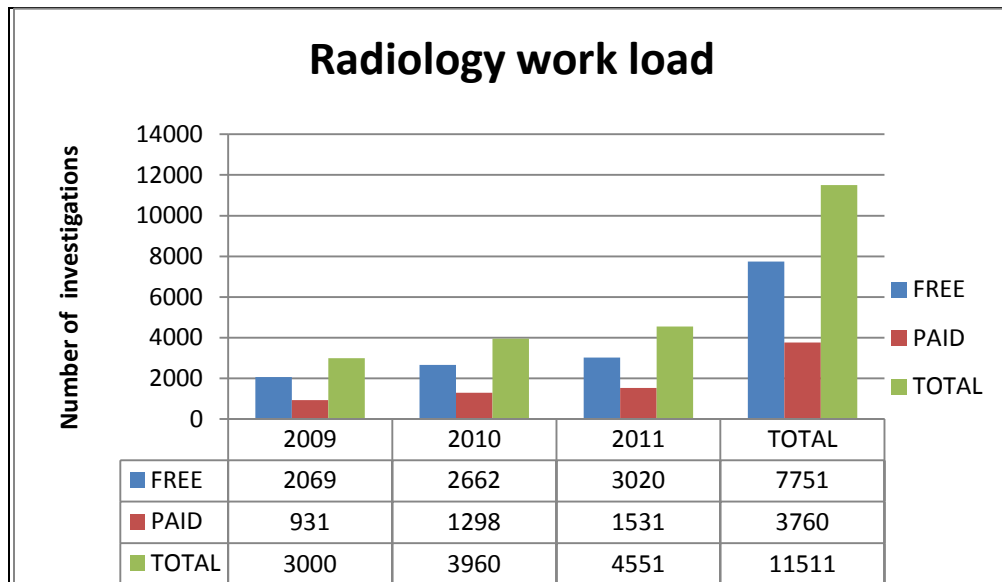
Workload of Radiology Department

The workload of the District Hospital has been divided into 2 categories: free and paid. The table shows the number of X rays paid and free carried out from year 2009 to 2011; BPL card holders can avail the X ray and Ultrasound free & the ANC USGs are done on free of cost

YEAR	FREE	PAID	TOTAL
2009	2069	931	3000
2010	2662	1298	3960
2011	3020	1531	4551
TOTAL	7751	3760	11511

YEAR	NO.OF X-RAY TAKEN
2009	3000

2010	3960
2011	4551



Diagnostic Laboratory of Dharwad District Hospital

Laboratory equipment

Dharwad District Hospital has the following major Laboratory equipments

Equipment	Quantity
Centrifuge Machines	2
Ion-Selective Electrolyte Analyzer	1
Fully automated Bench top chemistry Analyzer (Cobus 111)	1
Binocular Microscopic Compound	2
Lab Refrigerators (without deep freezers)	2
Hot air oven	1
BOD Incubator	1
Micro Pipettes	5
Urine strip Analyzer	1
ESR Analyzer	1
Haemoglobinopathy Testing Equipment	1
Automatic Cell Counter	1
1000mA X-Ray unit	1

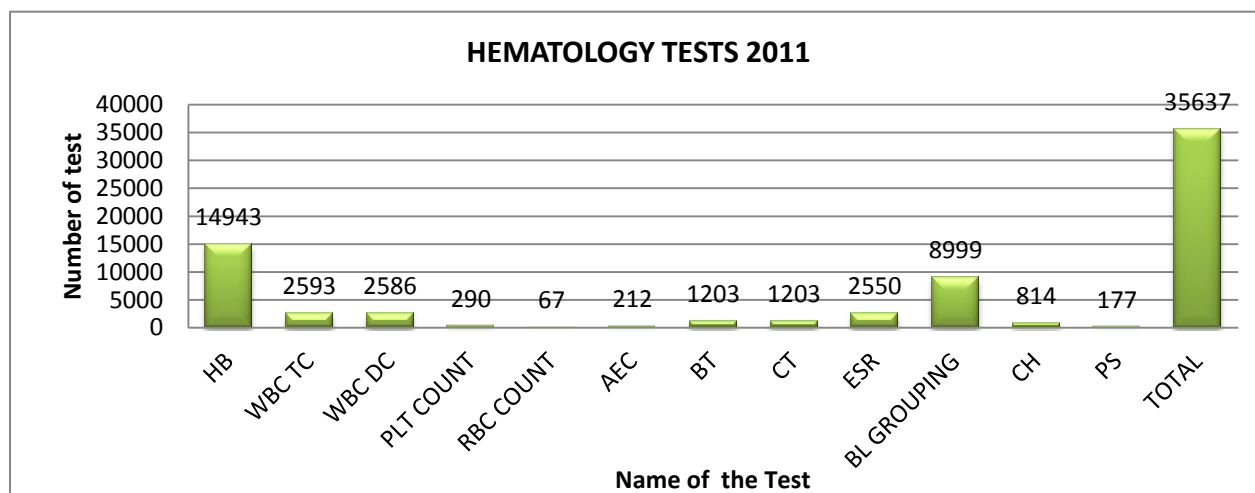
Workload of Laboratory Department

The following table shows the workload on laboratory diagnostic department in Dharwad District for last year.

Hematology tests in District Hospital, Dharwad in year 2011

The table below shows the list of Hematologic tests available in Dharwad District Hospital. The total number of tests carried out in year 2011 is 35637. It is found out that HB test comprises of the maximum share i.e. 41.93 % and RBC test comprises the minimum share i.e. 0.18% of total Hematologic tests in District Hospital in year 2011.

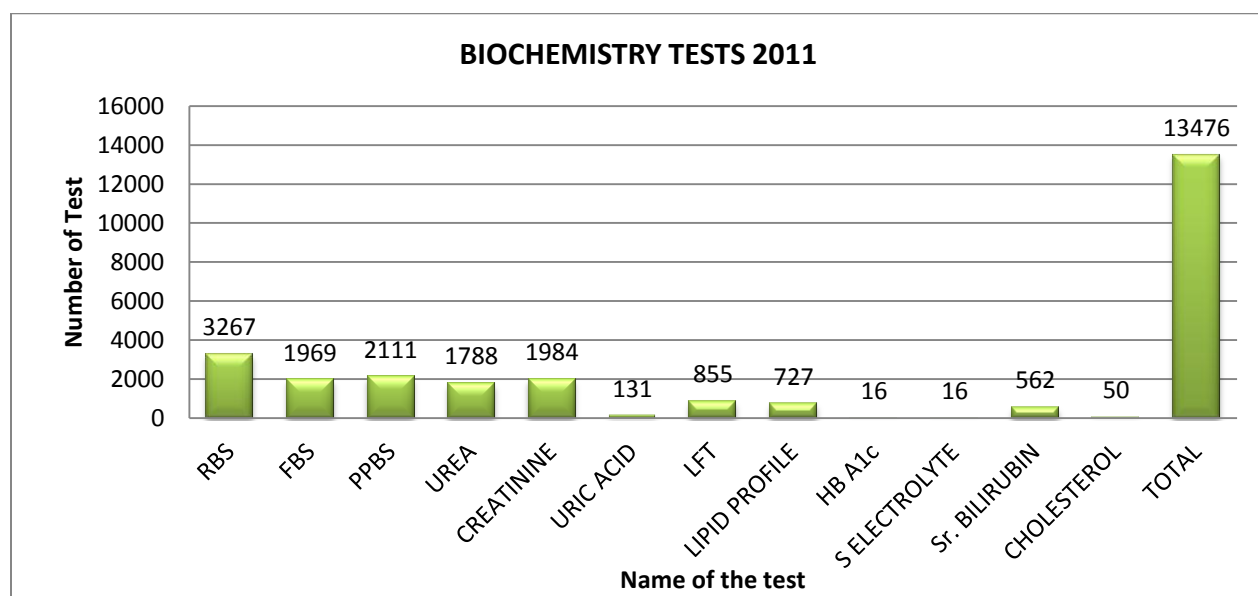
Name of Test	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
HB	112	114	111	114	128	128	132	118	139	115	142	137	1494
WBC TC	1	3	8	9	2	2	4	2	3	7	1	1	3
WBC DC	225	243	249	173	174	151	174	305	278	163	235	223	2593
PLT COUNT	225	243	249	173	167	151	174	305	278	163	235	223	2586
RBC COUNT	3	-	-	-	2	-	1	-	284	-	-	-	290
AEC	-	-	-	-	-	-	-	-	-	-	-	67	67
BT	37	30	24	16	17	23	19	9	13	6	10	8	212
CT	123	108	120	128	126	112	133	70	57	65	62	99	1203
ESR	123	108	120	128	126	112	133	70	57	65	62	99	1203
BL GROUPING	239	250	251	106	177	154	174	301	284	164	237	213	2550
CH	765	509	282	714	903	940	861	626	894	797	913	795	8999
PS	3	50	-	-	190	75	89	89	107	58	86	67	814
TOTAL	4	7	-	6	33	18	15	24	17	18	10	25	177
TOTAL	2868	2691	2413	2593	3197	3018	3097	2981	3662	2656	3271	3190	35637



Biochemistry Tests in District Hospital, Dharwad in year 2011

The total number of Biochemistry test carried out in Dharwad District Hospital in years 2011 is 13476. The 24.24 % of Biochemistry test carried out in year 2011 was RBS test and the lowest being HB A1C and S Electrolyte test with share of 0.12% each.

