

Study on Infrastructure Up-Gradation Planning with Focus
on Dental Wing Expansion of Patalia Hospital and Research
Centre, Jagatpura, Jaipur

By

Ashish Manocha

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2016-2018



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. ASHISH MANOCHA** of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Patalia Hospital and Research Centre, Jaipur** from **1st Feb 2018 to 30th April 2018**.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

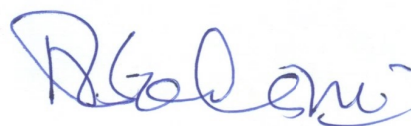
I wish him all success in all his future endeavors.



Dr (Col) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. P.R. Sodani

President

The IIHMR University, Jaipur



Patalia Hospital & Research Centre

Working to Build a Healthier Community

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Rx

This certificate is awarded to

Dr. Ashish Manocha

In recognition of having successfully completed his dissertation and has completed his project on

"Study
on
Infrastructure up-gradation planning
with focus on
Dental wing expansion
of
Patalia Hospital and Research Centre, Jagatpura, Jaipur"

Date – 1st Feb 2018 – 1st May 2018

He comes across as a committed, sincere and dedicated person who has a strong drive & zeal for learning.

We wish him all the best for future endeavors.

Reg. No. RMC-20317

Dr. Gajendra P. Sharma

M.D.

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation **INFRASTRUCTURE UPGRATION PLANNING WITH FOCUS ON DENTAL WING EXPANSION** at **Patalia Hospital and Research centre** , submitted by **Dr.ASHISH MANOCHA** Enrollment No- **IIHMR-U/01/2016-18/0396** under the supervision of **DR. P.R Sodani** for award of MBA in Hospital and Health Management of the University carried out during the period from **1st FEBRUARY 2018** to **30TH APRIL 2018** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

ACKNOWLEDGMENT

I sincerely acknowledge my gratitude to the **Patalia Hospital & Research Centre (PHRC)**, for giving me the opportunity to pursue my dissertation in their organization, which is one of the fastest growing healthcare provider in Jagatpura, Jaipur, Rajasthan .

I owe my significant debt to **Dr. Gajendra P Sharma, Managing Director**, (PHRC) and my guide for the project for his valuable guidance and support during my project work. I also thank him for sparing his valuable time in answering my queries inspite of his busy schedule.

My heartfelt gratitude to **Ms. Priyanka Nagar, Administrative Director, Dr. P Jerath, Clinical Director** for helping me during various phases of my project work.

I would also like to express my thanks to rest of the staff members of PHRC for their assistance during my dissertation.

I would like to express my special thanks to all the persons involved in the project on tertiary care hospital for providing me with the relevant information for my project study and for helping me to understand the various processes.

I am really thankful to my Institute Mentor, **Dr. P. R. Sodani, Acting President, IIHMR University** for making my dissertation possible at PHRC .

Last but not the least. I would like to thank my parents and friends whose unconditional support and trust has always been a constant source of inspiration for me .

Dr. Ashish Manocha
MBA-HM 21/396

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ACRONYMS/ ABBREVIATION

- PHRC- Patalia Hospital & Research centre
- OPD- Out patient department
- IPD- In-patient department
- ICU- Intensive Care Unit
- OT- Operation Theater
- EDP- Electronic Data Processing
- KVA- Kilo Watt Ampere
- OR- Operating Room

INTRODUCTION

Health is a natural human right and has been accorded due importance in our constitution through its delivery to masses remain daunting despite more than 60 years of independence .

After various committee's recommendations ever since, government has been trying to meet health needs of masses but factors like rising population and rapid urbanization rendering health needs uncompensated .

Making healthcare affordable and accessible for all the citizens is one of the key focus areas of the health policies of the country today . Fruitful medical research and health facility planning is an emerging sector of health infrastructure development forming the pillars of achieving this difficult but double endeavor

Planning of a hospital is a process intended to ensure that all building systems in a facility, including sustainable building technologies are installed and perform in accordance with the design intent that the design intent is consistent with the owner's project requirements and that operations and maintenance staff are adequately prepared to operate and maintain the completed facility .

A good medical facility is the need of the hour at proposed site at Jagatpura in Jaipur. There is a need for moderate to excellent health care facilities in the locality. Moderate Size hospital of 75 bed capacity can be set up at the site, well connected with road and rail .

Jagatpura, Jaipur and the surrounding areas have substantially prosperous population leading a very comfortable life . This results in a spurt in demand for better healthcare. There had been a specific demand for advanced and quality care. This demand was being met by the Hospitals in Jagatpura to a limited extent . As the demand was rising rapidly there was requirement of new hospital set-ups to come up to cater to those rising needs .

