HEALTH CARE & DIAGNOSTICS · ADDIS ABABA

Diagnostic, Imaging & Dialysis Center

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Feasibility Study for a Private Health Care Center in Addis Ababa, Ethiopia

Market, technical, organizational, financial and environmental assessment of a laboratory, X-ray, ultrasound, ECG and haemodialysis center.

7 chapters
Market to environment

10-year financial model
NPV, IRR, payback, sensitivity

Health market
Lab, imaging and dialysis demand

Services & equipment
Capacity, staffing, regulation



2026
EDITION

Project feasibility study · Ethiopia
Editable Word and print-ready PDF
Gebeya251.com

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PREVIEW

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1. Executive Summary and Conclusion

1.1 The Project

This feasibility study assesses the viability of establishing a high-tech diagnostic laboratory, medical imaging and kidney dialysis centre in Addis Ababa. The centre will perform laboratory tests on blood, urine, stool and other specimens, X-ray, ultrasound and electrocardiography (ECG) examinations, medical consultations and kidney dialysis, to identify the nature and causes of disease and trauma and support treatment. The study covers the market, technical, organizational, financial, socio-economic and environmental aspects of the project.

The promoter is an Addis Ababa-based private limited company established in 2007, which imports, markets and distributes healthcare products and water, sanitation and hygiene (WASH) solutions. It started as a pharmaceutical and medical supplies importer with a portfolio of disposable syringes, examination gloves and hospital furniture. Its shareholders include practising doctors.

The centre is located in the Bole area of Addis Ababa, on a main road in a densely populated residential and business district. The plot covers 1,063 m², of which about 738 m² is built up, and the first phase of the building has five floors (ground plus four). The land is held on a 54-year lease from the Addis Ababa City Administration.

The objective of the project is to provide high-quality, accurate, reliable and reproducible diagnostic laboratory, imaging and kidney dialysis services in Addis Ababa.

High-quality laboratory testing and medical imaging are essential to patient care: they allow physicians to detect disease earlier, make diagnoses, prescribe treatment and monitor results. Medical images allow radiologists and other physicians to see the shape, size, density and texture of internal structures, to determine whether a problem exists, its extent and exact location.

Dialysis removes waste products and excess fluid from the blood when the kidneys stop working properly, usually by passing the blood through a machine. A survey conducted for this study identified 35 haemodialysis units in Ethiopia: 11 in government hospitals, where federal or regional governments subsidize the cost, and 24 private for-profit units; 31 are based in a hospital or clinic and four are stand-alone. Chronic kidney disease is increasing in Ethiopia because of post-infectious kidney conditions and the rise of non-communicable diseases such as diabetes and hypertension, creating an urgent and unmet need for more accessible and cost-effective dialysis.

Given the large population of Addis Ababa, the number and capacity of laboratory, imaging and dialysis providers fall short of demand. The gap is reinforced by growing hospital admissions linked to population growth, accidents and trauma. The project aims to help fill this gap.

1.2 Investment Cost and Sources of Finance

The total investment cost of the project is Birr 100.2 million, comprising fixed investment of Birr 92.3 million (building, X-ray, dialysis, ultrasound, ECG and laboratory equipment, furniture, generator and vehicles), pre-operating costs of Birr 7.2 million and initial working capital of Birr 0.7 million.

Table 1.1 Total Investment Cost (Birr)

No.	Description	Total cost
1	Civil works and construction: work completed	30,000,000
	Civil works and construction: remaining work	40,000,000
	Subtotal, building	70,000,000
2	X-ray machine	3,662,435

No.	Description	Total cost
3	Dialysis machines and related equipment	7,040,000
4	Electrocardiograph (ECG)	480,000
5	Ultrasound equipment	1,510,000
6	Laboratory facilities and equipment	1,661,431
7	Furniture and fixtures	2,625,200
8	Generator (150 kVA)	2,800,000
9	Vehicles	2,520,000
	Total fixed investment	**92,299,066**
10	Pre-operating costs	640,500
	Financing fee during the grace period	6,509,595
	Subtotal, pre-operating	7,150,095
11	Initial working capital	719,492
	Total investment cost	**100,168,653**

Source: Project data.

The building was acquired with interest-free banking (IFB) finance of Birr 24 million from the bank and Birr 6 million from the promoters. The additional investment needed to complete the building, purchase the medical equipment and provide working capital is Birr 70.2 million. The promoters will contribute Birr 21.8 million (31%) and the remaining Birr 48.3 million (69%) is to be financed through long-term IFB Murabaha finance (Table 5.4). It is proposed that the existing building finance of Birr 24 million and the new financing of Birr 48.3 million be consolidated and repaid over seven years after a one-year grace period.

1.3 Project Evaluation

The projected cash flow shows positive net cash flows in every year of operation, with cumulative cash flow reaching about Birr 335 million by Year 10. The internal rate of return (IRR) is 36%, and the net present value (NPV) at a 15% discount rate is Birr 95.4 million. The initial investment is recovered within about five to six years. The project is profitable throughout its life: as capacity utilization rises, annual net profit increases from Birr 11.4 million to Birr 37 million, or 22–37% of revenue.

