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Prefeasibility Report of setting up of Dialysis Centres at Taluka Level Hospitals of Bijapur District

Karnataka Infrastructure Development
Department Project

Submitted by



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Submitted to

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Executive Summary

Dialysis is essential for patients suffering from “*End Stage Renal Disease (ESRD)*” and it is observed from preliminary studies that the prevalence of Chronic Kidney Disease (CKD) the precursor to ESRD is 0.8% in India. The major contributing causes to CKD are diabetes and high blood pressure among others; these diseases are increasing at an alarming rate across the country. Hypertension is observed in 20-40 percent adults in urban areas and 12-17 percent adults in rural areas, the number suffering hypertension was estimated to be 118.2 million in 2000 and is expected to increase to 213.5 million in 2025. India is the world capital for diabetes cases with 19.3 million cases in 1995 to a projected increase to 57.2 million in 2025, but a 2004 study has projected the number of diabetes cases in India as 34.7 million already.

The cost of supporting the treatment of patients undergoing dialysis and suffering from ESRD is very high in the order of Rs 10,000 to Rs 20,000 per month; with 37% of the country’s population below the international poverty line of USD1.5 per day, it is impossible to support such high treatment costs. Cost of per session of dialysis is anywhere between Rs 1000 to Rs 2000 in the private set up, low cost dialysis centers in the country provide dialysis between Rs 150 to Rs 600, but these centers are run by NGOs and supported by philanthropists. Government set up dialysis in Karnataka costs Rs 350 per sitting but the availability of service is limited to only 6 machines per district headquarter hospital in Karnataka. This results in non-availability of service for suffering patients.

This objective of this project is to establish dialysis centers at taluka level hospitals of Gulbarga, Bijapur and Raichur on PPP mode. The partner/consortium is expected to provide nephrology support and dialysis for patients who require the same. The centres will be located in taluka/CHC hospital, the emergency medical, laboratory and ambulatory support will be provided by the hospital. The centre will be operated by qualified dialysis technicians and supported by trained nurses and shall operate two shifts every day, six days a week. The government will reimburse the partner as per the agreed annuity.

The proposed project will be offered on Build, Own, Operate and Transfer mode (BOOT) to the successful bidder, the bid variable being the cost at which a dialysis is provided. Project agreement can be either between two parties’ namely private service provider/equipment manufacturer and state government or between three parties – the government, equipment manufacturer and service provider. The service provider will be responsible for operating the centre, providing the service and adhering to the laws and regulations that govern the process. The equipment manufacturer/authorized dealer and service provider can agree on the revenue sharing/costing of the equipment between them.

iMaCS has presented three scenarios with different dialysis capacities in each taluka, with and without building infrastructure being provided by the government.

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

1.1. Project idea

1.1.1. 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.

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, however wide gaps exist between the desired and the actual level of services provided to the people at tertiary level, one of them is the provision of dialysis service.

Dialysis is the essential requirement for patients suffering from advanced chronic kidney disease and kidney failure when renal replacement is not possible. A nephrologist prescribes dialysis after detailed analysis and examination of the patient; Haemo dialysis and Peritoneal Dialysis are the two ways by which dialysis is provided to patients. Haemo dialysis is more popular as it involved lesser capital cost and is done under supervision in a centre. Peritoneal dialysis can be self administered at home, but it involves high initial investment and operation cost.

The Health and Family Welfare department has set up 18 haemo dialysis centres across the state at the district hospital premises and each centre is equipped with six dialysis machines; the Department of Medical education also provides dialysis services through the medical colleges. At the district hospital dialysis centres APL patients pay Rs 350 per sitting of dialysis and BPL patients are provided the service free of cost.

Private dialysis centres are operated either attached with a hospital/clinic or as a standalone centre similar to a diagnostic centre. The cost of dialysis in a private centre ranges from Rs 1000 to Rs 3000 per sitting depending on the location, type of dialysis, consumables used, reuse of consumables and funding received by the dialysis centre from support organizations.

Patients prescribed with dialysis need to undergo the process until they undergo renal replacement and the frequency of dialysis varies from once a week to once a day depending on the severity of the renal failure. Patients undergoing haemodialysis at private facilities spend between Rs 10,000 to Rs 20,000 every month for the process; additionally patients undergoing haemodialysis have to take special food and additional medicines to support the system. The trauma of the disease coupled with the high expenditure of treatment drains the patients emotionally and economically, hence the government has to step in to provide cost effective and viable alternative. Though the government has

established 18 haemodialysis centres, the capacity of them are limited as only a maximum of 4 cycles are possible per machine operating round the clock, also separate machines have to be maintained to service patients who suffer from communicable and infectious diseases. Cleaning and maintenance of the machine and unforeseen machine failure leading to down time further brings the operating efficiency of the centre. Hence at any point of time these dialysis centres are over loaded and patients are kept on waiting list for availing the service.

As the Government's centres are located in district headquarters it is difficult for patients relying on them because of the long travel required for every dialysis cycle, dietary, medical and family restrictions further add to the strain caused because of the procedure. Hence, the Government of Karnataka intends to provide dialysis services at each taluka, this would ease the load on district hospital, reduce the waiting time for service.

1.1.2. Why Dialysis?

The human kidney performs the following functions,

1. Removes the waste and water from the blood stream
 - a. Excess salt, and other chemicals are filtered by the blood to maintain the appropriate balance required for the body, these chemicals and salts are along with the excess water is removed from the body in the form of urine by the kidneys. Excess water in the body results in high blood pressure and swelling of body parts leading to failure.
2. Balancing the chemical composition of the body
 - a. By balancing the fluid levels in the body the kidneys assist in maintaining the chemical composition of the body. Chemical imbalance in the system disrupts the normal metabolism resulting in multiple diseases.
3. Assist in producing Red Blood Cells (RBC)
 - a. Kidneys produce Erythropoietin; this hormone simulates the production of RBC cells in the body. RBC cells act as oxygen carriers in the blood stream, reduction of RBC count results in anaemia and ultimately weakening of the body.
4. Assist in maintaining the blood pressure
 - a. The kidneys release hormones such as renin and angiotensin, these hormones regulate the salt and fluid content of the body and assist in contracting and relaxing the blood vessels that manage the blood pressure. Failure of kidneys increases blood pressure, resulting in contraction of blood pressure leading to high blood pressure, which strains the heart.
5. Assist bone development
 - a. Kidneys produce a hormone called Calcitrol, this maintains the correct level of calcium and phosphate in the blood and bones, failure of kidneys causes reduces calcitrol production and leads to renal bone disease

Kidney failure or failure of kidney function is broadly classified as,

1. Acute kidney failure
 - a. The kidney suddenly stops working, in most cases this is temporary and is caused because of injury, accident or poisoning
2. Chronic kidney failure
 - a. Gradual loss of kidney functions is called as chronic kidney failure and this may lead to permanent kidney failure. The causes of CKD is still unknown, but the following have been identified as leading causes,
 - i. Diabetes Mellitus
 - ii. High Blood Pressure
 - iii. Glomerular Disease
 - iv. Inherited and Congenital Kidney Disease
 - v. Polycystic Kidney Disease
 - vi. Renovascular Disease
 - vii. Chronic Pyelonephritis
 - viii. Kidney Stones
 - ix. Analgesic nephropathy and drugs

Patients who suffer from acute kidney failure are provided drug relief and temporary dialysis till normal operation of the kidney starts, but when patients reach the peak of chronic kidney failure the only option for cure/survival is to replace the kidney from a suitable donor, but with a paucity of replacement kidney, the only other option is to opt for dialysis till replacement kidney is available.

Dialysis is done in two ways,

1. Peritoneal Dialysis

A special fluid is infused in the peritoneal cavity in the stomach, which is surrounded, by arteries and veins. The wastes in the blood are transferred through the semi permeable peritoneal membrane. PD is done in two ways

- i. Continuous Cyclic PD – The patient is connected with the PD machine overnight and the dialysis happens during the sleeping hours
- ii. Continuous Ambulatory PD – The patient is infused with the fluid every and after a 3-6 hour period it is drained. The number of cycles may vary depending upon the intensity of the disease and the ability of the person to carry fluid.

2. Haemo Dialysis

During haemodialysis the blood is removed from the body, is cleaned using a dialyser, and is returned to the body. An Arteriovenous Fistula is surgically attached to the body for removing and injecting blood into the system. Haemodialysis is done in the following ways,

- i. Home Haemodialysis
 - a. Under medical supervision haemodialysis can be done at home either in the mornings or nocturnal
- ii. In centre Haemodialysis

-
- a. Under medical supervision haemodialysis is done at a centre either during waking hours or nocturnal

In centre waking hour haemodialysis is the most commonly found and preferred option because it offers comparatively lower cost of procedure for the patient, but this method has the following restrictions,

- i. Patient has to travel to the haemodialysis centre for every procedure
- ii. The dialysis timetable has to be strictly followed
- iii. The dialysis schedule restricts the ability to travel elsewhere
- iv. Full time work schedule is affected
- v. Special diet for the dialysis patient has to be strictly followed
- vi. Support medications need to be taken regularly

1.1.3. Why PPP for this project?

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 dialysis service affordable and at the door step of patients requiring the service,

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 several private dialysis 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. Stand alone dialysis centre has been established as a viable business in the country and leading healthcare organizations are entering the fray across the country
4. PPP in dialysis service is an established model across the country and there are ample examples to emulate
5. Dialysis 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

6. There is a human resource constraint in the state of Karnataka to operate the centre, besides this current staff is inadequately trained
7. Delay in reporting of problems in the hard & soft healthcare infrastructure lead to bigger and un-reparable problems.