Name of the Tests	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
RBS	354	156	259	266	288	325	377	323	257	128	296	238	3267
FBS	142	153	141	135	131	183	216	197	179	67	175	250	1969
PPBS	144	311	140	134	121	184	217	191	177	67	175	250	2111
UREA	133	152	157	162	249	177	172	162	109	56	151	108	1788
CREATININE	172	183	183	199	264	180	190	180	109	57	155	112	1984
URIC ACID	0	16	6	9	25	33	5	3	28	4	-	2	131
LFT	0	78	78	114	157	77	89	89	53	32	55	33	855
LIPID PROFILE	-	75	73	91	146	75	81	63	54	29	22	18	727
HB A1c	-	5	5	-	4	1	0	-	0	0	-	1	16
S ELECTROLYTE	2	1	1	4	2	1	1	2	0	1	-	1	16
Sr. BILIRUBIN	20	107	13	46	41	35	30	55	18	12	111	74	562
CHOLESTEROL	-	-	-	2	-	4	-	2	-	2	22	18	50
TOTAL	967	1237	1056	1162	1428	1275	1378	1267	984	455	1162	1105	13476

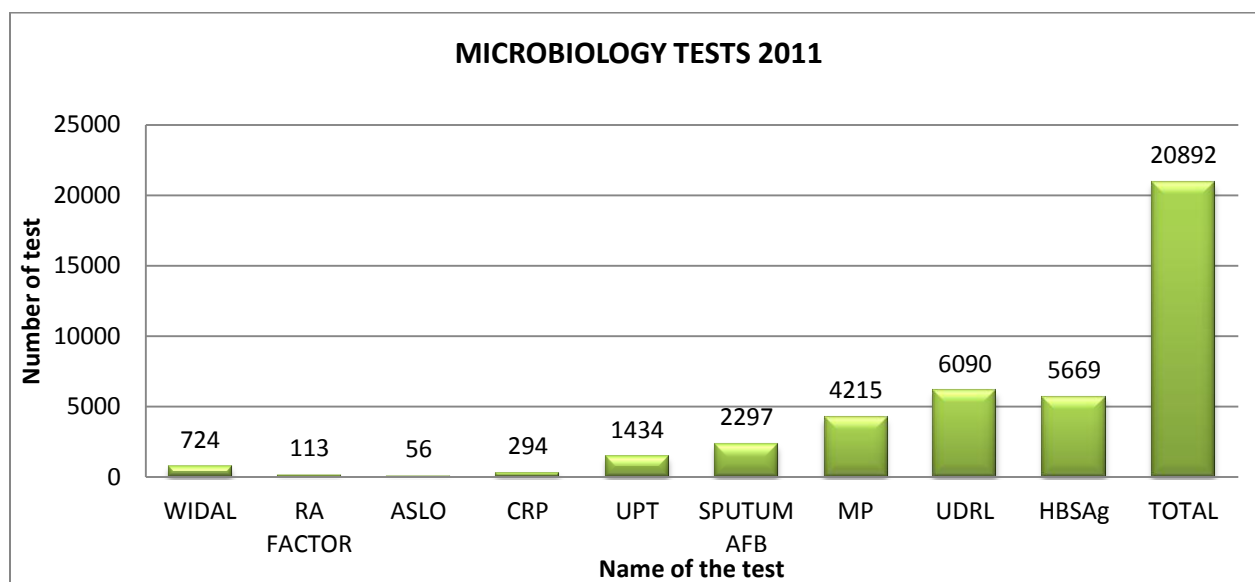


Microbiology Test in District Hospital, Dharwad in year 2011

The total Microbiology tests carried out in Dharwad District Hospital in the year 2011 is equal to 20892. The maximum share was captured by UDRL i.e. 29.14% and minimum was captured by ASLO i.e. 0.26%.

The following table shows the composition of different Microbiology tests carried out in year 2011 month-wise.

Name of the Test	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
WIDAL	171	37	36	34	36	44	36	69	76	54	80	51	724
RA FACTOR	16	6	5	11	14	12	6	4	16	10	8	5	113
ASLO	4	2	1	6	7	9	6	3	5	7	3	3	56
CRP	6	4	7	22	26	26	44	45	40	36	30	8	294
UPT	74	99	107	104	85	135	124	138	202	168	144	54	1434
SPUTUM AFB	212	196	195	140	198	162	227	211	204	162	181	209	2297
MP	351	230	171	234	200	177	385	407	416	507	578	559	4215
UDRL	575	604	368	414	453	573	445	443	574	491	544	606	6090
HBSAg	372	107	458	469	437	590	467	491	610	504	548	616	5669



Quality parameters of District Hospital Laboratory

Quality parameters of the district hospital lab are;

Sl No	Quality Parameter	Status
1	Time taken for reporting lab tests being conducted in DH? a. For routine tests b. For special tests	5 -10 minutes 3 hours; but in general for both kind of tests due to the load, all the samples are being collected in morning and the reports are given in the afternoon.

2	Number of computers available in the laboratory	2
3	Is data stored in computers?	Yes
4	How is the laboratory sterilized?	Cleaning and mopping with Phenyl twice a day
5	Is proper BMW Management practices observed strictly in Lab?	Yes, colored BMW bins and puncture proof container for storing needles are used, lab employees use protective gear and liquid lab wastes treated overnight before being released into the sewage system.
6	How frequently have you faced stock out in the last one month/year?	Occasional stock outs

Interaction with stakeholders

For primary information, iMaCS visited District Hospital Dharwad and discussed with the key officials of the hospital including the District Surgeon, Pathologist, Radiologist, Lab Technicians, and had an in-depth discussion on the status of the laboratory diagnostic service available at the hospital and the type of facilities available.

This interaction with key officials brought out following key issues;

1. Scope of the District Hospital Dharwad laboratory needs to be widened by enhancing its investigating capabilities. List of presently 'available tests' and 'desired tests to be available' at the hospital lab are given in the following table;

Name of the Test	Available	Required	Name of the Test	Available	Required
HAEMATOLOGY	√		Rubella (IgM/IgG)		√
CTBT	√		Herpes 1 (IgM)		√
BLOOD MORPHOLOGY	√		Herpes 2 (IgM)		√
CBC	√		Herpes 1 (IgG) (Quantitative)		√
PLATELET CT.	√		Herpes 2 (IgG) (Qualitative)		√
RBC	√		LE Panel (Full Panel)		√
RETICULOCYTE COUNT	√		Fragile X		√
ESR	√		Fungal Culture Only		√
Any others specify					√
COAGULATION TEST		√	Fungal Culture & Sensitivity		√

PROTHROMBIN TIME		√	G6PD		√
APTT		√	Hemoglobin Electrophoresis		√
FIBRINOGEN		√	Micral/Crea Ratio		√
D-DIMER		√	Monospot Test		√
URINE EXAMS			Serum Osmolality		√
			Any others specify		
24 HR URINE CHON		√	HEPATITIS MARKERS		
CREATININE CLEARANCE		√	HBsAg	√	
URINALYSIS	√		anti-HBs		√
ABBOTT PREGNANCY TEST		√	HBeAg		√
SPECIAL URINE TEST			Anti-Hbe		√
Urine 5-HIAA		√	anti-HBc IgM		√
Urine Amino Acid		√	anti-HBc total		√
Urine Amylase		√	anti-HCV		√
Urine Calcium		√	HAV-IGM		√
Urine Catecholamine		√	Anti-HBC (IgG)		√
Urine Copper		√	Anti-HAV (IgG)		√
Urine Cortisol		√	Anti-Delta		√
Urine Metabolic Screening		√	HBV-DNA		√
Urine Metanephrine		√	HCV-RNA		√
Urine Osmolality		√	C-SERIES		√
Urine VMA		√	Ca12-5 (ovary)		√
DRUGS OF ABUSE			Ca 15-3 (breast)		√
COMBO DRUG TEST (Meth/Canna)			Ca 19-9 (pancreas)		√
METHAMPHETAMINES		√	TUMOR MARKERS		√
GLUCOSE TESTING/DIABETIC PANEL			Carcino-embryonic antigen (CEA)		√
FBS	√		alpha-feto protein (AFP)		√
RBS	√		PSA-Free		√
PPBS	√		B-HCG		√
OGTT		√	CA 72-4 (G.C)		√
OGCT		√	MCA (Breast C.A)		√
HAEMOGLUCOTEST		√	REPRODUCTIVE ENDOCRINOLOGY		
HBAIC	√		Lutenizing hormone (LH)		√
MICROALBUMINURIA		√	Follicle stimulating hormone (FSH)		√
OTHER CHEMISTRY EXAMS			THYROID FUNCTION TEST		√

ACP			Free T3		√
AMYLASE			Free T4		√
LIPASE			TSH		√
BLOOD URIC ACID	√		BACTERIOLOGY/MISC.		
17 Retosteroids		√	Gram Stain		
17 OH Ketosteroids		√	AFB	√	
Aldolase		√	C & S		√
Arsenic		√	WATER ANALYSIS		√
Barbiturates (Qualitative)		√	KOH		√
Bone Fraction Serum Alka. Phos.	√		SEMEN ANALYSIS	√	
Calcitonin		√	HISTOLOGY/CYTOLOGY		√
Carbamezapine		√	PAPS		√
CK-MM		√	HISTOPATH		√
CK-Total		√	FNAB		√
CO2		√	CELL BLOCK		√
Copper Level		√	OTHERS		√
CSF/Pleural/Ascitic/Pericardial Ana.	√		Allergen Panel		√
Cyclosporin		√	Anti Cardiolipin IgM & IgG		√
Digoxin/Digitalis/Lanoxin		√	Anti Delta		√
Dilantin/Phenytoin		√	Anti ds DNA		√
Ferritin		√	Anti Mitochondrial Abs		√
Folic Acid		√	Anti Phospholipid Abs		√
Fructosamine		√	Anti Smooth Muscle Abs		√
Gastrin		√	Anti Thrombin		√
Homocystein		√	B2 Microglobulin		√
Incr. Phos.		√	Blood C/S with ARD		√
Ionized Calcium		√	Breast Panel		√
CMV IgG		√	C Peptide		√
CMV IgM		√	C2		√
Torch (Qualitative)		√	Ceruloplasmin		√
C Peptide		√	Chromosomal Analysis		√
Ceruloplasmin		√	Circumoval Precipitin Test		√
FTA-ABS		√	Factor 8		√
IgG		√	Factor 9		√
IgA		√	Fetal Hemoglobin		√
IgM		√	Folate		√
IgE		√	Semen Analysis	√	

IgF1		√	Electrolytes (3)		
Aids Test	√	√	Sodium	√	
Protein C		√	Pottassium	√	
Rubeola IgM & IgG		√	Chloride	√	
Varicela IgG (Titer)		√	Lipid Profile (7)	√	
Toxoplasma IgM		√	Total Cholesterol	√	
Cortisol		√	HDL Cholesterol	√	
LIPID PROFILE	√		Triglycerides	√	
CHOLESTEROL	√		LDL Cholesterol	√	
HDL	√		VLDL Cholesterol	√	
TRIGLYCERIDES	√		TC / HDL Cholesterol ratio	√	
KIDNEY PROFILE	√		LDL / HDL ratio	√	
BLOOD UREA NITROGEN	√		Liver Profile (10)	√	
CREATININE	√		Bilirubin (Total)	√	
LIVER PROFILE	√		Bilirubin (Direct)	√	
SGOT	√		Bilirubin (Indirect)	√	
SGPT	√		SGOT (AST)	√	
ALP	√		SGPT (ALT)	√	
BILIRUBIN	√		Alkaline Phosphatase	√	
TOTAL PROTEIN	√		Gamma Glutamyl Transferase		√
ALBUMIN	√		Serum Albumin	√	
ELECTROLYTES	√		Protein - Total	√	
SODIUM	√		Serum Albumin / Globulin	√	
POTASSIUM	√		Renal Profile (5)		
CHLORIDE	√		Calcium	√	
CALCIUM		√	Uric Acid	√	
MAGNESIUM		√	Blood Urea Nitrogen	√	
CARDIAC PROFILE		√	Serum Creatinine	√	
TROPONIN T		√	BUN/Creatinine ratio		
TOTAL CPK		√	Iron Deficiency Profile (3)		
CPK-MB		√	Serum Iron		√
LDH		√	Total Iron Binding Capacity		√
SEROLOGIC EXAMS			% Transferrin Saturation		√
ANTI-NUCLEAR ANTIBODY (ANA)		√	Hemogram (17)		
H-PYLORI		√	White Cell Count	√	