PHRC, a 20 bedded hospital is serving since 5 years in Jagatpura, Jaipur.

PHRC MISSION

Our mission is to continually strive to improve how we deliver patient care, keep our knowledge and skills relevant, advance our understanding of illness and health and manage our resources effectively .

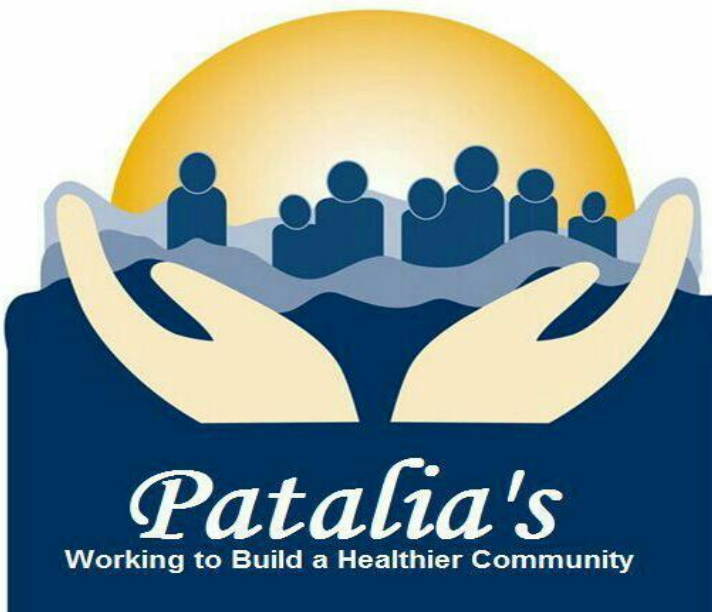
PHRC VISION

Our vision is to provide premium class healthcare to one and all at affordable prices .

VALUES

Our hospital is dedicated to providing health care services through a sincere commitment to our core values of:

- Care “we look after one and all”
- Commitment “ we are dedicated”
- Quality “we do the right thing”
- Imagination “we dream big”



PHRC identified this need and decided to come up with a 75 bedded Multispecialty hospital in Jagatpura, Jaipur in January 2018 and started planning it after completing all the necessary paperwork.

PHRC entered Jagatpura with a commitment to provide high-quality health services with global standards. PHRC was dedicated to bring out the best of the facility to treat and to maintain any type of critical case under one roof .

PHRC had performed many surgical procedures, normal deliveries and C-sections successfully and thus, reducing the Average Length of Stay and aiding in fast recovery of the patients .

PHRC offered all dental services for screening by way of various tailored dental check-up and diagnostic facilities to aid early detection and treatment of all the dental diseases and other dental hazards. Also, it is backed by a team of leading Consultants General Medicine, General Surgery, Gynecologist, who are recognized as leaders in this field in the area .

Assuring quality medical care and comfort to patients PHRC kept its hospital pricing affordable . Thus, within five years of its existence at Jagatpura, Jaipur PHRC gained the confidence of the patients as well as doctors. Also by providing a combination of strengths of new technology and an environment that promoted clinical excellence, PHRC established a premier name in Jagatpura, Jaipur . Thus, PHRC entered the healthcare market of Jagatpura with a bang.

As a result, the existing capacity of the hospital proving to be insufficient to cater to the growing list of their beneficiaries. Hence, they felt the need to increase their capacity. Thus they decided to spread out .

Moreover since the population is also growing at an alarming rate it is imperative that the quality of care delivered to the masses is not up to the mark. Jagatpura, Jaipur had a host of good hospitals but on account of the increasing load of patients, improper allocation of resources, shortage of resources, inefficient management of the set-ups, the hospitals were not able to deliver the medical care in an efficient way .

Furthermore it was found that Jagatpura has the finest of the doctors of Jaipur but it was lacking good infrastructure and professional management and as PHRC is known for quality care at affordable price they decided to expand their services in other fields of medicine in Jagatpura only in order to encash the market opportunity .

OBJECTIVE OF THE STUDY

1. To develop an infrastructure up-gradation plan for 75 bedded Patalia Hospital and Research Centre.
2. To plan and design the facility management for the Dental wing in PHRC.

METHODOLOGY

STUDY DESIGN

Descriptive study

SETTING

Patalia Hospital and Research Centre, Jaipur

DURATION OF STUDY

3 Months (February 2018- April 2018)

DATA COLLECTION PROCEDURE

Data used for the study was taken from the available data provided by the hospital.