1.1.4. 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 Dialysis service by tapping the expertise of the private sector
2. Mobilize private capital to speed up the delivery of infrastructure and services and eliminate subsidies
3. Reduce the travel time of patients by providing dialysis service at the taluka level
4. Enable efficient use of Dialysis service by improving the identification of long-term risks and their allocation, while maintaining affordable tariffs
5. Provide higher quality of services
6. Access best practices
7. Enable regular maintenance and upgrades

1.2 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 Dialysis 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 sensitivity analysis, the ideal pricing structure for the Dialysis 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 dialysis centres and pricing of services

Chapter 2 - Sector Profile

2.1. Industry Overview

2.1.1. Brief Introduction

The first dialysis centre in India was established at CMC Vellore in 1961 and soon KEM Mumbai, AIIMS New Delhi, PGI Chandigarh started dialysis in the same decade. In the last three decades dialysis have been established in multiple formats viz.,

1. Nephrologist owned dialysis centres
2. In hospital dialysis centres
3. Dialysis centres by charitable organizations
4. Stand alone dialysis centres

Hospital run dialysis centres were popular till a few years before because of the following reasons,

1. Availability of nephrologist and in house on duty doctors
2. Availability of trained manpower and support system
3. Dependability on the hospital brand for delivery of service

Dialysis centres operated by charitable organizations are very popular in Mumbai, which has the highest number of dialysis centres in the country. The success of these centres in providing low cost services is owed to,

1. Low or no cost incurred for the building for dialysis centres
2. Nephrologists/Doctors associated with the institutions provide the service for free or for minimal fee
3. Machines are procured with the assistance of philanthropists
4. Dialysers are reused, reducing the variable cost per dialysis

Stand alone dialysis centres by Nephrologists are also found across the country, the advantages and disadvantages of such an unit are,

1. The nephrologist owns the building or rents at a lower rate
2. Scale up of number of units is difficult hence the capacity is limited
3. Service delivery would be of high quality owing to the focused care

Lately many stand alone dialysis centres and dialysis centers attached with hospitals have emerged in tier 1 and tier 2 cities because of,

1. Viability of operating a standalone dialysis centre has been proved
2. ESRD has evolved as a life style disease affecting the population which can afford to pay for dialysis at a private centre
3. The model is becoming popular the population is underserved

Prominent healthcare organizations entering the dialysis business are,

1. Nephroplus Kidney Care Clinics
 - a. Located in Hyderabad, Secuderabad, Mahboobnagar and Bengaluru, Nephroplus provides haemodialysis, peritoneal dialysis, renal replacement and related surgeries. It has started a free helpline for assisting patients suffering from kidney diseases, it has also established a training academy for dialysis technicians and nurses. Nephroplus intends to open 100 dialysis centres by 2015.
2. Davita - Nephrolife
 - a. The centres provide kidney care as a standalone clinic and in partnership with established hospitals. It caters to the whole range of kidney care including dialysis, surgery, renal replacement, dietary services and information services. Davita-Nephrolife offers dialysis through four centres in Bangalore, three in Chennai, one in Tumkur, one in Hosur, one in Hyderabad and one in Pondicherry.
3. Renkare – Fortis
 - a. Fortis has ventured in the dialysis service through its subsidiary Renkare. It offers dialysis through six centers in New Delhi and plans to expand to 50 locations across the country in the next two years
4. Apex Kidney Care Mumbai
 - a. Apex Kidney Care Mumbai has eight centres across the country and intends to expand it to 50+ centres by 2014

2.1.2. Leading manufacturers of Dialysis Equipments

The global market for dialysis is highly consolidated with majority of the market being held by a few major players, BBraun(Germany), Fresenius (Germany), Baxter International (USA), and DaVita (USA). The other players in the dialysis equipment industry include NIKKISO (Japan), NIPRO (Japan), Gambro (Sweden) etc. Indian dialysis market is also dominated by the aforementioned MNCs.

2.2 Regional profile

As such no authentic data is available on number of Dialysis centre in Karnataka. Apart from the state run dialysis centres in 18 District hospitals and medical colleges there are private hospitals/standalone dialysis centres providing the service, but there is no record of the service delivery parameters.

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:

Table 1 Ranking of districts based on availability of Healthcare Facilities

District	Rank
Belgaum	211
Bellary	247
Bidar	243
Bijapur	302
Chikmagalur	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

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.

2.3 Key Issues

The key issues in setting up Dialysis centers are,

1. High cost of capital equipments

2. Limited availability of trained clinical and para clinical manpower – Nephrologists are in short across the country and there is a huge shortage for dialysis technicians, most hospitals/centres train nurses and BSc Biology/Zoology graduates as dialysis technicians
3. Short life of dialysis equipment – seven years in the normal operation life of a dialysis machine
4. Requires rigorous infrastructure set up
5. Regular maintenance of equipments as the running time of machines is high
6. High cost of associated employee salary
7. Power supply, procurement of supplies adds to cost

Chapter 3 - Market Assessment

3.1. Industry Outlook

The exact number of persons requiring dialysis in the country is still not known authoritatively. The Indian Society of Nephrology has established a Chronic Kidney Disease (CKD) registry and this is expected to provide useful epidemiological data in future.

In the prevention study done in Chennai, the prevalence at the community level is 8600 per million population (pmp) in the study group and 13900 pmp in the control group. The second study based in Delhi revealed a prevalence of CKD (serum creatinine more than 1.8 mg %) at 7852 pmp. The third study from Bhopal revealed an incidence of 151 pmp suffering from end stage renal disease (ESRD).¹

AIIMS, New Delhi conducted two studies², the first study covering a population of 4712 subjects in New Delhi who participated in a blood biochemistry test. Mean age was 42.38±12.54 years, 56.16% were male. Thirty-seven were found to have chronic renal failure (prevalence rate of 0.78%). If these data are applied to India's 1 billion population there are ~7.85 million CRF patients in India. Aetiologically, diabetes (41%), hypertension (22%), chronic glomerular nephritis (16%), chronic interstitial disease (5.4%), ischaemic nephropathy (5.4%), obstructive uropathy (2.7%), miscellaneous (2.7%) and unknown cause (5.4%) constituted the spectrum.

In the second study by AIIMS 48 centres were distributed all over India. Data were based on prospective investigations conducted over a period of one month (33 hospitals) to three months (15 hospitals) comprising 4145 CKD patients. It showed the following aetiological pattern: diabetes (29.7%), chronic glomerulonephritis (19.3%), hypertension (14%), chronic interstitial disease and vesico-ureteral reflux (12.6%), obstruction and calculus (9.3%), ADPKD and Alport Syndrome (8.4%), undiagnosed (6.2%). This study shows that the prevalence of CRF in India is ~0.8%. If we combine the two, diabetes has emerged as the most frequent cause (30–40%) followed by hypertension (14–22%), CGN (16–20%), CIN (5.4–12.7%), here do familial disease (8.4%), obstruction including calculus (2.9%). The two studies, which are different in some ways, perhaps explain the wide range in incidence, suggesting regional influences.

¹ Khanna U. The Economics of Dialysis in India. *Indian J Nephrol* 2009;19:1-4

² Suresh Chandra Dash, Sanjay K Agarwal, *Nephrology Dialysis Transplantation* (2006) 21:233, Oxford Journals

3.2. Opportunities and demand projections

iMaCS did a research for the district of Bijapur, Karnataka based on the CRF prevalence rate of ~0.8% calculated by AIIMS study across 48 centres distributed all over India.

Considering the following assumptions,

1. CRF prevalence rate 0.8% of the population
2. Population dependant on Government System for Dialysis – 75%
3. Dialysis requirement per patient – one per week
4. Annual population growth rate – 1.87% (Average annual growth rate in the past 10 years)
5. Number of cycles per machine per day - 3
6. Operating efficiency of the dialysis machine – 95% (95% of the time the machine is up and running during working hours)

Table 2 Projection of Dialysis Machine requirement for Bijapur District

	2012	2013	2014	2015	2016	2017
Karnataka Population	62026943	62936321	63859032	64795271	65745236	66709129
Bijapur Population	2215816	2257293	2299545	2342589	2386438	2431108

% Requiring Dialysis in Karnataka	496216	503491	510872	518362	525962	533673
% Requiring Dialysis in Bijapur	17727	18058	18396	18741	19092	19449
% Visiting GH for Dialysis	13295	13544	13797	14056	14319	14587

Number of Cycles required per patient per week	13295	13544	13797	14056	14319	14587
Total Cycles required per Year	691335	704275	717458	730888	744569	758506
No of M/c required in GH assuming 3 cycles per m/c per day	633	645	657	669	682	695
No of M/c assuming operating efficiency	666	679	692	705	718	731

It is found that the District of Bijapur alone requires 650 plus dialysis machines immediately. This assumption does not include the requirements of Sero Positive patients who need to be provided with separate dialysis machine to avoid cross infection. Though these numbers look exaggerated, it should be noted that there is no standardized study on the number of people requiring dialysis in Karnataka.

The below table gives the distribution of dialysis machines among government hospitals and their existing load,

Table 3 Number of dialysis cycles in government centres

Number of Dialysis Cycles at District hospital from April 2011 - January 2012												
Sl.No.	District	No of Machines	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1	KC General hospital, Bangalore	8	418	410	544	466	444	433	450	481	516	4162
2	Bijapur	6	221	218	238	240	264	264	250	299	351	2345
3	Gulbarga	6	258	269	275	291	265	256	247	271	193	2325
4	Tumkur	6	215	219	252	282	265	228	239	242	251	2193
5	Chikmagalur	6	204	187	186	185	209	191	202	203	197	1764
6	Chamarajanagar	6	242	245	153	193	208	114	120	107	122	1504
7	Jayanagar General hospital, Bangalore	8	147	160	161	135	129	105	127	193	236	1393
8	Chitradurga	6	116	134	127	145	143	155	194	158	184	1356
9	Kolar	6	137	135	134	142	153	142	131	108	141	1223
10	Chikkaballapura	6	104	101	111	110	133	141	126	151	175	1152
11	Bagalkote	6	63	71	74	68	71	80	88	100	76	691
12	Hospete	6	61	67	73	87	71	67	58	68	65	617
13	Udupi	2	62	66	55	55	64	63	68	70	73	576
14	Haveri	6	0	1	59	78	70	81	72	72	81	514
15	Karwar	6	61	59	49	48	31	18	40	37	31	374
16	Gadag	6	36	36	38	48	51	49	41	31	33	363
17	Dharwad	6	39	39	34	36	41	41	35	44	45	354
18	Sagara	6	0	0	0	0	3	46	46	48	82	222
19	Ramnagara	6	0									162

It is observed that Bijapur, Gulbarga, Tumkur, Chikmagalur, Chamrajnagar, Chitradurga, Kolar and Chikkaballapura have the maximum load and the average utilization of the machine varies from 0.95 cycle per machine per working day in Chikkaballapura to 2.5 cycles per machine per day in Bijapur. It should be noted that utilization of dialysis service also depends on,

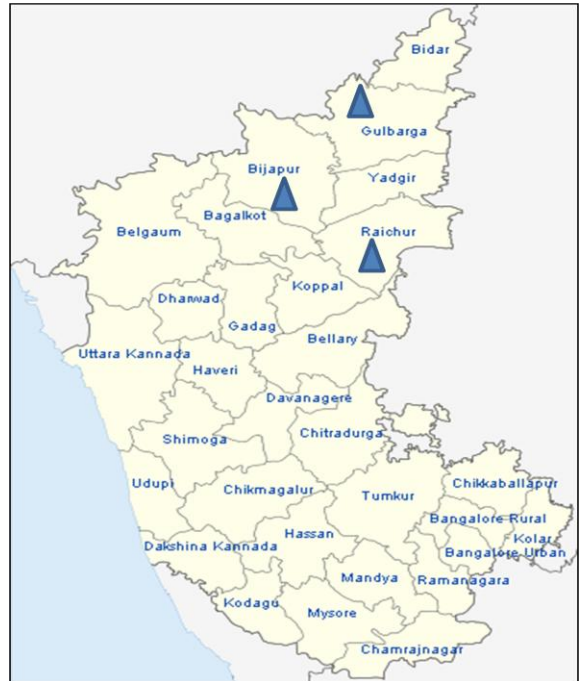
1. Availability of nephrologist
2. Uptime of the dialysis machine
3. Routine availability of consumables
4. Availability of trained manpower
5. Availability of advanced diagnostic support to assess and advice dialysis

Chapter 4 - Project

4.1 Description of the Project

GOK is planning to provide dialysis services at taluka level hospitals of Gulbarga, Bijapur and Raichur.