TB ANTIBODY		√	Neutrophils	√	
CRP	√	√	Lymphocytes	√	
CRP (Predictive Quantitative)		√	Monocytes	√	
RHEUMATOID FACTOR	√		Eosinophils	√	
ASO	√		Basophils	√	
DENGUE TEST		√	Red Cell Count	√	
TYPHIDOT		√	Hemoglobin	√	
WIDAL	√		Hematocrit	√	
S-TYPHI		√	Mean Corpuscular Volume	√	
VDRL	√		Mean Corpuscular Hemoglobin	√	
ANTI-HIV 1 & 2	√		MCH Concentration	√	
TPHA		√	Red Cell Distribution Width	√	
Leptospiral Test (Lat Test)		√	Platelet Count	√	
Anti-H Pylori (Qualitative)		√	Platelet Distribution Width	√	
Anti-H Pylori (Quantitative)		√	Mean Platelet Volume	√	
			ESR	√	
Any others specify					

- Current inadequacy of lab services result in referral of patients to KIMS Hubli and SDM Dharwad. These facilities are 17.5 Kms and 7 Kms away from District Hospital Dharwad respectively; many of the patients also prefer to private labs as well. On an average 8-10 patients are being referred per month. Eg: FNAC, Dengue, Chicken Guinea, etc.
- Skilled manpower availability in the lab is inadequate. Current manpower availability against IPHS norms is given in following table;

IPHS Norms for 301-500 Bedded Hospital		
Name of Post	IPHS Norm	Current Availability
Microbiologist	1	No
Pathologist	1	1
Cyto technician	1	No
Laboratory technician	6	4
Laboratory attendant	2	1
Group D		1

Best case studies for similar projects in India

1. Contracting of Clinical Lab services in Bihar

Problem with system before PPP	Shortage of lab technicians and irregular supply of reagents required for pathological tests
Private service providers	Central Diagnostics and Sen Labs
Services provided	Pathology, Biochemistry, Microbiology lab services
Price set by	State Health Society Bihar (SHSB)
Coverage in state	25 District Hospitals, 23 Sub-Divisional Hospitals, 76 Referral Hospitals and 398 PHCs

Shortage of lab technicians and irregular supply of reagents required for pathological tests led to a situation where in government hospitals were unable to provide efficient pathology services to patients. In order to improve the provision of such services in government hospitals, the Government of Bihar outsourced pathological services to private labs.

Two agencies were selected on the basis of technical evaluation process – Central Diagnostics and Sen Labs, each serving 19 districts. Rates for the tests were fixed. Initially, the charges for the tests were paid by the patients themselves. However, after a period of time, a decision was taken to provide free testing services to patients in government hospitals. Following this, rates for testing were fixed by the State Health Society Bihar (SHSB) – the private providers would conduct the tests at no charge to the patients and would later be reimbursed by SHSB.

Clinical lab services including pathology, biochemistry, microbiology lab services were provided. Central Diagnostics and Sen Labs set up labs in the District Hospitals and collection centres in health facilities below district level. They developed infrastructure using advanced equipment at central locations; logistics are managed in such a way that samples from all the collection centres could reach the central locations within a few hours. At the central locations, the samples are processed using advanced equipment and reports are dispatched electronically to the respective health centres to ensure that they are delivered within 24 hours. The coverage under this partnership has extended to 25 District Hospitals, 23 Sub-Divisional Hospitals, 76 Referral Hospitals and 398 PHCs across Bihar. The private providers pay a nominal rent for space in the District Hospitals and the Sub-Divisional Hospitals.

2. Contracting Radiology services in SMS Hospital, Jaipur, Rajasthan

Problem with old system	SMS Hospital in Rajasthan did not have capital intensive facilities like CT Scan and MRI.
Private service provider	Vardhaman Medicare Pvt. Ltd.
Prices set by Government	Rs.750 for a CT scan and Rs.2500 for an MRI
Services Provided	CT scan and MRI facilities

Sawai Man Singh Hospital (SMS Hospital) in Jaipur, Rajasthan is a government-run tertiary care hospital and medical college. The hospital provides free medical treatment to the poor. In 2004, the hospital entered into a Public Private Partnership (PPP) with Vardhaman Medicare Private Limited to provide Magnetic Resonance Imaging (MRI) and Computerized Tomography (CT) scan facilities to patients at low rates with the objective of providing these facilities at the lowest possible costs to patients within the hospital premises.

SMS hospital previously did not have CT scan and MRI facilities. Given the capital intensive nature of these facilities, Government decided to outsource this. In August 2004, SMS Hospital issued open tender, inviting applications from interested private agencies to install, operate and maintain CT scan and MRI facilities in its premises.

In this process Vardhaman Medicare Pvt. Ltd. was selected and the contract was signed for a period of seven years. As per the contract, the hospital would provide the space within its premises for a monthly rent of Rs.5000/-. The private provider is responsible for the installation of the machines and equipment, arrangement of and payment of electricity and water connections, staff salaries, security and maintenance of premises. The private provider will also maintain records and send regular reports to SMS Hospital. The contract allowed the hospital to use these facilities for teaching and training purposes relevant to the attached medical college.

The rates to be charged by the private provider have been agreed in the contract at Rs.750 for a CT scan and Rs.2500 for an MRI. Moreover, the private provider is obligated to provide free services to 20% of all patients from poor economic categories; the eligibility of patients for free services is verified by the Medical Superintendent of the hospital. Monitoring and evaluation of the PPP is under the purview of the Rajasthan Medicare Relief Society (RMRS).

Other Diagnostic facilities with Public Private Partnerships

- In Madhya Pradesh, the Rogi Kalyan Samity of Indore District Hospital (a registered society) outsourced high end diagnostic services from private providers who are allowed to set up within the hospital premises and allowed to charge fees as agreed with the society which are substantially lower than the market rates.
- DoHFW, Government of West Bengal has already established diagnostic facilities in 53 Rural Hospitals / upgraded BPHCs in West Bengal under PPP till September 2009. A Modern Diagnostic Unit is being set up under PPP in Gandhi Memorial Hospital, Kalyani.
- DoHFW, Government of West Bengal has also established facilities of CT scan in seven Medical College & Hospitals and MRI in one Medical College and Hospital in the state under PPP. Seven more MRI Units under PPP are coming up in seven Medical College and Hospitals. CT Scan Units are also being set up in 12 District Hospitals under PPP, four of which have already started functioning.

Source: www.ppphealth.org, a UKaid supported information site

Type of Agreement

The Dharwad district hospital has an established radio diagnostic centre with multiple X-ray machines, CT scan and Ultra Sound, a regular radiologist is in place, whereas the laboratory is in want of modern equipment, manpower, and better service delivery. Hence, it is proposed to operate only the laboratory diagnostic centre on PPP basis.

The project is designed will be offered on Own, Operate and Transfer mode to the successful bidder, the bid variable being the fractional cost at which is the service is provided compared to the existing CGHS rate. The agreement shall be between a private service provider and the government, where the service provider is in charge of procuring and managing the equipment, consumables, manpower, and providing the service.

This service provider will be responsible for operating the centre, providing the service and adhering to the laws and regulations that govern the process.

The contract shall be awarded district wise to the partners; the partner will be required to set up the diagnostic centre at the district headquarter hospital and provide the service. The partner shall establish spokes across the taluka hospitals in the district and shall provide logistics to collect the samples from these collection centers. A partner may also win multiple districts depending upon their quote. The government may also decide to bundle all three districts and give it on PPP to a single partner/consortium.

The primary roles and responsibilities of the Private partner and Government is as follows,

Roles and Responsibilities of the Government

1. To provide built-up space inside the government district hospital as is, where is condition
2. The laboratory associated with the district hospital will cease to function and all the tests from the district hospital will be conducted by the partner
3. The government will encourage the private partner to set up as many collection centres as possible/required in government hospitals of the district
4. The private partner can take over all equipments deemed necessary from the existing laboratory set up
5. The private partner can employ the existing government staff if they satisfy their norms and are encouraged to give a nominal amount to the absorbed employees in addition to the government salary they draw
6. List of tests to be conducted onsite will be provided to the partner by the Government
7. While Bio Medical Waste collection and segregation at site is the responsibility of the partner, the government will undertake the BMW disposal activity
8. Providing a conducive organizational atmosphere for the set up to operate

Roles and Responsibility of the Service Provider

1. To undertake renovation of the space provided for operating the district laboratory
2. To arrange back up power for equipments and water storage necessary
3. The partner shall serve all patients referred by the government district hospital doctors, and the government shall reimburse the cost of the service at a fraction of CGHS rate agreed upon
4. The partner shall establish “*Standard Operating Procedures*” for proper clinical and administrative management of the diagnostic service, the centre will be auditable against the SOPs by the host hospital and Health and Family Welfare department at anytime
5. There shall be no differentiation in terms of service to APL/BPL patients, but the partner shall keep a record of APL/BPL patients served
6. The partner shall equip the laboratory with all requisite infrastructure and shall operate an integrated Lab Information System to manage the process
7. The partner shall collect the specified amount as designated by the government from the patients and shall submit the same with the district hospital every week
8. The partner shall employ manpower as described in the model and shall ensure continuity of service. The partner shall continuously train the manpower for better service delivery
9. The partner shall ensure availability of all consumables and requisites for smooth operation of the centre
10. The partner shall adhere to the existing laws and regulations for operating the diagnostic centre
11. The partner shall co-ordinate with the hospital authorities and employees for delivering the services
12. The laboratory and equipments shall be maintained in operable condition 95% of the time
13. The partner shall provide the necessary service and maintenance required for the equipments
14. The partner shall ensure quality of service by adhering to established SOPs and shall get the lab NABL accredited within three years of commencement of operation
15. The partner shall ensure Turn Around Time (TAT) for all lab tests as agreed during the agreement stage
16. The partner shall agree on the type of tests to be provided as per IPHS norms and specialty existence at the district hospital, for tests which are not available at the establishment set up by the partner, the partner shall get the service delivered from an equally qualified centre at the market rate for the government
17. The partner shall provide for necessary security services of the diagnostic centre premises
18. Sub-meters for electricity and water supply shall be installed and the report shall be submitted to designated hospital authorities every month.
19. On the expiry or earlier termination of this Agreement, the said hospital space / room shall be vacated peacefully and handed over to hospital authority in the condition they had received.