PROPOSED BUSINESS MODEL

Healthcare industry is extremely complex in terms of the wide spectrum of the specialties, technologies, and the skilled and unskilled manpower. Like any other industrial venture, proper planning of hospitals is vital for the success of the venture

The first step is proper project conceptualization with the right mix of beds and to generate sufficient income and to attract maximum clientele. For this a comprehensive market research is required to assess the need, demand, and supply for health care services apart from evaluating competition. A detailed financial feasibility report then shows the promoters the viability of the project subject to various scenarios like effect on profitability with change in the debt/equity ratios, project cost escalation, etc .

Based on market research inputs, it was found that there was a specific demand for quality and advanced care in fields like Cardiology, Orthopedics, Minimal Access Surgery, Critical Care Management in Jagatpura, Jaipur . The existing facilities were being burdened by the ever-increasing load of the patients, not only from the city but also from the adjoining areas . Thus, it is imperative that there is a need to establish a Hospital, which would cater to these unmet needs .

So, in order to provide quality comprehensive Healthcare board members of PHRC, proposed to start a Tertiary Care Hospital in Jagatpura, Jaipur . After analyzing the space availability they decided to start a hospital catering to the beneficiaries in the fields of Cardiology, Orthopedics, Minimal Access Surgery, Critical Care Management .

It was decided that the Tertiary Care Hospital will be providing Diagnostic; Curative & Preventive services in General Medicine, General Surgery, Gynecology & Obstetrics, Dental Surgery, Food & Dietetics, Cardiology, Orthopedics, Pediatrics, Minimal Access Surgery, Critical Care Management .

PROJECT AT A GLANCE

Project	Tertiary Care Hospital
Promoter	PHRC
Location	Jagatpura, Jaipur , Rajasthan
Capacity	75 beds
Major Specialties	General Medicine, General Surgery, Gynecology & Obstetrics, Dental Surgery, Food & Dietetics, Cardiology, Orthopedics, Pediatrics, Minimal Access Surgery, Critical Care Management.

SIZE OF HOSPITAL

75-bedded In-patient unit, with suitable component of Outpatient unit, Emergency Department, Clinical Support services & all needed Utility and Support services .

FACILITY MIX

The proposed Tertiary Care Hospital will provide the following services:

- Complete range of diagnostic services.
- Outpatient consultations.
- Intensive care.
- Surgical facilities.
- Dental Care.
- Executive Health Check-ups.

CATCHMENT AREAS

Primary catchment area: Jagatpura, Malviya Nagar, Sanganer, Pratap Nagar

Secondary catchment area:.,KhoNagori, Chaksu,.

FACILITIES PLANNING

The proposed specialties for the 75-bedded hospital have been recommended keeping in mind the disease profile and the demographic profile of the region as per the secondary data provided by the hospital. The facilities proposed are of multispecialty nature .

As per the planning done, the Hospital will have an Out Patient Department providing consultations in all major medical specialties along with the Casualty and Emergency Services .

There will be a well-provided ambulance service and various amenities including an organized catering service (out-sourced) . The Emergency/Casualty department is planned to be fully equipped with resuscitation equipments, beside piped Oxygen and suction etc. providing acute care to the admitted patients. The Surgical Intensive Care Unit will provide postoperative intensive care to the critically ill with the help of sophisticated equipments. A Pre/Post operative ward is said to be well equipped .

This is supported by a Comprehensive Diagnostic Service with X-Ray machine, an Ultra Sound Scanner or Doppler Machine, ECG Machine .

FUNCTIONAL AREAS

- Ground coverage: 8000 sq feet.
- Parking space for cars: 5000 sq feet.
- Super build up area: 40,000 sq feet.
- Electric supply: Jaipur state power corporation.
- Water supply: Jaipur water supply and sewerage board Jagatpur circle
- Sewage treatment plant: available
- Telephone lines: available
- Load of electricity: 1000 kW
- Generator: 1250 Kwa

BED MIX

FACILITY	BEDS
ICU	12
GENERAL WARDS	16
ECONOMY WARD	20
DELUXE ROOMS	10
MATERNITY WARD	5
A and E	4

FUNCTIONAL SERVICES

CLINICAL SERVICES	SUPPORT SERVICES	UTILITY SERVICES
General Medicine	Pathology	Ambulance services
General Surgery	Microbiology	Basic engineering
Gynecology & Obstetrics	Radiology	Housekeeping (outsourced)
Dental Surgery	Pharmacy	Linen and Laundry (outsourced)
Food & Dietetics	Medical Records	Security
Cardiology	CSSD	Hospital waste management
Orthopedics		
Pediatrics		
Critical Care Management		