1. The dialysis centres will be located in the Taluka/CHC level hospital premises. The centre will start with a capacity five-dialysis machines and should have the building infrastructure to expand to 15 machines. We have provided scenario analysis for Five machine centre, Ten machine centre and Fifteen machine centre
2. The partner shall employ one nephrologist per district who will consult all patients at the district headquarters and through video conferencing. Adequate manpower shall be employed by the partner for operating the dialysis centre as agreed
3. The centre shall demarcate one machine out of five for Sero positive cases, this is an average and can be altered based on the local profile of the taluka/district
4. The lab tests required will be provided by the government hospital and the ambulance requirement also will be from the hospital and 108 services.
5. The partner shall provide entertainment facilities during the dialysis period. The patients shall bear the cost of special food required for dialysis patients
6. The partner shall provide the service for all patients requiring dialysis, the patient has to be advised dialysis by the nephrologist associated with the centre and it should be approved by the Government Hospital approval committee created for this purpose
7. The partner shall collect the minimum charges prescribed by the government for availing dialysis services from the beneficiaries and submit it with the government. The government shall reimburse the partner for the number of cases served as per the annuity.



4.2 Components of the project

For setting up of a dialysis centre in a Taluka/CHC hospital or stand alone center, the requirements are as follows,

- a) Space for dialysis unit – 1700 sqft to 3000sqft of built up space for running 5-15 dialysis machines including supportive services.
- b) Haemodialysis Dialysis machines
- c) RO plant
- d) Cot, Mattresses and Dialysis Chairs
- e) Para monitors, Ancillary equipments and crash cart
- f) Consumables

Services/ Items to be provided by the Government

General Provisions

Administrative responsibilities, required space, adequate raw water, required electrical power required for running the project.

Professional and other support services

Required investigations, other supportive and emergency services, treatment of complications, medicines and services for complications shall be ensuring 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 Haemodialysis Plants.

Haemodialysis Machines

The partner shall provide, install, maintain and run the Haemodialysis units in the Talukas hospitals and CHC of the district identified by the State Health and Family Welfare Department. The partner is responsible for comprehensive maintenance and standby machine in case of breakdown of machine in any of the centres to ensure uninterrupted service.

RO Plant

The partner shall provide, install and run fully automated compatible RO water plant of required capacity.

Cot, Mattresses and Dialysis Chairs

The partner shall provide, install and maintain cots, mattresses and Dialysis Chair as per the WHO guidelines/ Indian Society of Nephrology guidelines

Para monitors

The partner shall provide, install and maintain Para monitors of approved specification as per following ratio:

- I. 1 Para monitors for 5 machines
- II. 2 Para monitors for 10 machines
- III. 3 Para monitors for 15 machines

Isolation Units for HBs Ag and HCV Patients,

The partner shall provide for Isolation Units for HBs Ag and HCV patients as per following ratio:

- I. 1 in 5 machines
- II. 2 in 10 machines
- III. 3 in 15 machines

This ratio can change with mutual consultation

Ancillary equipments

The partner shall provide and maintain all ancillary equipments like the Weighing scale, BP apparatus, Stethoscopes, Ph meter, TDS meter 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 dialysis.

The partner shall provide facilities for the disposable, equipments and patient belongings as per the standard requirements of Haemodialysis procedure.

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. Disposal of the BMW shall be done by the private partner.

4.3 Description of the District - Bijapur

Bijapur is a land locked district spreading 10541 sq km in the northern part of Karnataka. The district is bound by Solapur district on the north side and Sangli on the north–west (both of Maharashtra state), by the district of Belgaum on the west side, Bagalkote on the south side, Gulbarga on the East side and by Raichur on the south–east side. The district headquarters is also called Bijapur and has notable historic contributions during the Chalukyas of Kalyani dynasty between the 10th and 11th century. . Bijapur district comprise of 5 Taluks namely,

1. Indi
2. Bijapur
3. Muddebihal
4. Sindgi
5. Basavana-Bagewadi

Demographic profile: The district has a population of 21.75 Lakh persons as per 2011 census and the district population has gone up by 20.38 percent compared to 2001 population. A demographic profile of Belgaum is as below,

Table 4 Demographic Profile of Bijapur

Total population	21,75,102
Male	11,12,953
Female	10.62,149
Population growth	20.38%
Density/Km ²	207
Proportion to Karnataka population	3.56%
Sex ratio	954
Rural : Urban Population	61.4% : 38.6%
Average Literacy	67.2%
Male Literacy	77.41%
Female Literacy	56.54%

Source: Census 2011 data

Taluka wise population distribution of Bijapur district is as below,

Table 5 Taluka wise population of Bijapur

Name of the Area	Urban / Rural	Estimated population
B.Bagewadi	R	320225
B.Bagewadi	U	30125
B.Bagewadi	T	350350
Bijapur	R	401708
Bijapur	U	288480
Bijapur	T	690188
Indi	R	382267
Indi	U	36635
Indi	T	418902
Muddebihal	R	231895
Muddebihal	U	64008
Muddebihal	T	295903
Sindagi	R	357262
Sindagi	U	31620
Sindagi	T	388882
District Total	R	1693357
District Total	U	450868
District Total	T	2144225

Source: DHO, population distribution not as per 2011 census

Health Facilities:

The distribution of public health facilities in Bijapur district is as follows,

Table 6 Health Facilities in Bijapur District

Taluka	PHC	CHC	TH	DH	UHC	Pvt. Dialysis clinic	Dialysis Facility
B.Bagewadi	13	1	1	0	0	0	0
Bijapur	14	0	0	1	2	2	1+2
Indi	12	2	1	0	0	0	0
Muddebihal	8	2	1	0	0	0	0
Sindagi	8	3	1	0	0	0	0

Details of Taluka Hospitals

The bed strength and IP/OP details of the taluka hospitals in Bijapur is,

Table 7 IP/OP details of Taluka Hospitals in Bijapur

Sl.No	Name of the Taluka Hospital	No. Of Beds	IPD					OPD				
			2007-08	2008-09	2009-10	2010-11	2011-12	2007-08	2008-09	2009-10	2010-11	2011-12
1	B.Bagewadi	100	850	765	4357	5813	6830	36060	44826	58791	54503	56867
2	Indi	100	4757	3224	2012	3112	1960	42482	43352	43412	45818	40102
3	Sindgi	100	2312	3252	3058	2487	3257	48238	42995	51315	39604	44359
4	Muddebihal	100	788	889	1681	2867	1729	33635	32953	49997	44615	30613

The distribution of medical specialists in Bijapur Taluka Hospitals is,

Table 8 Distribution of Specialists in Public Hospitals of Bijapur

Name of the Taluka Hospital	OBG		Pead		Anasthesia		MD Medicine		Surgery		Opth.		Derma		Radiology		Ortho.	
	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI	Sanc	AVI
B.Bagewadi	1	1	1	1	1	1	1	-	1	1	1	-	-	-	-	-	1	-

Indi	1	-	1	1	1	1	1	-	1	-	1	-	-	-	-	-	1	-
Sindgi	1	-	1	1	1	1	1	1	1	1	1	1	1	1	-	-	1	1
Muddebihal	1	1	1	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-

The availability of other medical specialists in the taluka hospitals is,

Table 9 Taluka wise manpower distribution

Name of the Taluka Hospital	GDMO/SMO		Specialists		Staff Nurses		Lab. Tech		Pharmsist		X-Ray Tech.		Group-D		FDA	
	Sanc	Avl	Sanc	Avl	Sanc	Avl	Sanc	Avl	Sanc	Avl	Sanc	Avl	Sanc	Avl	Sanc	Avl
B.Bagewadi	1	0	8	4	18	20	2	2	2	2	2	2	18	4	1	1
Indi	1	0	8	2	18	14	2	2	2	2	2	1	18	4	1	1
Sindgi	1	0	8	7	18	8	2	2	2	1	2	1	18	4	1	1
Muddebihal	1	0	8	4	18	20	2	2	2	2	2	1	18	4	1	1

The availability of essential diagnostic equipment at the taluka hospitals of Bijapur are,

Table 10 Availability of essential diagnostic equipments in Taluka Hospitals of Bijapur

Name of the Taluka Hospital	Micro Scope	Hemoglobino meter	X Ray	Sonography	CT Scan	MRI
	Yes	Yes	Yes	No	No	No
B.Bagewadi	Yes	Yes	Yes	No	No	No
Indi	Yes	Yes	Yes	No	No	No
Sindgi	Yes	Yes	Yes	No	No	No
Muddebihal	Yes	Yes	Yes	No	No	No

Dialysis Facility in the District

Dialysis facility is available only in the district headquarters Bijapur, Vatsayala Hospital Bijapur and BLDE hospital Bijapur.