Contract Period

It is proposed that the Diagnostic centre is provided on contract for a period of ten years, following which it will be rebid. The reasons for selecting 10 years as optimum concession period are following;

1. Rapid Technological changes happening in the current era are making existing diagnostic technology obsolete in 10 years. So better diagnostic tools will render current machines undesirable and non operational in coming 10 years.
2. Of the total capital investment of 1.50 crores, around 90 percent is pertaining to the machinery.

Cost of Service

The service provider shall charge the government a fixed amount towards each test conducted, this shall be an agreed fraction of the existing CGHS rates for diagnostic service delivery. The fractional cost at which the partner agrees to provide the service shall be the bid variable during the process for finalizing the service provider. The government shall revise the service cost as and when the CGHS rates are revised, which is once in two years normally.

The partner is encouraged to set up the district laboratory as a hub and establish collection centres in all Taluka Hospital of the district. The tests not available in the Taluka Hospital shall be done at the district hospital laboratory and results delivered back at the respective hospital. This process shall ease the load at district hospital for want of diagnostic service at lower hospitals.

The partner can service the patients referred by the private doctors also but at government rates.

Thus the service provider has two streams of revenues,

1. Reimbursement by the Government from tests referred from DH and other public hospitals (at a fractional cost of prevailing CGHS rate)
2. Referral patients from private practitioners, who pay personally for the service delivered

It is to be noted that the service provider would have to collect user charges from the patients undergoing tests as per the government norms. The amount collected from the patients shall be deposited in a designated bank account and the government shall reimburse the service provider separately every month in proportion to the service provided as per the annuity.

In addition to above for maintaining transparency, avoiding any accounting problem such as deliberate escalation of patient volume and thus leakage in revenue, it shall be mandatory for the service provider to maintain proper record of patients in LIMS which must include OPD / IPD number generated by the government institutions. This linkage of Lab number and OPD / IPD number will help government in traceability of patients, thus creating a check over service provider.

Chapter 5 - Project Financials

Current cost of Lab service:

Manpower Cost*			
Sr. No.	Designation	Monthly cost	Annual cost
1	Pathologist	47178	566136
2	Sr. Lab technician	30000	360000
3	Sr. Lab technician	30000	360000
4	Jr. Lab Technician	22000	264000
5	Jr. Lab Technician	19000	228000
6	Jr. Lab Technician	9500	114000
7	Lab attendant	3000	36000
Total Manpower Cost		160678	1928136

*Manpower cost includes Basic pay + HRA + MA/UA

Cost of consumables	
Lab reagents and consumables*	2018104

*List of consumables and their cost is given in annexure 5

Total annual cost (in Lakhs)	39.46
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Financial projections of the proposed project model

Modeling the financial projections of a diagnostic centre is complex because of the following reasons,

1. The service delivery mix varies from lab to lab, this influences the infrastructure, consumables, capital and manpower used, which results in variation in pricing
2. The pricing also depends on the cost of capital at each location
3. Different tests have different cost associated with them, it is difficult to project exactly the number of tests that would be conducted and determine the price based on the same
4. The price is also dependant on the type and extent of equipments used for conducting the test, many tests can be done in multiple ways each with an associated cost
5. The price also depends on the quality of consumables used, for example vaccutainers would definitely cost more than using syringes, but vaccutainers offer better sterility, easier and efficient handling of sample, reduced contamination of sample and least discomfort to patient
6. If the laboratory is NABL or equivalent certified it would increase the administrative cost of the establishment, ultimately increasing the cost of service delivery
7. The cost of service delivery also depends on the operational process and turnaround time expected from the service provider, while computerization and networking of equipments increases the effectiveness and efficiency of the laboratory it also increases the cost of service delivery

Hence, iMaCS used reverse costing method to assess the minimum volume of business required to ensure quality operation, and adequate return on investment for the private partner. The process of financial modeling involved the following process,

1. Projection of the district population
2. Projection of OPD and IPD attendance at the district hospital
3. Projection of number of cases which require diagnostic service (the standards for the same have been taken from reputed medical referral texts)
4. Projection of associated expenditure
5. Deduction of revenue required per patient to achieve pre tax project IRR in the range of 15-20%
6. Calculation of total business from the above derivations

It is observed that to achieve a pre tax IRR of 12% a minimum business of Rs 1.21 Crore is required in year one gradually increasing to Rs 7.08 Crore in tenth year.

The financial model is presented below,

Cost Estimation

5.1.1. Capital Infrastructure for Building & Equipments

The model assumes that the existing laboratory will be provided or the requisite space will be provided to the partner at free of cost in an as is where is basis, the partner's responsibility is to refurbish the centre as per their work/process flow and NABL standards required. The partner is also expected to put in place an Lab Management Information System, which will integrate the processes and equipments in the laboratory.

Investment		
S. No	CAPITAL BUDGET HEAD	PRODUCT
1	Cost of ready building on 3000 sqft area [@ 1500/sq ft]	-
2	Cost of Renovation	0.20
3	Cost of the Lab equipments with 5 years of AMC	1.10
4	Cost of LIMS	0.20
5	Cost of Generator	0.04
Total Capital Cost (in crores)		1.54

5.1.2. Manpower cost

The model assumes the following manpower requirement for the District Diagnostic Centre

Human Resource Requirements				
S. No	Position	Person Required	Monthly salary	Total Salary / annum (in crores)*
1	Pathologist	2	120000	0.29
2	Lab Technicians	10	25000	0.30
3	Lab Manager	1	27,000	0.03
4	Administrative staff	2	18,000	0.04
5	Lab Attendants & others	5	18,000	0.11
6	Sweeper	4	6,000	0.03
Total Capital Cost				0.80

** Salary also includes 20% 'Incentive for working in remote area'*

5.1.3. Logistic cost

As per the project design, the private partner shall be encouraged to establish the district hospital laboratory as the hub and shall establish collection centers at Taluka hospitals and have milk runs fetching the samples. Total three vehicles will be required to collect samples from 5 taluka hospitals. The logistic cost of the project has been tabulated below;

S. No	Locations for collection centre	Vehicle** required	Capital Investment (in Lakh Rs.)	Operative Cost*	
				Daily	Annual
1	Dharwad	1	5	158.67	49,187
2	Hubli				
3	Kalghatgi	1	5	382.67	118,627
4	Kundgol				
5	Navalgund	1	5	439	135,987
Sub total		3	15		303,800.00
Average distance (in Kms) covered per liter diesel					-
Diesel cost per liter					
Total Capital Cost (in Lakhs)			15		
Total Operative Cost (in Rs. Lakhs)					3.04
Total transportation Cost (in Lakhs)					18.04
	Cost Head	Number required		Monthly cost	Annual cost
	Total Manpower Cost	4		12000	5.76
	Maintenance cost			2000	0.24
Total Logistic Cost (in Lakhs)					24.04

* Average distance (in Kms) covered by vehicle per liter diesel is 12 and per liter diesel cost is Rs. 56

** Vehicle is fitted with ILR (Ice Line Refrigerator) for maintaining cold chain for samples.

5.1.4. Building rent

Private player will pay the monthly rent of the building to GoK as tabulated below;

Monthly Rent (in Rs.)	Annual Rent (in Rs.)
6000	72000

Tariff Revenue Stream

5.2.1. Population and Diagnostic Centre Load Assumptions for the Project Model

The population of the district and the metropolitan area of the district headquarter is projected, depending upon which the OPD/IPD numbers of the hospital is projected and ultimately the number of patients requiring diagnostic service is derived.

Population Projection Assumptions		No. of operation days*
Minimum Assurance on Revenue and hospital working days by GoK	Yes	310

* Lab services will be available 24X7 for IPD and emergency cases. However to make calculation simple, 310 days have been taken when the OPD services will also be available.

Projection Period	10	years
Population Increase per annum	1.50%	%

Population Projections (Based on census 2011)	FY 12
Dharwad	1,846,993
Dharwad Hubli Metropolitan area	1,049,563
Rest of the district	797,430

	0	1	2	3	4	5	6	7	8	9	10
Population Projections	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22
Total population of Dharwad District	1,846,993	1,874,698	1,902,818	1,931,361	1,960,331	1,989,736	2,019,582	2,049,876	2,080,624	2,111,833	2,143,511
Dharwad Hubli Metropolitan area (Direct Population)	1,049,563	1,065,306	1,081,286	1,097,505	1,113,968	1,130,677	1,147,638	1,164,852	1,182,325	1,200,060	1,218,061
Rest of the district (Indirect Population)	797,430	809,391	821,532	833,855	846,363	859,059	871,944	885,024	898,299	911,773	925,450
OPD patient attendance (% of direct population)	20%										
OPD patient attendance (% of indirect population)	5%										
OPD patient volume Projections	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22



OPD Patients from <i>Dharwad Hubli Metropolitan area (Direct Population)</i>	209,913	213,061	216,257	219,501	222,794	226,135	229,528	232,970	236,465	240,012	243,612
OPD patients from <i>Rest of the district (Indirect Population)</i>	39,872	40,470	41,077	41,693	42,318	42,953	43,597	44,251	44,915	45,589	46,273
Total annual OPD	249,784	253,531	257,334	261,194	265,112	269,088	273,125	277,222	281,380	285,601	289,885
Per day OPD	806	818	830	843	855	868	881	894	908	921	935

	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22
Number of beds available in the hospital	250	250	250	250	250	250	250	250	250	250	250
Bed Occupancy	60%	65%	70%	70%	75%	75%	75%	75%	75%	75%	75%
Average number of In-patients on any given day	150	162.5	175	175	187.5	187.5	187.5	187.5	187.5	187.5	187.5
Percentage of IPD patients going for lab investigations per day	50%	50%	50%	50%	50%	50%	150%	250%	350%	450%	550%
Projections of patient volume for Lab from IPD	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22
Per day patient volume for Lab Diagnostic Centre from IPD	75	81	88	88	94	94	281	469	656	844	1,031

Percentage of OPD patients going for lab investigations per day	30%										
Projections of patient volume for Lab from OPD	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22
Total annual patients in Lab from OPD	74,935	76,059	77,200	78,358	79,534	80,727	81,937	83,166	84,414	85,680	86,965
Per day patient volume for Lab Diagnostic Centre from OPD	242	245	249	253	257	260	264	268	272	276	281

5.2.2. Expenditure and Revenue Related Projections for the Diagnostic Centre

The assumptions towards expenditure and revenue projected are briefed below.