1.4 Conclusion and Recommendation

The project will provide high-quality, accurate and reliable diagnostic laboratory, imaging and dialysis services in Addis Ababa. The market study shows a large unmet demand for these services, which represents a strong business opportunity.

The investment of about Birr 100 million will be financed by the promoters' equity and long-term IFB finance. The financial analysis shows that the project is viable and will recover its investment within about five to six years, with an IRR of 36% and an NPV of Birr 95.4 million. The centre will employ 38 people and contribute an average of about Birr 1.4 million a year in taxes.

The study therefore recommends the project to providers of finance, as a profitable investment that will also contribute to quality healthcare for the target population and to the country's socio-economic development.

MRI scanners have long been difficult for government and private hospitals to afford. At the time of the study, Addis Ababa, with about 5 million people, had only four fixed MRI scanners serving some 30 government and private hospitals, and there were only two outside the capital. Some patients have had to travel to Kenya, South Africa or Europe for scans, while demand for free scans at public hospitals leaves patients facing long waits or the cost of private scans. The main private imaging providers in the city include Wudassie and Pioneer diagnostic centres.

2.3.3 Kidney Dialysis in Addis Ababa

Most dialysis centres and patients are concentrated in Addis Ababa, which has 23 of the 35 units (65.7%) and 77.3% of the patients on dialysis but only about 4.3% of the national population. Most units outside the capital are in major towns, and some regions have no dialysis service at all. The private sector is the main provider, serving 78.8% of patients on maintenance haemodialysis; it faces high consumable costs, supply interruptions and limited regulation. A few public hospitals operate dialysis in public–private partnerships.

Virtually all patients in the private sector pay out of pocket. Excluding medication for related conditions, a haemodialysis session in the private sector cost on average Birr 2,300 at the time of the study. A patient on three sessions a week therefore pays about Birr 359,000 a year for dialysis alone, many times the average income per person of about US$850, so maintenance haemodialysis is unaffordable to most Ethiopians and often causes catastrophic household expenditure. Most units run four-hour sessions; about 20% run 3.5-hour sessions and one unit three-hour sessions.

2.3.4 Services and Service Policy

The centre will provide high-quality diagnostic laboratory, imaging and dialysis services using advanced equipment, quality supplies and qualified laboratory, radiology and nursing professionals.

Its customers will include patients from across the country, health facilities in the city and region, biomedical research centres, and government and non-governmental organizations. The first centre will be in Addis Ababa, with long-term plans to open branches in other towns where demand exists.

The centre will be able to perform all categories of tests designated for higher-level laboratories. An independent quality unit will regularly control and monitor test quality, services will be improved continuously as diagnostic methods advance, and customer feedback will be actively sought. The laboratory will have six sections—haematology, serology, clinical chemistry, immunology, microbiology and histocytology—alongside the radiology department, and will perform the tests listed below.

Table 2.3 Laboratory Tests to Be Performed by the Centre

Section	Tests
Haematology	White blood cell count, haemoglobin, haematocrit, differential count, platelets, reticulocytes, haemoparasites, RBC morphology, MCV, MCH, MCHC, prothrombin time, PTT, APTT, INR, iron, TIBC, ferritin, folate, vitamin B12, ESR
Clinical chemistry	Glucose, uric acid, creatinine, urea, alkaline phosphatase, AST, ALT, bilirubin (direct and total), albumin, globulin, A/G ratio, cholesterol, triglycerides, HDL, LDL, LDH, LDL/HDL ratio, sodium, potassium, chloride, calcium, phosphorus, magnesium, CK, CK-MB, troponin I, 24-hour creatinine, creatinine clearance, HbA1c, fructosamine, carbon dioxide, glucose tolerance test, lipase, amylase, γ-GT, 24-hour urine protein, urine calcium, serum electrophoresis
Tumour markers	Male: CA 19-9, CEA, AFP, PSA, free PSA, testosterone; female: CA 125, CA 19-9, CEA, AFP, β-HCG, Pap smear
Hormones	Estradiol, FSH, LH, prolactin, progesterone, T3, T3 uptake, T4, free thyroxine index, TSH
Urine and body fluids	Urinalysis (qualitative), urine microscopy, body fluid analysis

3.4 Technology and Engineering

3.4.1 Services and Service Process

The centre will serve individual patients, hospitals, physicians, clinics, smaller laboratories, biomedical research centres and other institutions, including private, government and non-governmental organizations under contracts. Imaging services are provided at the centre; laboratory sample collection can also be provided at customers' premises. The main services are:

- **Ultrasound imaging**, which uses sound waves to produce images of the inside of the body, to help diagnose pain, swelling and infection in internal organs and to examine the foetus in pregnancy and the brain and hips of infants.
- **Radiography (X-ray)**, one of the most direct methods to detect the causes of health problems and monitor the progress of disease.
- **Electrocardiography (ECG)**, to assess heart rhythm and detect heart disease.
- **Anatomic pathology**, including microscopic examination of tissues and cells, such as biopsies and Pap smears, to diagnose cancer and other diseases.
- **Infectious diseases**, including tests for malaria and water-borne diseases, HIV, hepatitis and influenza, HIV and hepatitis viral load, sexually transmitted infections, CD4 counts and drug-resistant tuberculosis.
- **Cardiovascular and endocrine disorders**, including cholesterol and cardiac markers, thyroid function, diabetes, bone disorders, infertility and pituitary, adrenal, growth and metabolic disorders.
- **Genetic and inherited conditions**, including maternal screening for birth defects.
- **Toxicology**, covering drugs of abuse, blood lead and heavy metals, and therapeutic drug monitoring for patients on long-term medication.
- **Kidney dialysis**, removing waste products and excess fluid from the blood of patients whose kidneys no longer function adequately.