Taluka wise breakup of patients availing the dialysis services at District Hospital Dialysis Centre has been tabulated as below:

Table 11 Taluka wise distribution of Dialysis Patients in Bijapur DH

Year	Bijapur	Sindagi	B. Bage wadi	Indi	Mudde bihal	Other		
						Belgaum	Gulbrga	Bagalkot
2010-11 (215)	96	34	36	5	13	9	0	22
2011-12 (385)	202	40	40	26	39	6	5	27
Total (600)	298	74	76	31	52	15	5	49
% Distribution	50%	12%	13%	5%	9%	3%	1%	8%
Distance from Bijapur in km		60	40	60	80			
Jan-Apr 2012	95	18	10	23	20	18		
	52%	10%	5%	13%	11%	10%		

Statistics of two private facilities have been tabulated as below:

Table 12 Statistics of BLDE hospital Dialysis Cases

BLDE Hospital Bijapur							
Number of available Dialysis machine					4		
Number of dialysis cycles conducted per machine					1 to 2		
Average waiting period for a patient requiring Dialysis to get serviced					2 Days		
Cost of one dialysis					For HbsAg negative pts = 1100, for HIV +ve pts = 2000		
Centre gets patient referral from					Neighbouring physicians and talukas		
Month/Year	2006	2007	2008	2009	2010	2011	2012
Jan	118	187	97	111	95	75	70
Feb	82	176	95	111	88	73	72
March	131	170	83	112	81	70	85
April	145	145	86	89	75	66	67
May	158	133	85	101	69	62	70

June	186	125	91	76	72	101	120
July	203	124	93	79	83	72	72
August	219	146	74	86	104	90	
Sept	220	108	68	87	86	81	
Oct	232	108	91	69	69	84	
Nov	199	118	97	74	75	56	
Dec	190	118	112	92	70	82	
Grand Total	2083	1658	1072	1087	967	912	556

Table 13 Statistics of Vatsayala hospital Dialysis Cases

Vatsayala Hospital, Bijapur		
Number of available Dialysis machine	6	
Number of dialysis cycles conducted per machine	3	
Average waiting period for a patient requiring Dialysis to get serviced	Varies from 1 day to 15 days	
Cost of one dialysis	For HBsAg negative pts = 1100, For HIV +ve pts = 2000	
Centre gets patient referral from	Physicians within the city and nearby talukas	
Month/ Year	2011	2012
Jan	387	424
Feb	351	445
March	420	456
April	386	447
May	353	452
June	383	-
July	433	-
August	491	-
Sept	430	-
Oct	400	-
Nov	410	-
Dec	389	-
Grand Total	4833	2224

The maximum cases are from (decreasing order) as described by Vatsayala Hospital Dialysis centre is,

1. Jamkhandi, Mudhol, Rabkavi Banahatti, Sindagi, Indi
2. 50% from Jamkahandi, Mudhol (Bagalkot), Sindagi
3. 15% from Rabkavi Banahatii (Bagalkot), Indi



Figure 1 Govt. Dialysis Centre



Figure 2 Private Dialysis Centre

Other Major Medical Facilities Available in the District

Apart from the district hospital and taluka hospitals the other major medical and dental colleges in Bijapur district are, Al-Ameen Dental College

1. Lugman Medical College(Unani), Bijapur
2. Al-Ameen Homoeopathic Medical College, Bijapur
3. Al-Ameen Medical College
4. BLDEA's B.M. Patil Medical College, Hospital and Research Centre

Ayurvedic medical colleges in Bijapur District

1. Dr. Basavaraj Nagur Rural Ayurved Medical College
2. Taluka S.P.S. Mandali's Ayurvedic Medical College, Sindagi, Bijapur
3. Government Ayurveda Mahavidyalaya, Bijapur
4. Late Smt Rajeshwari Karpurmath Ayurveda Medical College, Bijapur
5. A.V. Samiti's Ayurveda Mahavidyalaya, Mannikeri, Bijapur

Connectivity within the District

The distance from the taluka headquarters to the district headquarters in Bijapur district is,

Table 14 Taluka Connectivity from District Headquarters

Name of the Taluka Hospital	Connectivity available from the taluka headquarters to district headquarters		Distance(Kms)
	By Bus	By Train	
B.Bagewadi	Yes	No	45
Indi	Yes	Yes	60
Sindgi	Yes	No	60
Muddebihal	Yes	No	85

Railway Station in Bijapur District

1. Aliyabad Railway Station
2. Lachyan Railway Station
3. Chorgi Railway Station
4. Minchnal Railway Station
5. Nimbali Railway Station
6. Almatti Railway Station
7. Indi Road Railway Station
8. Bijapur Railway Station

9. Kyataneakeri Road Railway Station
10. Padnur Railway Station

Bus Station in Bijapur District

1. Bijapur Central Bus Station
2. Tikota Bus Station
3. Nidgundi Bus Station
4. Chadchan Bus Station

4.4 Interaction with stakeholders

For primary information, iMaCS visited District Hospital Bijapur, Indi and Sindagi taluka hospitals BDLE Hospital, Vatsayala Hospital Dialysis centre and interacted with the medical and para medical personnel associated with them.

All the participants welcomed the idea of operating dialysis centre at taluka level and concurred to the fact that there is a dearth of dialysis service in the district. Both the private players offering dialysis have plans in pipeline to expand their existing capacity for dialysis.

The interaction also brought out the following key issues:

1. Government officials stated that the numbers of patients requiring dialysis facilities are increasing every year so there is an immediate need of a public dialysis centre at the district level. In the absence of which, poor patients are forced to visit private facilities and pay higher charges.
2. 80% patients of the study sample joined District Hospital Dialysis Centre after leaving following private dialysis centres.

- a. Shree B.L.Patil Medical College Hospital Dialysis Unit, Bijapur
 - b. Vatsalya Dialysis Centre, Bijapur
3. Patients switched to public dialysis facility due to the high cost of dialysis at private centres. For Seronegative patients dialysis cost in private facilities varies from Rs. 800 - 1200. For Sero positive patients it goes up to Rs. 2000. In public facilities BPL patients get free services. For APL patients charges vary from Rs. 500 - 800.
 4. On average patients, require twice-a-week dialysis cycle.
 5. Waiting period for the patients to get dialysis service varied from 7 days to 20 days.
 6. Monthly cost of dialysis including special food, transportation and medicines varies from Rs. 500 - 5000 / month / patient.
 7. Patients in the study sample are within 22 kms distance from Bijapur city.
 8. No patient is willing to pay for dialysis facility even if it is made available closer to his residential area.

4.5 Best case studies for similar projects in India

Nephrology Centres in Uttarakhand

Build -Operate-Transfer of Nephrology Centres at:

1. Coronation Hospital, Dehradun and
2. Base Hospital, Haldwani

Project Brief:

There are number of patients who require dialysis treatment on regular basis. The number of dialysis machines is inadequate in government hospitals. There is always a long waiting status for the patients in government hospitals. The dialysis procedure in private hospitals is very costly and is difficult for poor patients to continue treatment in private hospitals.

It was felt that a fully equipped Nephrology Centres be created in Dehradun and Haldwani to meet the demand of patients requiring dialysis procedure continuously.

PPP Structuring:

PPP Model - Built Operate & Maintain (BOT) Model

Concession Period - Five (5) years

Concession:

- a) Space measuring 480 sq meters at Coronation Hospital.
- b) Space measuring 550 sq meters at Base Hospital, Haldwani

Government Support:

- a) The government support as per bid outcome.
- b) State government shall hand over existing furniture & fixture.

Benefits to Government:

- a) Maximizing service availability
- b) Reduction of O&M Cost
- c) Free service to BPL patients
- d) Transfer of Operational Risk to PPP partner
- e) Extended hours of operation compared to government setup

Description of Activities:

- a) To procure and run thirteen (13) dialysis machines and other equipments in each location
- b) To furnish the given space

Operation:

- a) To keep the facility open for patients from 8.00 AM to 6 P.M. (Min)
- b) To respond to emergency cases during odd hours also.
- c) To dedicate one separate machine each for patients infected with HIV, hepatitis-B and hepatitis-C.
- d) To recruit the required personnel including Nephrologists, Technicians, nurses, ward boys and other support staff.
- e) To install a suitable database and application software for maintaining patient records.

- f) To maintain agreed service levels (99% uptime, 12 hrs operation etc)

User Charges:

- a) The entire amount of user charges, cost of consumables etc would be collected by Government
- b) To charge the patients for consumable at least 15% less than MRP.
- c) No user charges from BPL & HIV infected patients. Consumable cost to be reimbursed by GoUK.
- d) To maintain records of paying and non paying patients (BPL&HIV infected patients).

Project Performance (Nephrology Centre, Dehradun):

The Nephrology Centre Project, Dehradun is running successfully at Coronation Hospital, Dehradun. Apollo Hospital Enterprise Limited is the PPP partner for the dialysis centre operation in Coronation Hospital. The number of patients availing the services from Aug 2010- August 2011 is below:

Month	BPL Patient	APL Patient	Total
August 10	37	81	118
September 10	104	94	219
October 10	136	124	291
November 10	132	130	290
December 10	167	122	318
January 11	179	139	357
February 11	158	121	305
March 11	194	120	342
April 11	251	148	424
May 11	256	171	472
June 11	244	181	504
July 11	238	180	512
August 11	272	203	561

The Nephrology Centre Project, Haldwani has been awarded to Rahi Care on 8 March 2011. The project site has been handed over to the Concessionaire. The actual bid quoted by Rahi Care is 1,034.00 per procedure.

- Source - Impacting the Health Sector - Uttarakhand Public Private Partnership (cell.upppc.org)

B Braun Dialysis Centres in Andhra Pradesh

B.Braun is operating 10 haemodialysis centres in Chittoor, Guntur, Hyderabad, Kakinada, Kurnool, Srikakulam, Vijayawada, Visakhapatnam and Warangal districts with 111 dialysis machines and eight other centres are being set up in Anantapur, Cuddapah, Eluru, Mahabubnagar, Nellore, Nizamabad, Prakasam and Vizianagaram. B.Braun has set up and is operating the centres under the **Build, Own, Operate and Transfer model for a period of seven years.**

Location:

These centres are located in medical colleges in the respective districts and the medical college provides space, utilities and nephrologist for clinical duty.