Capital cost

Building cost (3000 Sqft Functional area @ Rs. 1500/sqft)	Borne by GoK	
Cost of renovation	0.20	Crores
Equipment cost	1.10	Crores
Cost of LIMS	0.20	Crores
Cost of Generator	0.04	Crores
Total Capital cost	1.54	Crores

Operative cost

Rent of the building to GoK	0.01	Crores
Manpower cost	0.80	Crores
Supplies and consumables (% of annual revenue of the Lab)	35%	%
Purchased services (Water*, Power**, Telephone, Power back up***)	0.03	Crores
Logistics	0.24	Crores
Insurance Cost	0.15	Crores
NABL cost (third year onwards)	0.01	Crores

Assumptions

Annual Escalation of Manpower expenditure	5%	%
Annual Escalation of Expenditure (other than Manpower)	5%	%
Annual decrease in insurance cost	20%	%
Surveillance audit cost of NABL (% of accreditation audit cost)	33%	%

*Per unit cost of water including 20% of sanitary charge is .072 Rs per liter¹. ** Per unit power consumption cost is Rs. 5². ***Per liter fuel cost is Rs. 56.

¹ <http://bwssb.org>

² <http://www.kerc.org>



REVENUE RELATED

Assumptions

Frequency of Escalation of investigation rates - once every	2	years
Escalation Rate for Services	10%	%

5.2.3. Cash Flow

The cash flow of the diagnostic centre for five years is projected below and the IRR is derived,

	0	1	2	3	4	5	6	7	8	9	10
INVESTMENT											
Capital investment (in crores)		1.54									
Income to the centre per patient		119	119	131	131	144	144	158	158	174	174
OPERATING REVENUE		Project Year									
	0	1	2	3	4	5	6	7	8	9	10
Per day patients in Lab from OPD	242	245	249	253	257	260	264	268	272	276	281
Per day patients in Lab from IPD	75	81	88	88	94	94	281	469	656	844	1,031
Per day patient volume in Lab	317	327	337	340	350	354	546	737	929	1,120	1,312
TOTAL OPERATING REVENUE (in crores)		1.205	1.241	1.381	1.422	1.581	2.435	3.619	4.559	6.050	7.085
OPERATING EXPENDITURE											
Rent of the building to GoK		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manpower		0.80	0.84	0.88	0.93	0.97	1.02	1.07	1.13	1.18	1.24
Supplies & Consumables		0.42	0.43	0.48	0.50	0.55	0.85	1.27	1.60	2.12	2.48
Purchased services		0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05
Logistics		0.24	0.25	0.27	0.28	0.29	0.31	0.32	0.34	0.36	0.37
Insurance Cost		0.15	0.12	0.10	0.08	0.06	0.05	0.04	0.03	0.03	0.02
NABL cost (third year onwards)				0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.003
TOTAL OPERATING EXPENDITURE (in crores)		1.65	1.69	1.78	1.83	1.93	2.28	2.76	3.15	3.74	4.18



NET CASH FLOW - (SURPLUS / -DEFICIT)		-1.98	-0.45	-0.40	-0.41	-0.35	0.15	0.86	1.41	2.31	2.91
PRE-TAX PROJECT IRR (5 years)		12%									

Ranking of the Project

It is observed that a minimum business of Rs 1.21 Crore is required in the first year and it has to progress to Rs 7.08 Crore by the tenth year to achieve a pre tax IRR of 12%. It is therefore imperative that a minimum load of patients has to be serviced by the partner; hence, following steps need to be taken by the government,

1. The district hospital laboratory should be handed over the partner to ensure captive market of patients
2. The partner shall be encouraged establish the district hospital laboratory as the hub and shall establish collection centers at Taluka hospitals and have milk runs fetching the samples and delivering reports
3. The partner shall be encouraged to serve the patients referred by private practitioners at a cost agreed with the government

Considering the situation there are multiple ways to finance the project,

Option	Advantages	Disadvantages
Collect the charges involved in providing the service from the public at actual	<ol style="list-style-type: none"> 1. Enables the project financially viable 2. Ensures market competitiveness 	<ol style="list-style-type: none"> 1. The public would not be able to financially provide for the service 2. The lab service is currently being provided at a heavily subsidized rate, the rates charged by the partner will be very high compared to that 3. Double standard in service cost cannot be maintained by the government
The mutually agreed price may be paid by the government for every test done, and a minimum business may be ensured by the government	<ol style="list-style-type: none"> 1. Provides a stable projection for both the government and the partner to plan for the business 2. Ensures minimum reimbursement for the private partner 	<ol style="list-style-type: none"> 1. It is a complex process to establish rates for individual tests as it depends on multiple reasons as explained earlier 2. Even if a rate is agreed upon depending on projected number of test mix, variation of the number/type of tests which happens in actual may adversely affect either the government or partner 3. The planned service delivery mix may inhibit the degree

		<p>of sophistication and automation brought in the process by the partner</p> <p>4. The partner is not encouraged to look for additional sources of income and there is no incentive for efficiency improvement by the partner</p>
<p>The government reimburses the partner against an established price standard for service delivery as per actual number of tests conducted and allows the partner to serve referral patients from private practitioners as well (but at an agreed rate)</p>	<ol style="list-style-type: none"> 1. Ensures minimum standard of payment 2. Private partner encouraged to provide better services and increase his operational efficiency 3. Ability to compete with the other private labs in the region 	<ol style="list-style-type: none"> 1. Lack of clarity on the number of high end tests that will ensure better returns 2. The government may not be able to control the actual price setting for private patients

Considering the above options, ***it is preferred to follow an established price standard to be reimbursed on actual***, but considering the facts that,

1. The firm is provided a constructed building which brings down the infrastructural cost
2. The government ensures captive patients for the partner
3. The firm is provided with additional government patients from taluka hospitals
4. The firm is allowed to serve private patients with following two riders
 - 4.1. No discrimination in prices i.e. Price of diagnostic tests for private patients will be same as for government patients
 - 4.2. Priority shall be given to patients referred from government institutions. However exception to this can only be made in case of very sick / serious patient or an emergency situation.

It is proposed that the government can demand services at a multiple cost of CGHS rates, this multiple (could be premium or discount over CGHS) can be the bid variable during the procurement process.

The government can also decide to provide a minimum business by providing a minimum guaranteed revenue that can help meet the fixed costs of the facility thereby reducing demand risk further. The decision on guaranteeing minimum business could be arrived at during detailed feasibility study to be done with the transaction advisory process upon further refinement of the financials.

Value for Money Analysis

The value for money analysis of the project has been tabulated as below;

Benefit	In-house FM services	Outsourced FM services
Cost of services	39.46 per annum	GoK ensures no leakage of patients and minimum revenue of 1.31 crore per annum in the first year to private service provider. It will only bear the cost of utilities. Spared manpower can be deployed at other public facilities to fill the manpower gap.
Quality of services	Unable to scale up and match NABL standards	Strict adherence to ensure Lab become NABL accredited in third year
24X7 Lab Service availability	Not ensured	Ensured
24X7 Availability of supplies & consumables	Not ensured	Ensured
Availability of latest technology	Low	High
Down time of used machinery	High	Low
Need to train manpower	Required	Manpower with requisite skill sets will be deployed
Reliability	Reliability of test results is low	Reliability of test results is high and match market standard
Administrative burden	High	Low
Patient and staff satisfaction	Low	High
Operational efficiencies and effectiveness	Low	High
Image of the hospital	Low	High

Special Scenario – Lab diagnostic services upgraded by GoK

In case GoK wishes to upgrade the existing lab in the district hospital to enhance its scope of investigations, capability and quality, following will be the estimated cost;

Investment		
S. No	CAPITAL BUDGET HEAD	PRODUCT
1	Cost of ready building on 3000 sqft area [@ 1500/sq ft]	-
2	Cost of Renovation	0.20
3	Cost of the Lab equipments with 5 years of AMC*	0.55
4	Cost of LIMS	0.20
5	Cost of Generator	
Total Capital Cost (in crores)		0.95

**This is 50% of the cost incurred by the private player for augmenting the existing equipments.*

Human Resource Requirements				
S. No	Position	Person Required	Monthly salary	Total Salary / annum in crores)
1	Pathologist	2	120000	0.29
2	Lab Technicians	10	25000	0.30
3	Lab Manager	1	27000	0.03
4	Administrative staff	2	18000	0.04
5	Lab Attendants & others	5	18000	0.11
6	Sweeper	4	6000	0.03
Total Capital Cost				0.80

Operative cost

Rent of the building to GoK	-	Crores
Manpower cost	0.80	Crores
Supplies and consumables (% of annual revenue of the Lab)	35%	%
Purchased services (Water, Power, Telephone, Power back up)	0.03	Crores
Logistics	0.24	Crores
Insurance Cost	0.15	Crores
NABL cost (third year onwards)	0.01	Crores

Expenditure related assumptions

Annual Escalation of Manpower expenditure	5%	%
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Annual Escalation of Expenditure (other than Manpower)	5%	%
Annual decrease in insurance cost	20%	%
Surveillance audit cost of NABL (% of accreditation audit cost)	33%	%

Revenue related assumptions

Frequency of Escalation of investigation rates - once every	2	years
Escalation Rate for Services	10%	%

Cash Flow

	0	1	2	3	4	5	6	7	8	9	10
INVESTMENT											
Capital investment (in crores)		0.95									
Income to the centre per patient		111.5	111.5	123	123	135	135	148	148	163	163
OPERATING REVENUE		Project Year									
	0	1	2	3	4	5	6	7	8	9	10
Per day patients in Lab from OPD	24 2	245	249	253	257	260	264	268	272	276	281
Per day patients in Lab from IPD	75	81	88	88	94	94	281	469	656	844	1,031
Per day patient volume in Lab	31 7	327	337	340	350	354	546	737	929	1,120	1,312
TOTAL OPERATING REVENUE (in crores)		1.12 9	1.16 3	1.29 4	1.33 2	1.48 1	2.28 2	3.39 1	4.27 2	5.66 9	6.63 8
OPERATING EXPENDITURE											
Rent of the building to GoK		-	-	-	-	-	-	-	-	-	-
Manpower		0.80	0.84	0.88	0.93	0.97	1.02	1.07	1.13	1.18	1.24
Supplies & Consumables		0.40	0.41	0.45	0.47	0.52	0.80	1.19	1.50	1.98	2.32
Purchased services		0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05
Logistics		0.24	0.25	0.27	0.28	0.29	0.31	0.32	0.34	0.36	0.37
Insurance Cost		0.15	0.12	0.10	0.08	0.06	0.05	0.04	0.03	0.03	0.02
NABL cost (third year onwards)				0.01	0.00 3	0.00 3	0.00 3	0.00 3	0.00 3	0.00 3	0.00 3
TOTAL OPERATING EXPENDITURE (in crores)		1.62	1.65	1.74	1.79	1.89	2.22	2.67	3.04	3.60	4.01
NET CASH FLOW - (SURPLUS / -DEFICIT)		- 1.44	- 0.49	- 0.45	- 0.46	- 0.41	0.06	0.72	1.23	2.07	2.63

PRE-TAX PROJECT IRR (5 years)	12%
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Scenario Analysis using economic criteria

In order to make healthcare services available to all and fill gaps in health infrastructure, GoK plans to rope in private player for providing Lab diagnostic services to the population. So effectively GoK will be the client for the private player who will reimburse him as per the volume of patients serviced per month. Whether these patients will be charged or not, if charged then will it be as per the prevailing market rates or at some concessional rates, how much concession will be given to patients, whether to make any distinction between BPL and APL category patients etc. all these issues are political sensitive and needs to be decided by the government of Karnataka. Above scenarios are based on the premise that service provision and thus the reimbursement of private player will not be affected by economical strata of patients.