OPD MIX

No. of beds= 75

No. of OPD days =300

No. of IPD days = 365Bed days = 365*75 = 27375

ALOS =3

No. of admissions per annum=27375/3 = 9125

SPACE PLANNING

Hospitals are amongst the largest and most complex of all modern institutions. Hospital architecture is a part of this complexity . Unlike other organizations, which may be built in various ways, hospital building has lesser choices. Apart from providing the right environment for patients and care providers, it should also be sensitive to the needs of the visitors including patient's families . A number of hospitals are ideally constructed to deliver the present/ future requirements of healthcare . It is an essential requirement to examine the emerging issues, analyze the challenges appreciate the emerging trends and study the various strategic options available for designing, planning and constructing a hospital . It is essential to build and renovate hospital buildings as per present and future requirements .

Once the decision is taken to build a hospital, the next step is its architectural design . A detailed architect's brief has to be first prepared to enable the architect in drawing up his plans .

Considerable inputs from the other departments like air-conditioning, electrical, plumbing, equipment vendors etc. are required to finalize the working plan for the building .

Healthcare architecture differs from that of other building types in the complexity of the functional relationships between the various parts of the hospital. In the residential and commercial building types the design brief is relatively easy to understand and cater to. Healthcare architecture, however, requires specialized knowledge on the part of the architect and the supporting engineering team. The lack of such trained professionals results in many of the hospitals in India today being ill conceived and costing their promoters much more in construction and in inefficient operation than actually needed. Eventually it is the patient who bears the brunt of this incompetence through lack of quality in the medical care provided and physical and mental discomfort and the increased cost of hospitalization.

Specialized healthcare architecture is a field that is still in its infancy in India. However, this specialized field is not only about satisfying the stringent functional demands that the hospital makes on its designer. The emphasis of healthcare architecture is also on improving the quality of the environment for patient and caregivers alike. It must meet the needs of people who use such facilities in times of uncertainty, stress, and dependency on doctors and nurses. It must recognize and support patients' families and friends by providing pleasant spaces. At the same time the building should project an underlying reassurance that the patient is in the hand of competent medical staff and in a technically sound healthcare facility.

In the future patients will be increasingly demanding of healthcare organizations. Those facilities that are designed to be most responsive to patients in terms of convenience, caring encounters, service orientation and the quality of care will do best in meeting these new demands.

Architects are regarded as talented problem solvers. The problem here is to find a way to deliver a high quality of care and access in a setting that is also highly supportive of human relationships during times of great anxiety and fear. The particular skills of the design team are well suited to meeting this challenge.

After conceptual layouts have been approved ("signed off") by the Designing committee, the architect incorporates more detailed planning criteria into the drawings, the end product of which is a schematic drawing, it is not done in isolation. All the various members of the design team participate in giving inputs, comments, critical assessments and the schematic drawings are the product of what may be a time-consuming and difficult process; it may involve intense discussions, hopefully followed by "working" compromises between all kinds of design factors and cost constraints.

These schematic drawings include exterior elevations (quite likely rendered), and fairly detailed sections, showing vertical stacking of functions. It may include perspective views (nowadays increasingly prepared and rendered on a personal computer) and may also include a "walk-through", a series of computer generated images giving the illusion of a video clip starting maybe with the approach to the building and going all the way through the main entrance into the lobby and

possibly beyond, depending on the time and money spent making it .

After the schematic drawings have been approved, the architectural design development stage begins, which is more technical and detailed .

1. Site:

By this time the survey, soil investigation and utility information was done. This information will support development of initial studies in foundation and structural framing, sanitary and storm sewer systems, site development and grading, and electric power and energy services. Access of traffic to the building entrance, separation of emergency and service traffic elements and provision for parking are further studied at this time

2. Building:

Architectural development includes further study and decisions regarding materials, windows, exterior finishes, architectural treatment and detail; refinement of space layout within the facility, selection of finishes and materials in keeping with maintenance and durability requirements; and comparative cost studies of methods and materials for partition systems and exterior walls, ceiling and windows .

3. Engineering:

Further development is also required on concepts of air handling, air conditioning, electrical distribution, lighting, communication, data systems and medical gas, plumbing and piping systems.