Concession

The medical college hospital provides,

1. Required space
2. Adequate raw water
3. Electrical power for operation

Other Services Provided by the Hospital

1. The hospital assures atleast 540 dialysis cycles per machine per year
2. The hospital provides emergency medical relief, treatment of complications and other specialists required
3. The hospital provides creatinine, PCV and potassium, HB and other investigations
4. Femoral and Jugular catheters are provided by the hospital
5. All support therapy and medicines are provided by the hospital

Services Provided by BBraun

B.Braun provides new hemodialysis machines, water treatment plant, reprocessing machine, maintenance of infrastructure, administrative services, and manpower including duty doctor, nurses, and technicians.

Compensation to BBraun

The government of Andhra Pradesh supports the project by providing payment for the dialysis at Rs 1200/- per dialysis of which Rs 1080 is for B. Braun and Rs 120 is for the medical college. The dialysis is provided free of cost to patients covered under Rajiv Arogyasri Programme.

4.6 Project Design

Type of Agreement

The project is designed will be offered on Build, Own, Operate and Transfer mode to the successful bidder, the bid variable being the cost at which a Dialysis is provided. The project can be designed on two types of agreements,

1. Agreement between a private service provider/equipment manufacturer and the government, where the service provider/equipment manufacturer is in charge of procuring and managing the equipment, and providing the service
2. A tri partite agreement between the government, equipment manufacturer/ authorized dealer, and service provider - The service provider will be responsible for procuring the machine from the manufacturer/authorized dealer and delivering the service, and the manufacturer/authorized dealer will be responsible for the maintenance and upkeep of the machine.

Both the models have their inherent strengths and weakness; the right model shall be selected after further analysis during the transaction advisory stage. Adding a service provider would bring in operational efficiency in the management of the dialysis centres, but it will bring up the administrative cost of the set up. The equipment manufacturer will be involved in the process of procuring, installing and managing the equipment set up. 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 equipment manufacturer/authorized dealer and service provider can agree on the revenue sharing/costing of the equipment between them.

The contract shall be awarded district wise to the partners; the partner will be required to set up the centres in each taluka of the district and provide the service. 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 three parties involved are as follows,

Roles and Responsibilities of the Government

1. To provide the land (if available the building) for operating the dialysis centre at the premises of CHC/Taluka hospital
2. Provide emergency medical advice and treatment for complications arising during dialysis
3. Ensuring access to water and electricity
4. Providing laboratory, diagnostic and ambulatory support whenever required
5. Providing a conducive organizational atmosphere for the set up to operate
6. Ensuring minimum number of dialysis cases per month

Roles and Responsibility of the Service Provider

1. Manning and operating the dialysis centre as per the terms of reference
2. Providing the necessary medical advice and treatment through a nephrologist
3. Constructing/renovating the building to house the dialysis centre within the agreed duration as per the TOR
4. Maintaining the supply chain of consumables
5. Recruiting, training and retaining of man power for the centre
6. Adhering to the applicable laws and regulations considering a Dialysis centre
7. Reporting as per the expected norms of the terms of reference
8. Coordinating with the medical hospital for delivering the services
9. To maintain the dialysis equipment in operable condition 95% of the time
10. Sub-meters for electricity and water supply shall be installed, bills shall be paid by the private partner.
11. Monthly report shall be submitted to designated hospital authorities every month.
12. 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.

Roles and Responsibility of the Equipment Manufacturer/Authorized Dealer

1. To provide the dialysis equipment as per the Terms of Reference
2. To provide appropriate support and service for maintenance of the dialysis machine
3. To upgrade the equipment as per the requirement and agreement with the government and service provider

The roles and responsibilities of the service provider will reside with the Equipment manufacturer/authorized dealer if they prefer to provide the service themselves.

Contract Period

It is proposed that the Dialysis centre is provided on contract for a period of seven years which is the internationally accepted norm for the life of a dialysis machine. After the completion of this period, project will be rebid to operate for another seven years.

Cost of Service

The service provider shall charge the government a fixed amount towards each dialysis provided, this shall be the bid variable during the process for finalizing the service provider and equipment manufacturer/authorized dealer. The government shall revise the service cost every two years as per the prevailing cost of inflation and service delivery.

It is to be noted that the service provider would have to collect user charges from the patients undergoing dialysis. 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.

The equipment manufacturer/authorized dealer and service provider can agree on the revenue sharing/costing of the equipment between them.

Chapter 5 - Project Financials

iMaCS follows the total cost concept termed TCO i.e. Total Cost of Ownership while making the financial projections rather than taking into account only the purchase price. The model has been developed to cover three scenarios of operation,

1. Five dialysis machine per taluka centre
2. Ten dialysis machine per taluka centre, and
3. Fifteen dialysis machines per taluka centre

These scenarios have been overlaid with two state of assumption,

1. The government provides only the land and the partner has to build the infrastructure required
2. The government provides built space to the partner for setting up the system

It is to be noted that the Bijapur taluka has an existing government run dialysis centre. The model here assumes one dialysis centre per taluka irrespective of the availability of government dialysis centres or building availability. The model can be tweaked during the transaction stage to accommodate the availability/non availability of building/existing dialysis centre.

The cost estimates for the three different scenarios are presented below,

5.1. Cost Estimation

5.1.1. Capital Infrastructure for Building

Building Infrastructure			5 M/c	10 M/c	15 M/c
SI No	Space for	Dimension	Sq feet area	Sq feet area	Sq feet area
1	Patient waiting area	10*15	150	150	200
2	Administrative area	10*10	100	100	100
3	Doctor + observation	10*15	150	150	150
4	Dialysis area	7*3+7*4+7*2	540	1080	1620
5	Dialsate preparation room	10*15	150	150	200
6	Washroom	3*5*10	150	150	150
7	Nurse/Technician Station	10*10	100	100	150
8	Laboratory	10*10	0	0	0
9	Cleaning room	10*10	100	100	150
10	Store room	2*10*10	200	200	150
11	Janitor Room	5*10	50	50	50
12	Water Treatment Room	10*10	100	100	150
Total Built Area			1790	2330	3070
Development Cost per Sq ft			1200	1200	1200
Building Development Cost			2148000	2796000	3684000

The Haemodialysis equipments include the core dialysis equipments required for delivering the service.

Haemo Dialysis Equipments				5M/c	10 M/c	15 M/c
SI No	Machine	Number Req	Unit Cost	Total Cost	Total Cost	Total Cost
1	Haemodialysis Machine	5	600000	3000000	5700000	8100000
2	Dialysis Fluid Filter	5	30000	150000	285000	405000
3	RO Plant	1	200000	200000	380000	540000
4	Haemocleaner	1	350000	350000	665000	945000
Total Dialysis Equipment Cost				3700000	7030000	9990000

Support equipments include the furniture, cot, generator and other support systems required.

Support Equipments		5 M/c Per Taluk			10 M/c Per Taluk			15 M/c Per Taluk		
SI No	Equipment	Number Req	Unit Cost	Total Cost	Number Req	Unit Cost	Total Cost	Number Req	Unit Cost	Total Cost
1	Waiting chairs	20	600	12000	20	600	12000	25	600	15000
2	Doctors chair	1	5000	5000	1	5000	5000	1	5000	5000
3	Medical Table	1	5000	5000	1	5000	5000	1	5000	5000
4	Admin/Nurse Chairs	5	2500	12500	7	2500	17500	10	2500	25000
5	Admin/Nurse Tables	2	3000	6000	2	3000	6000	2	3000	6000
6	Rack for MRD	2	8000	16000	1	8000	8000	1	8000	8000
7	Liftable bed	5	15000	75000	10	15000	150000	15	15000	225000
8	Bed side table/cabinet	5	2000	10000	10	2000	20000	15	2000	30000
9	Fans	12	2000	24000	16	2000	32000	20	2000	40000
10	Cleaning area set up	1	10000	10000	1	10000	10000	1	10000	10000
11	Exhaust fan for Cleaning	1	5000	5000	1	5000	5000	1	5000	5000
12	Storage Almairah	2	15000	30000	2	15000	30000	1	15000	15000
13	Refrigerator	1	15000	15000	1	15000	15000	1	15000	15000

14	Crash cart	1	20000	20000	1	20000	20000	1	20000	20000
15	Stretcher Trolley	1	15000	15000	1	15000	15000	1	15000	15000
16	Wheel chair	1	8000	8000	1	8000	8000	1	8000	8000
17	Air Conditioning 1.5 Tonnes	4	25000	100000	8	25000	200000	12	25000	300000
18	Generator 30kW	1	350000	350000	1	350000	350000	1	350000	350000
19	Inverter Backup Set	1	200000	200000	1	200000	200000	1	200000	200000
20	Computer + Printer + Scan	1	50000	50000	1	50000	50000	1	50000	50000
Total Support Equipment Cost				968500			1158500			1347000

Bio medical equipments for a dialysis centre includes the following,

Bio Medical Equipments		5 M/c Per Taluk			10 M/c Per Taluk			15 M/c Per Taluk		
Sl No	Machine	Number Req	Unit Cost	Total Cost	Number Req	Unit Cost	Total Cost	Number Req	Unit Cost	Total Cost
1	Stethoscope	2	1000	2000	2	1000	2000	2	1000	2000
2	Spyghmomanometer	1	1000	1000	1	1000	1000	2	1000	2000
3	Needle cutter	1	5000	5000	1	5000	5000	2	5000	10000
4	Heart Monitor	1	25000	25000	2	25000	50000	3	25000	75000
5	Defibrillator	1	10000	10000	1	10000	10000	1	10000	10000
6	Oxygen cylinder	2	3000	6000	3	3000	9000	4	3000	12000
7	Glucometer	2	2500	5000	2	2500	5000	2	2500	5000
8	Weighing Scale	1	2000	2000	1	2000	2000	1	2000	2000
9	Autoclave	1	20000	20000	1	20000	20000	1	20000	20000
Total Bio Medical Equip Cost				76000			104000			138000

5.1.2. Manpower cost

The model assumes the following manpower requirement for the taluka centres,

Manpower for Bijapur				5 M/c			10 M/c			15 M/c			Guideline/Remarks
SI No	Post	Qualification	Base/Centre	Number Required	Salary Per Month*	Total Salary per Annum	Base/Centre	Number Required	Total Salary per Annum	Base/Centre	Number Required	Total Salary per Annum	
1	Nephrologist	MBBS, MD	1	1	180000	2160000	1	1	2160000	1	1	2160000	One Nephrologist for the District on Tele Medicine
2	Dialysis Technician	BSc	2	10	12000	1440000	4	20	2880000	6	30	4320000	Two shifts per day, one technicians per five Machine per shift for five talukas
3	Staff Nurse	BSc	2	10	10800	1296000	2	10	1296000	2	10	1296000	Two shifts per day, one staff nurse per shift for five talukas
4	Housekeeping/Cleaning staff	10th pass	2	10	6000	720000	4	20	1440000	6	30	2160000	Two shifts per day, one cleaning staff per shift per five machines for five talukas
5	Administrative Person	Graduate	2	10	9600	1152000	2	10	1152000	2	10	1152000	Two shifts per day, one administrative person per shift for five talukas
	Total			41	218400	6768000		61	8928000		81	11088000	