However the social sector has some peculiarities which require special mention. Health services are vulnerable to segmentation between rich and poor. As a result the public sector ends up providing subsidized services to the poor whereas the private sector providing the paid services to the rich who can afford them. So government, in order to judiciously use its limited financial resources, may need to allocate the budget to financially support only the poor patients while providing the facility to others at concessional rate. Above mentioned project scenarios are analyzed in this section to know the financial implications on GoK if this strategy is adopted to implement health PPPs.

Projections of total and BPL population for the three districts chosen for this project are given in the annexure. Analysis of this data reveals that proportion of BPL population in Dharwad district is 62%. Based on this it is assumed that of the total patient load in the Lab diagnostic centre, 62% are from BPL category that will not pay anything for the service while 38% are from APL category that will pay for investigations as per the cost decided by the state government. For computation purposes it is assumed that income to the centre per APL patient will be as calculated above for two scenarios.

Using the economic criteria, the two project scenarios have been compared in the following table;

	Lab diagnostic services on PPP mode	Lab diagnostic services upgraded by GoK	Scenario analysis using economic criteria	
			Lab diagnostic services on PPP mode	Lab diagnostic services upgraded by GoK
Characteristic Feature	<ul style="list-style-type: none"> GoK provides land and 'ready to move in' infrastructure 	<ul style="list-style-type: none"> GoK provides quality Lab Diagnostic services by augmenting the infrastructure 	<ul style="list-style-type: none"> GoK provides land and 'ready to move in' infrastructure 	<ul style="list-style-type: none"> GoK provides quality Lab Diagnostic services by augmenting the infrastructure and providing necessary resources

	<ul style="list-style-type: none"> Patients not differentiated into BPL and APL category <input type="checkbox"/>	and providing necessary resources <ul style="list-style-type: none"> Patients not differentiated into BPL and APL category <input type="checkbox"/>	<ul style="list-style-type: none"> Patients differentiated into BPL / APL category 62% of total patients are from BPL category which will get services free of cost 38% of total patients are from APL category which will pay for services at the rates decided by GoK 		<ul style="list-style-type: none"> Patients differentiated into BPL / APL category 62% of total patients are from BPL category which will get services free of cost 38% of total patients are from APL category which will pay for services at the rates decided by GoK 	
Patient volume in first year	101247	101247	BPL Patients	62773	BPL Patients	62773
			APL Patients	38474	APL Patients	38474
Income to the centre per patient	119	111.5	119		111.5	
Minimum Financial Burden on GoK in the first year (in Crore Rs.)	1.20	1.13	0.75		0.70	

So the minimum annual financial burden of GoK in the first year of operations will be Rs 0.75 crore for first scenario while Rs. 0.70 crore for second scenario.

Chapter 6 – Policy, Statutory and Legal Framework

Policy Framework: - Section 5.6 of the Karnataka Integrated State Health Policy 2004, provides the framework for PPP in healthcare sector. This section, under the heading ‘Public, private and voluntary sector partnerships’ states that

*“The state Policy recognizes the role of the voluntary and private sectors in public health care. Though already existing in an adhoc and often informal manner, public, private and voluntary partnerships will be further developed in a planned, systematic manner in order to develop in spirit and practice for better health care and also for optimal utilization of health resources. District and Taluk health action networks and issue-based networks will be encouraged with active participation from the public sector in such voluntary sector initiatives. **Participation of voluntary and private sector will be enhanced through outsourcing certain services, in infrastructure maintenance and investments in health services”.***

Statutory and Legal Framework: - The diagnostic centre shall be governed by all existing bio medical, statutory and legal laws governing an imaging centre. The diagnostic centre along with the hospital or independently as the case and situation may apply shall get it certified for/obtain the following certificates,

1. Building Permit
2. No objection certificate from Chief Fire Officer
3. Indian Medical Council Act and Code of Medical Ethics, 2002
4. Drugs and Cosmetics Act, 1940
5. License under Bio-medical Management and handling Rules, 1998
6. Right to Information Act
7. Consumer Protection Act, 1986

The service provider shall be responsible for procurement and management of all statutory and legal requirements for the diagnostic centre.

Chapter 7 - Indicative Environmental & Social Impacts

Environmental Impacts

The diagnostic procedure does not produce harmful radiations or noise, but body fluid wastes are generated during the procedure, which needs to be collected, stored, and disposed safely. Stringent bio medical waste disposal processes need to be developed and implemented by the partner.

Social Impacts

Lab diagnostic service will be accessible to all the citizens irrespective of his/her region, urban/rural location, gender, social and economic groupings. This will also bring equity in healthcare services which also encompass disadvantaged groups (Scheduled Castles and Tribes) and vulnerable groups (street children, elderly). Other social impacts of this project are;

- The project will enable provision of high quality and high end diagnostic service for the public which is currently unavailable at the district hospital and at the same time is costly at private diagnostic centres
- Improved efficiency of the government hospital due to availability of better diagnostic service
- Reduced referral to higher institutions for want to diagnostic service, thereby reducing the cost of providing ambulance logistics facility
- Reduced referral from lower institutions for want of diagnostic service, thereby reducing congestion
- The low cost availability of the service will reduce the cost of service at a private centre
- Society will get the best of public and private services at one place i.e. private sectors quality and efficiency at public rates thus reducing their economic cost of availing the healthcare services.
- Enhanced patient satisfaction and diminished strain
- Improved utilization of public healthcare facilities
- Timely diagnosis leads to better treatment and better medical results.
- This initiative will also help state government to achieve its goal of prevention of physical disability by its early detection and intervention. This will bring major gains in terms of human well-being, development and economic productivity.
- Patients will get access to high-end diagnostic imaging facility within the MCH premises saving the travel time of going to another public health facility / private facility; this reduces the out of pocket medical expenses. This way this project will help state government in mitigating the adverse effect of escalating prices of diagnostics on state population.
- Employment generation for the trained manpower
- Streamlined operation and efficient work culture of private partner will impact the public healthcare functioning in the long run
- Reduces the cost of diagnostic service at the private facility due to market competition effect

Mitigation Measures

Diagnostic equipments and process should be operated under strict trained manpower supervision, the following safety measures need to be taken into account,

1. Diagnostic machines and associated equipments must be located and designed as per the manufacturer's specific layout guidelines
2. Machine should always be under CMC for regular maintenance
3. Proper sterilization and infection prevention practices should be adhered to
4. Quality of consumables should be maintained for consistency and efficiency of results
5. Proper BMW collection, storage and disposal norms should be developed and adhered to

Chapter 8 – Operating Framework

Project Structure at a Glance

Sl No	Parameter	Description
1	PPP Model	Own, Operate and Transfer
2	Concession Period	Ten years, following which it will be rebid.
3	Concession Component	<ol style="list-style-type: none"> 1. Right to operate diagnostic centre at government hospital premises 2. Building and utilities provision at the concerned hospital 3. Reimbursement for patients referred from the Government hospitals 4. Referral facility from all government hospital 5. Can serve private patients but at government rates
4	Government Support	<ol style="list-style-type: none"> 1. Space and building 2. Water and electricity expenses borne by the government (Power back up to be arranged by the private partner) 3. Assurance of captive patients from the district hospital
5	Project Benefits	<ol style="list-style-type: none"> 1. Provision of advanced diagnostic services to the public 2. Taluka hospital are also provided with the service 3. Improved quality of services 4. Will bring down the existing market rate 5. Improved hospital efficiency through better diagnostics 6. Private sector efficiency in operation and maintenance
6	Operation and Maintenance	<ol style="list-style-type: none"> 1. Operation of the diagnostic centre equipments 2. Ensure 95% machine uptime 3. Operates on two shifts from 8AM to 2PM and 2PM to 8PM, available on call from 8PM to 8AM for emergency cases 4. Service provider to address all maintenance related issues 5. Provide requisite reports as agreed in the TOR
7	User Charges Involved	<ol style="list-style-type: none"> 1. User charges collected as per government norms and deposition with the government 2. The diagnostic centre is free to serve private patients at government rates
8	Inventory Management	<ol style="list-style-type: none"> 1. Procure and manage all consumables and inventory required 2. Maintain optimum inventory and ensure nil stock out
9	Revenue Management	<ol style="list-style-type: none"> 1. The diagnostic centre will be reimbursed at an agreed rate by the Government every month as per the number of cases

Risks & Mitigation

In PPP arrangements, risks are inherent in the project due to the varied pursuits and value systems of the two sectors involved in the contract. The private sector is predisposed to prioritizing shareholder return and taking measured risks, whereas regulations and authorities, political opinion and the achievement of societal goals influence the public sector. Additional problems arise because public taxpayers may not welcome the idea of PPPs due to a perceived lack of transparency in the private sector. Full disclosure may also be an issue for the private sector who has an interest in protecting proprietary information to ensure their competitiveness.

Following are the perceived risks involved in developing a diagnostic centre

1. Construction / implementation risk arising from
 - a. Delay in project clearance
 - b. Contractor default
 - c. Construction cost overrun
2. Market risk arising from
 - a. Insufficient demand
 - b. Impractical user levies
3. Finance risk arising from
 - a. Inflation
 - b. Change in interest rates
 - c. Increase in taxes
4. Operation and maintenance risks arising from
 - a. Termination of contract
 - b. Technology risk
 - c. Manpower risk
5. Legal risks arising from
 - a. Changes in law
 - b. Changes in lease rights

The emphasis is on optimal allocation of risk or risk transfer. This can “incentivize” partners to ensure that objectives of the agreement are met. Risk transfer has the opportunity to be extremely beneficial to the public sector but if not appropriately managed insufficient risk is transferred to the private sector. Governments cannot allow essential services such as healthcare to fail, so the ability of the public sector to transfer risk to the private sector becomes nonexistent and therefore no longer a benefit of partnership. For example under the Private Financing Initiative (PFI) in the UK, some failed partnerships have required the government to step in and subsidize a service and yet the core essence of the PFI contract is that the private sector should take on appropriate risk in return for the appropriate reward.