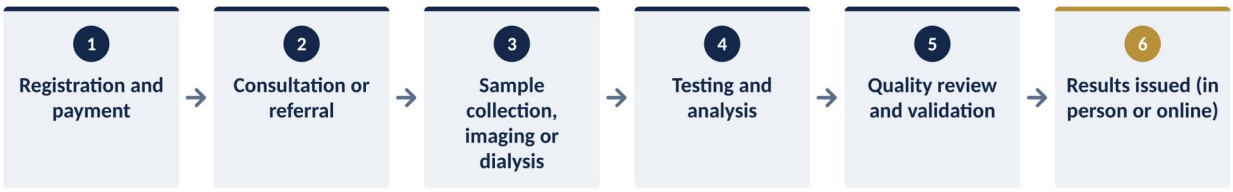

Figure 3.2 **Service Delivery Process**

Source: Project data.

3.4.2 Medical Equipment

The cost of the laboratory, imaging and dialysis equipment, furniture and generator is Birr 19,779,066.

Table 3.2 **Medical Equipment, Furniture and Generator**

No.	Item	Cost (Birr)
1	X-ray machine	3,662,435
2	Dialysis machines and related equipment	7,040,000
3	Electrocardiograph (ECG)	480,000
4	Ultrasound equipment	1,510,000
5	Laboratory facilities and equipment	1,661,431
6	Furniture and fixtures	2,625,200
7	Generator (150 kVA)	2,800,000
	Total	**19,779,066**

Service	Daily capacity	Year 1 (50%)	Year 2 (75%)	Years 3–10 (100%)
Office space rented (m² per month)	700	700	700	700

Source: Project data.

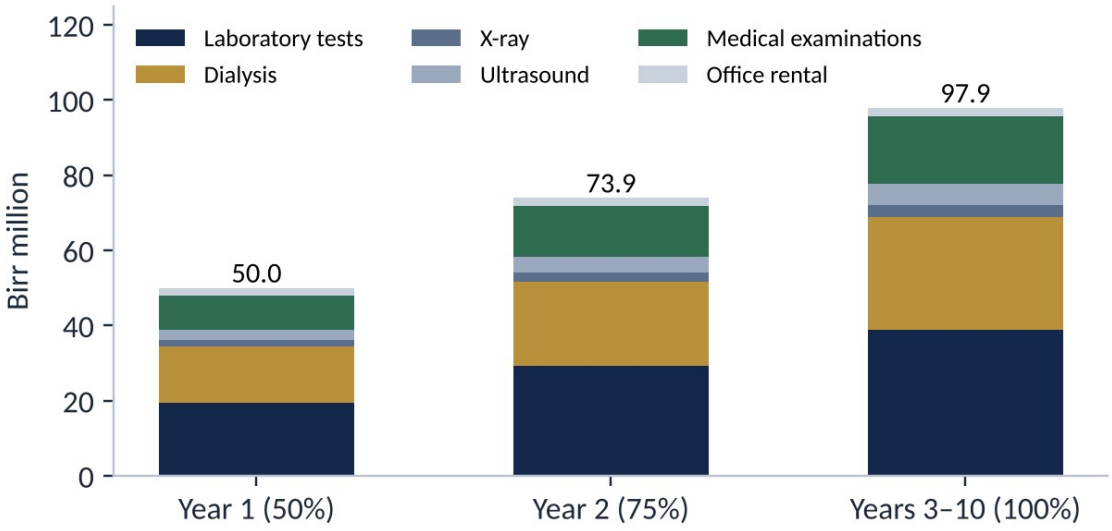

Figure 3.3 Annual Sales Revenue by Service, Years 1–3

Source: Table 5.5.

3.6 Utilities and Infrastructure

The centre will provide adequate lighting, ventilation, telephone, water and waste disposal. Utilities include electricity, water, gas and telephone. The laboratory will have two sinks, one for general use and one for hand washing, a 5,000-litre reserve water tank and a standby generator for power interruptions. Dialysis also requires a reliable supply of treated water.

Table 3.5 Annual Utility Requirement and Cost

Utility	Unit	Quantity	Unit price (Birr)	Total cost (Birr)
Electricity	kWh	200,000	1.7611	352,220
Water	m³	30,000	6.20	186,000
Telephone	Minutes	300,000	0.20 per 6 minutes	10,000
Fuel oil (standby generator)	Litre	2,000	43	86,000
Total				**634,220**

Source: Project data.