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

5.1.3. Cost of Consumables

SI No	Consumable	Number Required	Cycle Reuse	Unit Cost in Rs	Cycle Cost in Rs	Remarks
1	Dialyser	1	3	650	217	Assuming dialyser is reused three times
2	Blood Tubing Set	1	3	150	50	
3	Needle Set	1	1	20	20	
4	Glucometer Strip	1	1	15	15	
5	Syringe	1	1	8	8	
6	Saline/Dextrose solution	1	30%	25	8	
7	Other Consumables				100	Including Housekeeping chemicals, dialyser cleaning chemical, gloves, saline requirement
Total consumable cost per Cycle					417	

5.1.4. Total Expenditure Projections

Bijapur District	5 M/c per taluk		10 M/c per taluk		15 M/c per taluk	
Expenditure Projections for 5 Centres/District	Parameter	Remarks	Parameter	Remarks	Parameter	Remarks
Manpower Initial per Annum	67.7	Rupees Lakh	89.3	Rupees Lakh	110.9	Rupees Lakh
Capital Expenditure on Building	107.4	Rupees Lakh	139.8	Rupees Lakh	184.2	Rupees Lakh
Capital Expenditure on Support Equipment	48.4	Rupees Lakh	57.9	Rupees Lakh	67.4	Rupees Lakh
Capital Expenditure on Haemodialysis Equip	185.0	Rupees Lakh	351.5	Rupees Lakh	499.5	Rupees Lakh
Capital Expenditure on Bio Medical Equip	3.8	Rupees Lakh	5.2	Rupees Lakh	6.9	Rupees Lakh
Total Capital for Equipments	237.2	Rupees Lakh	414.6	Rupees Lakh	573.8	Rupees Lakh
Consummables cost per cycle	417.2	Rupees	417.2	Rupees	417.2	Rupees

AMC & maintenance of equipment as % of equipment cost	4.0%	%	4.0%	%	4.0%	%
Building Maintenance	1.0%	%	1.0%	%	1.0%	%
Cost Escalation per year	5%	%	5%	%	5%	%
Contingency Expenses for equipments and consumables	2%	%	2%	%	2%	%

5.2. Tariff Revenue Stream

5.2.1. Assumptions for the project model

Capacity Projection under different Scenarios							
No of Dialysis machines in each unit	No of Taluka	M/C per Taluka	Sero Negative M/c	Sero Positive M/C	No of M/c	Cycle Capacity	Cycle Capacity Per Machine
Bijapur	5	Five machines per taluka					
		5	4	1	30	26,676	889
		Ten machines per taluka					
		10	8	2	60	53,352	889
		Fifteen machines per taluka					
		15	15	12	90	80,028	889

The assumptions governing the capacity limitations of the centres are as listed below

Capacity Limitations	Parameter	Remarks
Working days per week	6	
Working hours per day	12	
Time per sitting	4	
No of Shifts	2	8am-2pm, 2pm-8pm
Number of Dialysis Shifts	3	
Operating Efficiency	95.00%	
Per day cycle capacity per centre	14	

The revenue generation limits are defined as per the existing Government of Karnataka rates, CGHS rates, 30% cheaper than market rate and 40% cheaper than market rate

Revenue Projections	Rs
Charge per dialysis as per existing govt. rates	350
CGHS rate per dialysis for Sero negative	1,100
CGHS rate per dialysis for Sero positive	1,200
Existing market rate	1,500
Rates 30% cheaper than current market Rate of Rs 1500	1,050
Rates 40% cheaper than current market Rate of Rs 1500	900

The revenue and expenditure projections for the three scenarios are as below,

Five Machines Centre		Years					
Parameter/Year	1	2	3	4	5	6	7
Number of Dialysis M/c in the District	25	25	25	25	25	25	25
Capacity utilization	85%	90%	95%	100%	100%	100%	100%
Cycle Capacity per year	18896	20007	21119	22230	22230	22230	22230
Number of Sero Negative Cases	15116	16006	16895	17784	17784	17784	17784
Number of Sero Positive Cases	3779	4001	4224	4446	4446	4446	4446
Revenue Projection		Rs Lakh					
Existing Govt. Rate	66	70	74	78	78	78	78
CGHS Rate	212	224	237	249	249	249	249
At Rs 1050, 30% Cheaper than market rate of 1500	198	210	222	233	233	233	233
At Rs 900, 40% cheaper than market rate of 1500	170	180	190	200	200	200	200
Expenditure Projection		Rs Lakh					
Year/Parameter	1	2	3	4	5	6	7
Indexation Factor	1.00	1.05	1.10	1.16	1.22	1.28	1.34
Manpower	68	71	75	78	82	86	91
Building Maintenance	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Equipment Maintenance	9.5	10.0	10.5	11.0	11.5	12.1	12.7
Consumables	78.8	83.5	88.1	92.7	92.7	92.7	92.7
Contingency	1.8	2.0	2.2	2.4	2.5	2.7	2.8
Power cost*	0.73	0.77	0.81	0.85	0.89	0.94	0.98
Fuel cost**	0.40	0.42	0.44	0.47	0.49	0.51	0.54
Cost of water for utility***	0.04	0.04	0.05	0.05	0.05	0.05	0.05
Total Expenditure	160	169	178	187	192	196	202

* Calculations based on the assumptions that power consumption per machine per month (including power utilization for administrative purpose) is 130 units. Per month fixed cost for 50KW three phase LT power connection is Rs. 1750 and per unit power consumption cost is Rs. 6.70³.

** Calculations based on the assumptions that per month diesel consumption is 60 liters and per liter fuel cost is Rs. 56.

*** Calculations based on the assumptions that water usage in toilet per patient including staff is 10 liters and drinking water usage per patient including staff is 3 liters. Per liter unit cost of water including 20% of sanitary charge is .072 Rs per liter⁴.

³ <http://www.kerc.org>

⁴ <http://bwssb.org>

Ten Machines Centre		Year						
Parameter/Year	1	2	3	4	5	6	7	
Number of Dialysis M/c in the District	50	50	50	50	50	50	50	
Capacity utilization	85%	90%	95%	100%	100%	100%	100%	
Cycle Capacity per year	37791	40014	42237	44460	44460	44460	44460	
Number of Sero Negative Cases	30233	32011	33790	35568	35568	35568	35568	
Number of Sero Positive Cases	7558	8003	8447	8892	8892	8892	8892	
Revenue Projection		Rs Lakh						
Existing Govt. Rate	132	140	148	156	156	156	156	
CGHS Rate	423	448	473	498	498	498	498	
At Rs 1050, 30% Cheaper than market rate of 1500	397	420	443	467	467	467	467	
At Rs 900, 40% cheaper than market rate of 1500	340	360	380	400	400	400	400	
Expenditure Projection		Rs Lakh						
Year/Parameter	1	2	3	4	5	6	7	
Indexation Factor	1.00	1.05	1.10	1.16	1.22	1.28	1.34	
Manpower	89	94	98	103	109	114	120	
Building Maintenance	1.40	1.40	1.40	1.40	1.40	1.40	1.40	
Equipment Maintenance	16.6	17.4	18.3	19.2	20.2	21.2	22.2	
Consumables	157.7	166.9	176.2	185.5	185.5	185.5	185.5	
Contingency	3.5	3.9	4.3	4.7	5.0	5.3	5.6	
Power cost*	1.26	1.32	1.38	1.45	1.53	1.60	1.68	
Fuel cost**	0.81	0.85	0.89	0.93	0.98	1.03	1.08	
Cost of water for utility***	0.08	0.09	0.09	0.09	0.10	0.10	0.11	
Total Expenditure	271	286	301	317	323	330	337	

* Calculations based on the assumptions that power consumption per machine per month (including power utilization for administrative purpose) is 130 units. Per month fixed cost for 50KW three phase LT power connection is Rs. 1750 and per unit power consumption cost is Rs. 6.70⁵.

** Calculations based on the assumptions that per month diesel consumption is 60 liters and per liter fuel cost is Rs. 56.

*** Calculations based on the assumptions that water usage in toilet per patient including staff is 10 liters and drinking water usage per patient including staff is 3 liters. Per liter unit cost of water including 20% of sanitary charge is .072 Rs per liter⁶.

⁵ <http://www.kerc.org>

⁶ <http://bwssb.org>

Fifteen Machines Centre		Year						
Parameter/Year	1	2	3	4	5	6	7	
Number of Dialysis M/c in the District	75	75	75	75	75	75	75	
Capacity utilisation	85%	90%	95%	100%	100%	100%	100%	
Cycle Capacity per year	56687	60021	63356	66690	66690	66690	66690	
Number of Sero Negative Cases	45349	48017	50684	53352	53352	53352	53352	
Number of Sero Positive Cases	11337	12004	12671	13338	13338	13338	13338	
Revenue Projection		Rs Lakh						
Existing Govt. Rate	198	210	222	233	233	233	233	
CGHS Rate	635	672	710	747	747	747	747	
At Rs 1050, 30% Cheaper than market rate of 1500	595	630	665	700	700	700	700	
At Rs 900, 40% cheaper than market rate of 1500	510	540	570	600	600	600	600	
Expenditure Projection		Rs Lakh						
Year/Parameter	1	2	3	4	5	6	7	
Indexation Factor	1.00	1.05	1.10	1.16	1.22	1.28	1.34	
Manpower	111	116	122	128	135	142	149	
Building Maintenance	1.84	1.84	1.84	1.84	1.84	1.84	1.84	
Equipment Maintenance	23.0	24.1	25.3	26.6	27.9	29.3	30.8	
Consumables	236.5	250.4	264.3	278.2	278.2	278.2	278.2	
Contingency	5.2	5.8	6.4	7.1	7.4	7.8	8.3	
Power cost*	1.78	1.87	1.96	2.06	2.16	2.27	2.38	
Fuel cost**	1.21	1.27	1.33	1.40	1.47	1.54	1.62	
Cost of water for utility***	0.09	0.10	0.10	0.11	0.11	0.12	0.12	
Total Expenditure	380	402	423	446	454	463	472	

* Calculations based on the assumptions that power consumption per machine per month (including power utilization for administrative purpose) is 130 units. Per month fixed cost for 50KW three phase LT power connection is Rs. 1750 and per unit power consumption cost is Rs. 6.70⁷.