Risk Mitigation Strategies

SI No	Category	Risk	Risk Incurred by	Mitigation Strategy
1.1	Implementation Risk	Delay in project clearance	Partner	<ol style="list-style-type: none"> 1. Government to provide all clearances for initiation of the project within 60 days of selection of partner from competitive bid process. It will also help the private partner to get the necessary licenses for establishment and operations of lab diagnostic centre in district hospital. 2. The partner has the right to terminate the contract with three months prior notice if the government fails to honour the commitments
1.2		Contractor Default	Government	<ol style="list-style-type: none"> 1. Only organizations with prior experience in operating an diagnostic chain for the past 5 years are qualified for bidding 2. The partner should have currently operating chains in at least four states across the country of which Karnataka is mandatory 3. The partner should have at Rs 5 Crore turn over ever year in the past three years 4. The partner should have an established laboratory in the state to service tests which is capable of undertaking tests not available at the district site 5. The partner should submit list of employees associated with them specifying their qualification and experience 6. It is preferred that the partner/service provider has experience in PPP projects, qualifying marks shall be provided for such bidders; if the bidder has experience in operating diagnostic centres on PPP then they shall be provided additional qualifying marks 7. Government to retain the earnest money in case the private partner defaults before signing the contract 8. Client default payment clause to be inserted as a part of the contract

				<p>9. The government has the right to terminate the contract with one-month notice if the service provider is not adhering with the Terms of Reference mutually agreed.</p> <p>10. The government shall give two warning notices and provide adequate time for rectification before sending a notice for termination of services. The termination notice shall be given only by the Commissioner Health and Family Welfare or by the Secretary Health and Family Welfare</p> <p>11. The service provider shall not sub-let the premises or service to any other party without the prior permission of the government. The government has the rights to terminate the contract in the event of any such activity with a 15 day notice, and take control of the premises, equipment and accounts during the period and afterwards till the case is resolved</p>
1.3		Construction/Renovation cost/time overrun	Partner/Government	<p>1. Land/Building shall be recognized for this purpose prior to the issue of RFP</p> <p>2. Building to be provided to the partner wherever available</p> <p>3. Land/Building shall be handed over within 30 days of signing of the contract, in as is where is condition</p> <p>4. Private players shall be invited to inspect the land/building during the bidding stage to assess the time taken to commence the operation</p> <p>5. Time frame to be agreed upon to commence operations, failing which the service provider has to pay liquidate damages as mentioned in the TOR</p>
1.4		Non availability of Medical and technical personnel to operate the centre	Partner/Government	<p>1. The service provider shall provide a list of manpower already under employment during the bidding stage</p> <p>2. The centre to be staffed within the operation commencement time frame assured to the government, failing which the service provider has to pay liquidated damages as mentioned in the TOR</p>
2.1	Market Risk	Insufficient demand	Partner	<p>1. The government shall ensure that all district hospital</p>

				<p>diagnostic requirements are channeled to the partner</p> <ol style="list-style-type: none"> The partner is also encouraged to set up collection centers at other government hospitals of the district and provide a milk run facility The government may assure a minimum value of tests irrespective of the mix of tests The service provider is free to service patients referred from private institutions, but shall not levy charges more than what agreed for with the government
2.2		Impractical user levies	Government/Partner	<ol style="list-style-type: none"> The service shall be priced as a fraction of CGHS rate for both, government and private patients
3.1	Finance Risk	Inflation risk	Partner	The government shall revise the reimbursement rate for diagnostic service as and when the CGHS rate is revised
3.2		Change of interest rates/tax rates	Partner	The partner has to bear any changes in interest rates and tax rates by the state/central government
3.3		Exchange rate fluctuation	Partner	The partner has to bear the exchange rate fluctuation during the procurement process
4.1	Operation and Maintenance	Technology obsolescence	Government	<ol style="list-style-type: none"> The initial contract is for a period of five years, beyond which if the parties agree to continue the contract the diagnostic centre should be upgraded to meet the latest technology specification at that point of time
4.2		Man power retention	Government	<ol style="list-style-type: none"> The service provider shall employ manpower as agreed with the government The service provider shall frame effective human resource policies for the training and retaining manpower at the centre, there shall be defined plans for replacement of trained manpower. The centre shall not be deficit of the number of employees agreed for not more than one week at a stretch Should employees go on leave, fall sick or leave the organization the service provider has to ensure the replacement within a week The service provider shall adequately train its manpower

				<p>annually</p> <p>6. All new recruits by the service provider shall be trained by the service provider for a period agreed with the government in an established set up</p>
4.3	Operation and Maintenance	Utilities	Private	<p>1. The government shall provide the electrical and water supply free of cost</p> <p>2. The service has to maintain power stabilizing equipments and power backup generator as required</p>
4.4		Process adequacy and Quality of Service	Government	<p>1. The service provider shall maintain detailed books of records of,</p> <ul style="list-style-type: none"> a. Diagnostic test records b. Consumables – in stock, out of stock, consumption pattern – as per the existing government guidelines c. All expenditure involved in the day to day operation of the hospital as per the existing government guidelines d. Maintain and display quality indicators as per the machine standards e. Display MIS of the centre <p>2. The diagnostic unit shall maintain and adhere to detailed Standard Operating Procedures for,</p> <ul style="list-style-type: none"> a. Service delivery b. Patient handling c. Documentation management d. Emergency and Disaster management e. Bio Medical waste management f. Ethical treatment and management of patients g. Cleaning and sterilisation h. Infection prevention i. Any other process deemed necessary by the H&FW department <p>3. The diagnostic centre shall get itself NABL and ISO 9001:2008 certified within two years of commencement of operation</p>

				<ol style="list-style-type: none"> 4. The service provider shall produce a report to the Commissioner Health and Family Welfare on the operation of the diagnostic centre every month. The report shall contain, <ol style="list-style-type: none"> a. Staff attendance report b. Number and variety of diagnostic tests conducted on Outpatients/In patients/Private patients c. Expenditure statement for consumables, separately for Inpatient, outpatient, special clinics d. Uptime/downtime of the machine e. Maintenance work which have been conducted in the past month 5. This monthly report shall be scrutinised by the Commissioner of Health and Family Welfare and the state nodal officer for the project 6. The diagnostic centre shall be subjected to six monthly stock audit, monthly accounts audit and weekly visual inspection cum audit
4.5	Operation and Maintenance	Equipment Maintenance	Government	<ol style="list-style-type: none"> 1. The service provider and the equipment manufacturer need to produce a defined maintenance contract document at the time of contract award 2. The cost of any maintenance of the machine has to be borne by the service provider 3. Insurance cost of the machine shall be borne by the service provider, the government is not liable for any damage caused to the machine either during operation or during the idle period 4. The service provider shall maintain 95% uptime during a month 5. All service issues shall be attended to within 24 hours of intimation by the equipment manufacturer 6. If there is a equipment downtime period of more than 72 hours at a stretch, the service provider has to arrange for

				diagnostic service to be provided from an alternate centre at the same cost, while bearing the cost of transportation of patients
5.1	Legal risk	Changes in Policy	Private	<ol style="list-style-type: none"> 1. The government shall be cognizant of the impact of any policy change that may adversely affect the contract (this is apart from the issues relating to taxes, inflation changes, change of interest rates, exchange rate fluctuation which have been discussed above) 2. The government shall insulate the contract from any such policy changes, or see to that the partners are adequately compensated for losses incurred because of policy change
5.2	Legal risk	Adherence to legal and regulatory compliances	Government	<ol style="list-style-type: none"> 1. The private partner is responsible for adherence legal and regulatory compliances 2. Any loss arising from inadequate compliance to legal and regulatory norms are to be borne by the private partner 3. The partner shall get the process/centre ISO 9001:2008 certified to adhere to all process in place
5.3		Medico legal risk	Government/Private	<ol style="list-style-type: none"> 1. The medico legal risk is shared between the Government, the service provider and the equipment manufacturer on a case to case basis
5.4		Employee legal risk	Private	<ol style="list-style-type: none"> 1. The service provider is absolutely responsible for any legal risk arising out of employee disputes 2. Employees of the service providers cannot claim themselves as employees of the government and are not liable for any facilities and perks provided to government employees

Chapter 9 – Way Ahead

Currently the project plan is to set up district diagnostic centers in the three districts of Gulbarga, Dharwad, and Uttar Kannada.

Once implemented the success of the project can be measured in terms of the impact of service delivery, availability of universal access, assistance in treatment, benefits accrued to the society, and the feasibility of the project. Other districts of qualifying size and volume can adopt this model in future.

This model shall be showcased as a flagship project for investors. This also exhibits the forward marching initiatives of the Government of Karnataka in engaging with the industry both in economic and social fronts.

Chapter 10 - Annexure

Annexure 1 - Bed Distribution of Dharwad District Hospital

Sl. No.	Speciality	Beds allotted
1	Medicine	32
2	Surgery	30
3	OBG	40
4	Telemedicine	5
5	Paediatrics	16
6	Orthopaedics	18
7	Emergency	18
8	Ophthalmology	24
9	ENT	4
10	Burns	4
11	Dental	2
12	T.B.	16
13	Isolation	6
14	NICU	9
15	Special Ward	9
16	Sterilisation	10
17	GE Ward	7
	Total	250

Annexure 2- Existing Lab tests and Rates in Dharwad District Hospital

SI No	Name of the Test	Rate per Test in Rs
1	Hb%	10
2	TLC	10
3	DC	10
4	Hb%, TC, DC, ESR	60
5	BT, CT	30
6	P S Study	20
7	P L	10
8	AEC	10
9	MP	Free
10	HbsAG	25
11	Widal	30
12	Urine Albumin	5
13	Urine Sugar	5
14	Urine Microscopy	5
15	Urine Ketone bodies	15
16	BS, BP	15
17	UPT	30
18	Semen Analysis	50
19	Stool - Microscopy	10
20	Hanging Drops	15
21	RBS, FBS, PPBS	25
22	Sr Calcium	20
23	Sr Creatinine	10
24	Sr Bilirubin	10
25	Sr Triglyceride	50
26	T Protein	10
27	Sr Albumin	10
28	Blood Urea	20
29	Sr Cholestrol	20
30	SGOT	20
31	SGPT	20
32	HDL Cholestrol	20
33	Sr Uric Acid	20
34	LFT	100
35	Lipid Profile	100