** Calculations based on the assumptions that per month diesel consumption is 60 liters and per liter fuel cost is Rs. 56.

*** Calculations based on the assumptions that water usage in toilet per patient including staff is 10 liters and drinking water usage per patient including staff is 3 liters. Per liter unit cost of water including 20% of sanitary charge is .072 Rs per liter⁸.

⁷ <http://www.kerc.org>

⁸ <http://bwssb.org>

5.2.2. Cash Flow

For Operating Five Machines in each Taluka							
Scenario 1- Dialysis at Existing Rate of Karnataka Govt - Rs 350							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-344.63						
CAPEX Without Building	-237.23						
Total Operating Revenue	66	70	74	78	78	78	78
Total Operating Expenditure	160	169	178	187	192	196	202
Net Cash Flow (Surplus/-Deficit) (With Building)	-438.50	-98.74	-103.81	-109.10	-113.77	-118.67	-123.82
Net Cash Flow (Surplus/-Deficit) (Without Building)	-331.10	-98.74	-103.81	-109.10	-113.77	-118.67	-123.82
Pre Tax IRR (With Building)	N/A						
Pre Tax IRR (Without Building)	N/A						
Scenario 2 - Dialysis at CGHS Rate							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-344.63						
CAPEX Without Building	-237.23						
Total Operating Revenue	212	224	237	249	249	249	249
Total Operating Expenditure	160	169	178	187	192	196	202
Net Cash Flow (Surplus/-Deficit) (With Building)	-293.01	55.32	58.80	62.07	57.40	52.50	47.35
Net Cash Flow (Surplus/-Deficit) (Without Building)	-185.61	55.32	58.80	62.07	57.40	52.50	47.35
Pre Tax IRR (With Building)	4%						
Pre Tax IRR (Without Building)	20%						
Scenario 3 - Dialysis at 30% Cheaper than Market Rate - Rs 1050							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-344.63						
CAPEX Without Building	-237.23						
Total Operating Revenue	198	210	222	233	233	233	233
Total Operating Expenditure	160	169	178	187	192	196	202
Net Cash Flow (Surplus/-Deficit) (With Building)	-306.23	41.31	44.02	46.51	41.84	36.94	31.79
Net Cash Flow (Surplus/-Deficit)	-198.83	41.31	44.02	46.51	41.84	36.94	31.79



(Without Building)							
Pre Tax IRR (With Building)	-7%						
Pre Tax IRR (Without Building)	6%						
Scenario 4 - Dialysis at 40% Cheaper than Market Rate - Rs 900							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-344.63						
CAPEX Without Building	-237.23						
Total Operating Revenue	170	180	190	200	200	200	200
Total Operating Expenditure	160	169	178	187	192	196	202
Net Cash Flow (Surplus/-Deficit) (With Building)	-334.58	11.30	12.34	13.16	8.50	3.59	-1.56
Net Cash Flow (Surplus/-Deficit) (Without Building)	-227.18	11.30	12.34	13.16	8.50	3.59	-1.56
Pre Tax IRR (With Building)	N/A						
Pre Tax IRR (Without Building)	N/A						

For Operating Ten Machines in each Taluka							
Scenario 1- Dialysis at Existing Rate of Karnataka Govt - Rs 350							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-554.43						
CAPEX Without Building	-414.625						
Total Operating Revenue	132	140	148	156	156	156	156
Total Operating Expenditure	271	286	301	317	323	330	337
Net Cash Flow (Surplus/-Deficit) (With Building)	-692.70	-145.55	-153.13	-161.03	-167.54	-174.38	-181.57
Net Cash Flow (Surplus/-Deficit) (Without Building)	-552.90	-145.55	-153.13	-161.03	-167.54	-174.38	-181.57
Pre Tax IRR (With Building)	N/A						
Pre Tax IRR (Without Building)	N/A						
Scenario 2 - Dialysis at CGHS Rate							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-554.425						
CAPEX Without Building	-414.625						
Total Operating Revenue	423	448	473	498	498	498	498
Total Operating Expenditure	271	286	301	317	323	330	337
Net Cash Flow (Surplus/-Deficit) (With Building)	-401.71	162.55	172.09	181.31	174.80	167.96	160.77



Building)							
Net Cash Flow (Surplus/-Deficit) (Without Building)	-261.91	162.55	172.09	181.31	174.80	167.96	160.77
Pre Tax IRR (With Building)	35%						
Pre Tax IRR (Without Building)	61%						
Scenario 3 - Dialysis at 30% Cheaper than Market Rate - Rs 1050							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-554.425						
CAPEX Without Building	-414.625						
Total Operating Revenue	397	420	443	467	467	467	467
Total Operating Expenditure	271	286	301	317	323	330	337
Net Cash Flow (Surplus/-Deficit) (With Building)	-428.16	134.54	142.52	150.19	143.68	136.84	129.65
Net Cash Flow (Surplus/-Deficit) (Without Building)	-288.36	134.54	142.52	150.19	143.68	136.84	129.65
Pre Tax IRR (With Building)	23%						
Pre Tax IRR (Without Building)	43%						
Scenario 4 - Dialysis at 40% Cheaper than Market Rate - Rs 900							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-554.425						
CAPEX Without Building	-414.625						
Total Operating Revenue	340	360	380	400	400	400	400
Total Operating Expenditure	271	286	301	317	323	330	337
Net Cash Flow (Surplus/-Deficit) (With Building)	-484.85	74.52	79.17	83.50	76.99	70.15	62.96
Net Cash Flow (Surplus/-Deficit) (Without Building)	-345.05	74.52	79.17	83.50	76.99	70.15	62.96
Pre Tax IRR (With Building)	-2%						
Pre Tax IRR (Without Building)	8%						

For Operating Fifteen Machines in each Taluka							
Scenario 1- Dialysis at Existing Rate of Karnataka Govt - Rs 350							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-757.95						
CAPEX Without Building	-573.75						
Total Operating Revenue	198	210	222	233	233	233	233
Total Operating Expenditure	380	402	423	446	454	463	472



Net Cash Flow (Surplus/-Deficit) (With Building)	-939.96	-191.67	-201.72	-212.18	-220.49	-229.22	-238.39
Net Cash Flow (Surplus/-Deficit) (Without Building)	-755.76	-191.67	-201.72	-212.18	-220.49	-229.22	-238.39
Pre Tax IRR (With Building)	N/A						
Pre Tax IRR (Without Building)	N/A						
Scenario 2 - Dialysis at CGHS Rate							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-757.95						
CAPEX Without Building	-573.75						
Total Operating Revenue	635	672	710	747	747	747	747
Total Operating Expenditure	380	402	423	446	454	463	472
Net Cash Flow (Surplus/-Deficit) (With Building)	-503.48	270.49	286.11	301.33	293.02	284.29	275.13
Net Cash Flow (Surplus/-Deficit) (Without Building)	-319.28	270.49	286.11	301.33	293.02	284.29	275.13
Pre Tax IRR (With Building)	52%						
Pre Tax IRR (Without Building)	86%						
Scenario 3 - Dialysis at 30% Cheaper than Market Rate - Rs 1050							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-757.95						
CAPEX Without Building	-573.75						
Total Operating Revenue	595	630	665	700	700	700	700
Total Operating Expenditure	380	402	423	446	454	463	472
Net Cash Flow (Surplus/-Deficit) (With Building)	-543.16	228.47	241.77	254.65	246.34	237.61	228.44
Net Cash Flow (Surplus/-Deficit) (Without Building)	-358.96	228.47	241.77	254.65	246.34	237.61	228.44
Pre Tax IRR (With Building)	37%						
Pre Tax IRR (Without Building)	63%						
Scenario 4 - Dialysis at 40% Cheaper than Market Rate - Rs 900							
All in Rs Lakh/Year	1	2	3	4	5	6	7
CAPEX With Building	-757.95						
CAPEX Without Building	-573.75						
Total Operating Revenue	510	540	570	600	600	600	600
Total Operating Expenditure	380	402	423	446	454	463	472

Net Cash Flow (Surplus/-Deficit) (With Building)	-628.19	138.44	146.73	154.61	146.30	137.58	128.41
Net Cash Flow (Surplus/-Deficit) (Without Building)	-443.99	138.44	146.73	154.61	146.30	137.58	128.41
Pre Tax IRR (With Building)	10%						
Pre Tax IRR (Without Building)	23%						

5.3.Ranking of Project based on commercial viability

A comparative analysis of the three scenarios under different revenue rates with and without building infrastructure is stated below

Comparative IRR Rates For Different Scenarios					
Type of Centre	Category	Current GoK Rate	CGHS Rate	30% Cheaper than Market Rate	40% Cheaper than Market Rate
		Rs 350 per	Rs 1100/ Rs 1200 per	Rs 1050 per	Rs 900 per
Five Machine Centre at each taluka	IRR (With Building)	N/A	4%	-7%	N/A
	IRR (Without Building)	N/A	20%	6%	N/A
Ten Machine Centre at each taluka	IRR (With Building)	N/A	35%	23%	-2%
	IRR (Without Building)	N/A	61%	43%	8%
Fifteen Machine Centre at each taluka	IRR (With Building)	N/A	52%	37%	10%
	IRR (Without Building)	N/A	86%	63%	23%

The Break even costing of each type centre with and without considering building cost is as below,

Break Even Cost Per Dialysis Cycle Without Building Cost		Break Even Cost Per Dialysis Cycle With Building Cost	
Five Machine / Centre Without Building		Five Machine / Centre With Building	
Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh	Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh

237.225	1283	344.625	1283
Total No of Cycles	Total No of Cycles	Total No of Cycles	Total No of Cycles
148941	148941	148941	148941
Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs	Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs
159	861	231	861
Cost Per Cycle in Rs		Cost Per Cycle in Rs	
1021		1093	
Ten Machine / Centre Without Building		Ten Machine / Centre With Building	
Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh	Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh
414.625	2164	554.425	2164
Total No of Cycles	Total No of Cycles	Total No of Cycles	Total No of Cycles
297882	297882	297882	297882
Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs	Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs
139	726	186	726
Cost Per Cycle in Rs		Cost Per Cycle in Rs	
866		913	
Fifteen Machine / Centre Without Building		Fifteen Machine / Centre With Building	
Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh	Cost of Infrastructure in Rs Lakh	Variable Cost Per Cycle in Rs Lakh
573.75	3040	757.95	3040
Total No of Cycles	Total No of Cycles	Total No of Cycles	Total No of Cycles
446823	446823	446823	446823



Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs	Infrastructure Cost per Cycle in Rs	Variable Cost per Cycle in Rs
128	680	170	680
Cost Per Cycle in Rs		Cost Per Cycle in Rs	
809		850	

It is observed that the ten machines per taluka or fifteen machines per taluka (depending on the load in each taluka) at rates between Rs 915 to Rs 950 would be the ideal choice to opt for and this should be the range that the government should anticipate the rate to be.