Annexure 3 - Laboratory tests that shall be made available by the partner

S. No.	Specialty	Diagnostic Services/Tests
I	Clinical Pathology	
	a. Hematology	Hemoglobin estimation
		Total Leukocytes count
		Differential Leucocytes count
		Absolute Eosinophil count
		Reticulocyte count
		Total RBC count
		E. S. R.
	- Immunoglobulin Profile (IGM, IGG, IGE, IGA)	Bleeding time
	- Fibrinogen Degradation Product	Clotting time
		Prothrombin time
		Peripheral Blood Smear
		Malaria/Filaria Parasite
		Platelet count
		Packed Cell volume
		Blood grouping
		Rh typing
		Blood Cross matching
		ELISA for HIV, HCV, HBs Ag
		ELISA for TB
		APtt
		ANA/ANF, Rheumatoid Factor
	b. Urine Analysis	Urine for Albumin, Sugar, Deposits, bile salts, bile pigments, acetone, specific gravity, Reaction (pH)
	c. Stool Analysis	Stool for Ova cyst (Ph),
		Hanging drop for V. Cholera
		occult blood
		Bacterial culture and sensitivity
	d. Semen Analysis	Morphology, count
	e. CSF Analysis	Analysis, Cell count etc.
	f. Aspirated fluids	Cell count cytology
II	Pathology	
	a. PAP smear	Cytology
	b. Sputum	Sputum cytology
	c. Haematology	Bone Marrow Aspiration

		Immuno haematology
		Coagulation disorders
		sickle cell anaemia
		Thalassemia
	d. Histopathology	All types of specimens, Biopsies
III	Microbiology	
		KOH study for fungus
		Smear for AFB, KLB (Diphtheria)
		Culture and sensitivity for blood, sputum, pus, urine etc.
		Bacteriological analysis of water by H2s based test
		Stool culture for Vibrio Cholera and other bacterial enteropathogene
		Supply of different media* for peripheral Laboratories
		Grams Stain for Throat swab, sputum etc.
IV	Serology	RPR Card test for syphilis
		Pregnancy test (Urine gravindex) ELISA for Beta HCG
		Leptospirosis, Brucellosis
		WIDAL test
		Elisa test for HIV, HBsAg, HCV
		DCT/ICT with Titre
		RA factor
V	Blood Bank	Services as per norms for the blood bank including services for self component separation
VI	Biochemistry	Blood Sugar
		Glucose tolerance test
		Glycosylated Hemoglobin
		Blood urea, blood cholesterol
		serum bilirubin
		Icteric index
		Liver function tests
		Kidney function tests
		Lipid Profile
		Blood uric acid
		serum calcium
		Serum Phosphorous
		serum Magnesium

		CSF for protein, sugar
		Blood gas analysis
		Estimation of residual chlorine in water
		Thyroid T3 T4 TSH
		CPK
		Chloride (Desirable)
		Salt and Urine for Iodine (Desirable)
		Iodometry Titration

Annexure 4 - Laboratory Equipments as per Indian Public Health Standards (IPHS) for 301 to 500 bedded District Hospitals 2011

S. No.	Name of the Equipment	301-500 Bedded
1	Binocular Microscope	10
2	Chemical Balances	2
3	Simple balances	2
4	Electric Calorimeter	2
5	Fully Automated Auto-analyzer	1
6	Semi auto analyzer	1
7	Micro pipettes of different	10
8	Water bath	2
9	Hot Air oven	2
10	Lab Incubator	3
11	Distilled water Plant	2
12	Electric centrifuge, table top	3
13	Cell Counter electronic	1
14	Hot plates	6
15	Rotor/Shaker	2
16	Counting chamber	4
17	PH meter	3
18	Paediatric Glucometer/Bilirubinometer	1
19	Glucometer	2
20	Haemoglobinometer	3
21	TCDC count apparatus	2
22	ESR stand with tubes	6
23	Test tube stands	10 – 20
24	Test tube racks	10 – 20
25	Test tube holders	10 – 20

26	Sprit lamp	10
27	Rotatry Microtome	1
28	Wax Embel Bath	1
29	Auto Embedic Station	1*
30	Timer stop watch	2
31	Alarm clock	2
32	Elisa Reader cum washer	2
33	Blood gas analyser	1
34	Electrolyte Analyser	1
35	Glycosylated Haemoglobinometer	1
36	Blood Bank Refrigerator	3
37	Haematology Analyser with 22 parameters	1
38	Blood Collection Monitor	1
39	Laboratory Autoclaves	3
40	Blood Bank Refrigerator	4
41	Ordinary Refrigerator	4
42	Floatation Bath	1
43	Emergency Drug Trolley with auto cylinder	1
44	Dialected tube scaler	
45	Class – I Bio Safety Cabinet	1
46	Knife Sharpner	1
47	Air Conditioner with Stabilizer	1
48	Cyto Spin	1
49	Ro Plant	1
50	Computer with UPS and Printer	1
51	Automatic Blood Gas Analyzer	1
52	Fine Needle Aspiration Cytology	1
53	Histopathology Equipments	1
54**	Pipette – 1 ml & 5 ml	
	Burette 10 ml Conical Flask Biker/Glass bottles Glass or plastic funnel Glass stirring rod	
	small stainless steel bowl Electronic weighing scale Measuring cylinder	
	Gas Burner Laboratory balance Stop watch, Cyclomixer	
	Micro pipette 10-100 ml	

	:10-200 ml Micro tips Centrifuge, Oven Bath Serological Digital calorie meter	
	Stirrer with stainless steel stirring rod	
	Digital electronic temperature controller	
55***	i. Ion – meter Table Top (specific for fluoride estimation in biological fluid)	
	ii. Table Top Centrifuge without refrigeration iii. Digital PH Meter	
	iv. Metaler Balance v. Mixer	
	vi. Incubator	
	Pipettes/Micropipettes	
56	CO Analyser	1
57	Dry Biochemistry	
58	Whole Blood Finger Prick HIV Rapid Test and STI Screening Test each	4000
59	Blood Component Separator	1
60	Platelet Agitator	1
61	Platelet Thawing Machine	1
62	Laminar Flow	1

* To be provided as per need.

** To be provided for salt and Urine analysis for Iodine.

*** For analysis of Fluoride wherever applicable

Annexure 5 – List of consumables and their cost

SI No	Lab Reagents and items	Pack	Quantity	Cost
1	A S O Kit	20 T	5 kits	2226
2	Albumin BCG Method	400 T	3 kits	10080
3	ALP IFCC Amp buffer calorimetric assay	200 T	1	6922
4	ALT (SGOT) IFCC without PLP	400 T	6 kits	29028
5	AST (SGPT) IFCC without PLP	400 T	6 kits	29028
6	Blood collection EDTA tube (Purple)	100 s	69	85540
7	Blood collection Glucose tube(Ash)	100 s	35	39000
8	Blood collection Plain tube(Red)	100 s	60	72000
9	Blood Lancet	200s	370	69000
10	CRP	100 T	1	1586
11	Calberator for routine chemistry	12X 3m1	1	15664
12	Caliberator Lipids	3 X 1 ml	1	12558
13	Cholestrol chod PAP	400 T	1 kit	4200
14	Cleaning Soln STD B	250 ml	4	8500
15	Control Abnormal	4X5m1	1 kit	6778
16	Control Lipid normal	4 X 3 ml	1	13264
17	Control Normal	4X5m1	1 kit	5020
18	Creatinine Kineti c Jaffe	400 T	6 kit	63504
19	Deprotoniser	2 X 11m1	30	41580
20	Deprotoniser ISE	125m1	1	3200
21	Detergent Cell count	2 ltr	15	40050
22	Diluent (Cell count)	20 Ltr	30	194400
23	Direct Bilirubin Diazo Method	100T	12 kits	36024
24	DirectHDL Homogenous calori	200 T	3 kits	88200
25	E SR Tubes(Black)	100 s	45	75420
26	Glucose Test Enzymatic	400 T	30 kits	63000
27	H b Tubes		20	2500
28	Halogen Lamp		4	55272
29	Hcg Cards (pregnency Kit)	1 s	1200	54810
30	H BS Ag kit	40 T	200	228800
31	LeishmanStain	250 ml	10	1070
32	Lyse Cell count	500 ml	26	135200
33	Micro slides	50 s	20	3200
34	Microcuvette segment	1 80 No	36	222264
35	N/10 Hcl	500 ml	2	160
36	Quantitative Test for HBA1 c	24 T	1	4500
37	R A Kit	20 T	5 kits	1340
38	Snap Pack Na/ KCl	220 T	1	11138

39	Sodium Citrate	500m1	5	500
40	System Cleaner	1000m1	12	79980
41	Thermal paper autoanalyser	Roll	45	9900
42	Thermal paper Heamotology	Roll	60	12000
43	Thermal paper Electrolyte analyser	Roll	2	300
44	Total Bilirubin Diazo Method	400 T	4 kits	27148
45	Total Protein Birute Calorimetric	400 T	3 kits	15144
46	Triglycerides GPO PAP	200 T	1	3667
47	Urea GLDP UV	400 T	4 kits	24674
48	Uric acid PAP Calorimetric	400 T	1	4595
49	Urine strips for glucose/protein	100 s	200	73000
50	VDRL kit	50 T	40 kits	30360
51	20% Sulphosalicylic Acid	125 ml	10	810
Total cost				2018104

Annexure 6 – District wise population projections until 2018

District	Populat ion Growth Rate	2012	2013	2014	2015	2016	2017	2018	2013 - 2018 Grow th Rate	201 3- 201 8 %
Dharwad	1.0142	1,873,220	1,899,820	1,926,797	1,954,158	1,981,907	2,010,050	2,038,593	0.073	1.073
Gulbarga	1.0166	2,607,469	2,650,753	2,694,756	2,739,489	2,784,964	2,831,195	2,878,192	0.0858	1.0858
Uttara Kannada	1.006	1,445,468	1,454,141	1,462,866	1,471,643	1,480,473	1,489,356	1,498,292	0.0304	1.0304

Source: Data developed by SANIGEST for GoK project under WB TA assistance

Annexure 7 – District wise BPL population projections until 2018

BPL 2012	Populati on Growth Rate	2012	2013	2014	2015	2016	2017	2018
Dharwad	1.01	1,171,115	1,187,042	1,203,186	1,219,549	1,236,135	1,252,946	1,269,986



Gulbarga	1.02	2,150,283	2,179,527	2,209,168	2,239,213	2,269,666	2,300,534	2,331,821
Uttara Kannada	1.01	988,867	1,002,315	1,015,947	1,029,763	1,043,768	1,057,964	1,072,352

Source: Data developed by SANIGEST for GoK project under WB TA assistance

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