It is to be noted that the cost of dialysis service Rs 915 to Rs 950 is the amount reimbursed by the government to the service provider, the amount which the service provider collects from the patients may vary from time to time depending on the policy decision of the government. 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.

Based on the financial calculations the project is very much commercially viable for the private player at the above mentioned cost of dialysis service.

The rates Rs 915 to Rs 950 is arrived at assuming the dialyzer is reused three times for the same patient, if this could be increased the cost of service delivery can be brought down even more and the bid variable can be brought down even lower.

5.4.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 Dialysis 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 calculations 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 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 Bijapur district is around 69%. Based on this it is assumed that of the total patient load in the Dialysis centre, 69% are from BPL category that will not pay anything for the service while 31% are from APL category that will pay for dialysis as per the cost decided by the state government. For computation purposes it is assumed that per cycle dialysis cost for APL patient will be Rs. 915.

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

	Scenario 1	Scenario 2	Scenario analysis using economic criteria			
			Scenario 1		Scenario 2	
Characteristic Feature	<ul style="list-style-type: none"> GoK provides land Patients not differentiated into BPL and APL category Dialysis centre has ten machines 	<ul style="list-style-type: none"> GoK provides land and 'ready to move in' infrastructure Patients not differentiated into BPL and APL category Dialysis centre has fifteen machines 	<ul style="list-style-type: none"> GoK provides land Patients differentiated into BPL / APL category 69% of total patients are from BPL category which will get services free of cost 31% of total patients are from APL category which will pay for services at the rates decided by GoK 		<ul style="list-style-type: none"> GoK provides land and 'ready to move in' infrastructure Patients differentiated into BPL / APL category 69% of total patients are from BPL category which will get services free of cost 31% of total patients are from APL category which will pay for services at the rates decided by GoK 	
Number of cycles in first year	37791	56687	BPL Patients	26076	BPL Patients	39114
			APL Patients	11715	APL Patients	17573
Per cycle cost as per project financials (Rs)	915	915	915		915	



Minimum Financial Burden on GoK in the first year (in Lakh Rs.)	346	519	239	358
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So the estimated minimum annual financial burden of GoK in the first year of operations will be Rs 239 lakh for first scenario and Rs. 358 lakh 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 Dialysis unit shall be governed by all existing bio medical, statutory and legal laws governing an imaging centre. The dialysis centres along with the hospital or independently as the case and situation may apply shall get itself 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 dialysis centre.

Chapter 7 - Indicative Environmental & Social Impacts

7.1.Environmental Impacts

The dialysis 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.

7.2.Social Impacts

Dialysis 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 dialysis service at every taluka. Patients will get access to high-end treatment facility near to their home. This penetration cuts down the overall cost of treatment. This way this project will help state government in mitigating the adverse effect of escalating prices of medical treatment on state population.
- This initiative will also help state government to achieve its goal to bring major gains in terms of human well-being, development and economic productivity by early and timely intervention in chronic ailments
- 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.
- Improved availability of tertiary medical treatment
- The low cost availability of the service will reduce the cost of service at a private centre
- Increased awareness among the public which will indirectly lead to lowering of hypertension, diabetes cases
- Enhanced patient satisfaction and diminished strain
- Employment generation for the trained manpower required for operating the centre
- Streamlined operation and efficient work culture of private partner will impact the public healthcare functioning in the long run

7.3.Mitigation Measures

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

1. Dialysis machines and associated equipments must be located and designed as per the manufacturer's specific layout guidelines



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2. New machines should be purchased instead of refurbished one
 3. Machine should always be under CMC for regular maintenance
 4. Proper BMW collection, storage and disposal norms should be developed and adhered to

Chapter 8 – Operating Framework

8.1. Project Structure at a Glance

Sl No	Parameter	Description
1	PPP Model	Build, Own, Operate and Transfer
2	Concession Period	Seven years, after which project will be rebid
3	Concession Component	<ol style="list-style-type: none"> 1. Right to operate dialysis centre at government hospital premises 2. Building and utilities provision at the concerned Medical college 3. Reimbursement for patients referred from the Government hospital 4. Referral facility from all government hospital 5. Can serve private patients at rates fixed by government
4	Government Support	<ol style="list-style-type: none"> 1. Space and building (if available) 2. Assurance for minimum number of patients per month
5	Project Benefits	<ol style="list-style-type: none"> 1. Provision of dialysis service at taluka level 2. Economic benefits to the patients 3. Easy accessibility and availability for patients 4. Availability of service so far not available 5. Private sector efficiency in operation and maintenance
6	Operation and Maintenance	<ol style="list-style-type: none"> 1. Operation of the dialysis centre for providing haemodialysis service 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 dialysis centre is free to serve private patients at the price prescribed by the government
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 dialysis centre will be reimbursed at an agreed rate by the Government every month as per the number of cases

8.2. 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 dialysis 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 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 organisations with prior experience in operating an dialysis centre are qualified for bidding 2. 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 dialysis on PPP then they shall be provided additional qualifying marks 3. Government to retain the earnest money in case the private partner defaults before signing the contract 4. Client default payment clause to be inserted as a part of the contract 5. 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. 6. 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 7. 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
1.3		Construction/Renovation cost/time overrun	Partner/Government	<ol style="list-style-type: none"> 1. Land/Building shall be recognized for this purpose prior to the issue of RFP 2. Building to be provided to the partner wherever available 3. Land/Building shall be handed over within 30 days of signing of the contract, in as is where is condition 4. Private players shall be invited to inspect the land/building during the bidding stage to assess the time taken to commence the operation 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
1.4		Non availability of Medical and technical personnel to operate the centre	Partner/Government	<ol style="list-style-type: none"> 1. The service provider shall provide a list of manpower already under employment during the bidding stage 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
2.1	Market Risk	Insufficient demand	Partner	<ol style="list-style-type: none"> 1. The government shall ensure minimum number of cases per month to the service provider 2. If the minimum number of services is not attained, the government shall reimburse the amount equivalent to the number assured 3. The service provider is free to service patients referred from private institutions, but shall not levy charges more than what agreed for government hospital patients
2.2		Impractical user levies	Government/Partner	<ol style="list-style-type: none"> 1. The service shall be competitively priced by the government, it shall be lower than the prevailing market rate at the time of fixing the rate
3.1	Finance Risk	Inflation risk	Partner	<ol style="list-style-type: none"> 1. The government shall revise the reimbursement rate for dialysis service every two years

				2. The effective increase per dialysis shall not be higher than 10% of the previous amount
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	1. The initial contract is for a period of seven years, beyond which if the parties agree to continue the contract the dialysis machines should be replaced to meet the latest technology specification at that point of time
4.2		Man power retention	Government	<ol style="list-style-type: none"> 1. The service provider shall employ manpower as agreed with the government 2. 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. 3. The centre shall not be deficit of the number of employees agreed for not more than one week at a stretch 4. Should employees go on leave, fall sick or leave the organisation the service provider has to ensure the replacement within a week 5. The service provider shall adequately train its manpower annually 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
4.3	Operation and Maintenance	Utilities	Private	<ol style="list-style-type: none"> 1. The government shall provide the electrical and water supply free of cost 2. The service has to maintain power stabilizing equipments and power backup generator as required
4.4		Process adequacy and Quality of Service	Government	<ol style="list-style-type: none"> 1. The service provider shall maintain detailed books of records of, <ol style="list-style-type: none"> a. Medical records

				<ul style="list-style-type: none"> 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 dialysis 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. Any other process deemed necessary by the H&FW department <p>3. The dialysis centre stand alone or along with the district hospital shall get itself ISO 9001:2008 certified within one year of commencement of operation and the cost of certification shall be borne by the government.</p> <p>4. The service provider shall produce a report to the Commissioner Health and Family Welfare on the operation of the dialysis centre every month. The report shall contain,</p> <ul style="list-style-type: none"> a. Staff attendance report b. Number and variety of dialysis 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
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				<ol style="list-style-type: none"> 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 dialysis 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 dialysis 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 a dialysis centres in the three districts of Bijapur, Gulbarga and Raichur.

Way forward to implement this project is to first go for its feasibility study in which all the parameters described in this report will be dealt in more detail. Project financial model will be fine tuned by considering more parameters like inclusion of ‘hardship bonuses’ in the remuneration of medical specialists as incentive to attract them for working in remote districts, mechanism to differentiate patients and charge them as per the economic criteria (BPL / APL) etc.

Post feasibility study these projects should be implemented as planned. 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 during the GIM meeting 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: District wise population projections until 2018

District	Population Growth Rate	2012	2013	2014	2015	2016	2017	2018	2013-2018 Growth Rate	2013 - 2018 %
Bijapur	1.0187	2,215,776	2,257,211	2,299,421	2,342,420	2,386,224	2,430,846	2,476,303	0.0971	1.0971
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
Raichur	1.0143	1,952,297	1,980,215	2,008,532	2,037,254	2,066,387	2,095,936	2,125,908	0.0736	1.0736

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

Annexure 2: District wise BPL population projections until 2018

BPL 2012	Population Growth Rate	2012	2013	2014	2015	2016	2017	2018
Bijapur	1.02	1,526,898	1,547,664	1,568,712	1,590,047	1,611,671	1,633,590	1,655,807
Gulbarga	1.02	2,150,283	2,179,527	2,209,168	2,239,213	2,269,666	2,300,534	2,331,821
Raichur	1.01	1,395,647	1,414,628	1,433,867	1,453,367	1,473,133	1,493,168	1,513,475

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

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