During design development these systems are worked out sufficiently to allow cost studies and basic interfacing decisions to be made. Drawings are normally single-line indications of piping or ductwork. Total service requirements for electrical power, natural gas or fuel oil, sanitary and storm sewers, water, and solid waste disposal are now established

4. Equipment:

Hospital planning requires careful attention to the fixed and movable equipment that will be needed to implement the operational program. Early in design development, equipment and room detail interviews are held with medical and staff personnel. In these sessions, equipment requirements are documented. The information is used in coordinating room sizes, utility services, lighting and workflow. Documentation usually takes the form of room-by-room equipment lists, or room data sheets, and is submitted for administrative, medical staff and departmental review after compilation

5. Systems:

Complex systems of various types are often incorporated, in concept form, in schematic design. Functionally, these include communications, data transmission, storage and retrieval, materials handling, security, food preparation and others. Each system that is to be incorporated must be studied in detail and interfaced with equipment common to other building systems; space and structural requirements are often extensive. Justification of systems is critical, since initial and maintenance costs are usually high .10

Design development drawings normally show considerably greater detail than schematic drawings. Major equipment and furniture are shown in the plans in order to facilitate engineering coordination of utilities and lighting. A room-by-room equipment list, or room databook, is included to record equipment requirements .

Furniture and other accessories add aesthetic value to the building. The selection of the furniture has to be done in an economically prudent way taking into account that the aesthetics are not affected in anyway. There should be a proper balance between meeting the aesthetics and the controlling cost as well .

Consideration is to be given to the space available as it has a direct bearing on the accommodability of the same. They include beds, trolleys, cabinets, chairs tables waiting area couches, wheelchairs, monitor stand, cabinets for computers, etc .

A design development is desirable to provide summary discussion of operational concepts, materials, special equipment, and environmental systems. When design development documents are completed, a cost estimate is prepared and presented with the drawings, outline specifications and equipment information for hospital review. The estimate provides a current check on project scope related to budget .

After approval, design development documents provide the basis for the working drawing or contract document phase of the project. The design development phase sets the detailed operation of each room and leads to approval of all systems, fixed equipment, material types and building construction .

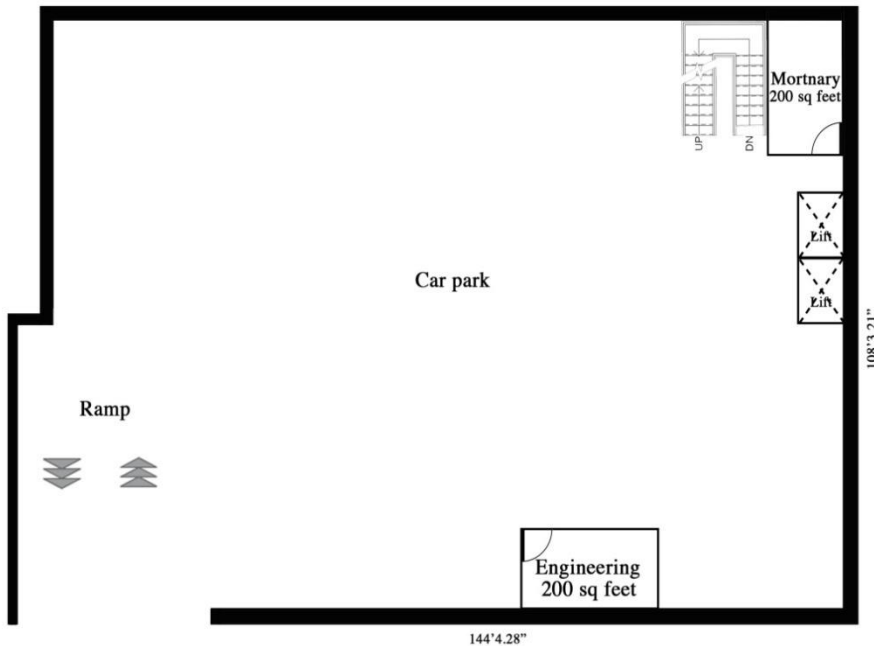
This is the most important part of as it sets all of the ideas, programs, needs and designs into the final building plan. All anticipation of future needs is now fixed, as the following phases only detail and construct what is now the final design product .

After the business model for the Upcoming Tertiary Care Hospital in Jagatpura, Jaipur was decided then the space planning was done. As the building was a pre-existing one hence while planning the already constructed structure was taken into consideration. Accordingly, ensuring maximum utilization of space the floor wise distribution of facilities was done .

FLOOR WISE DISTRIBUTION OF FACILITIES

BASEMENT 2

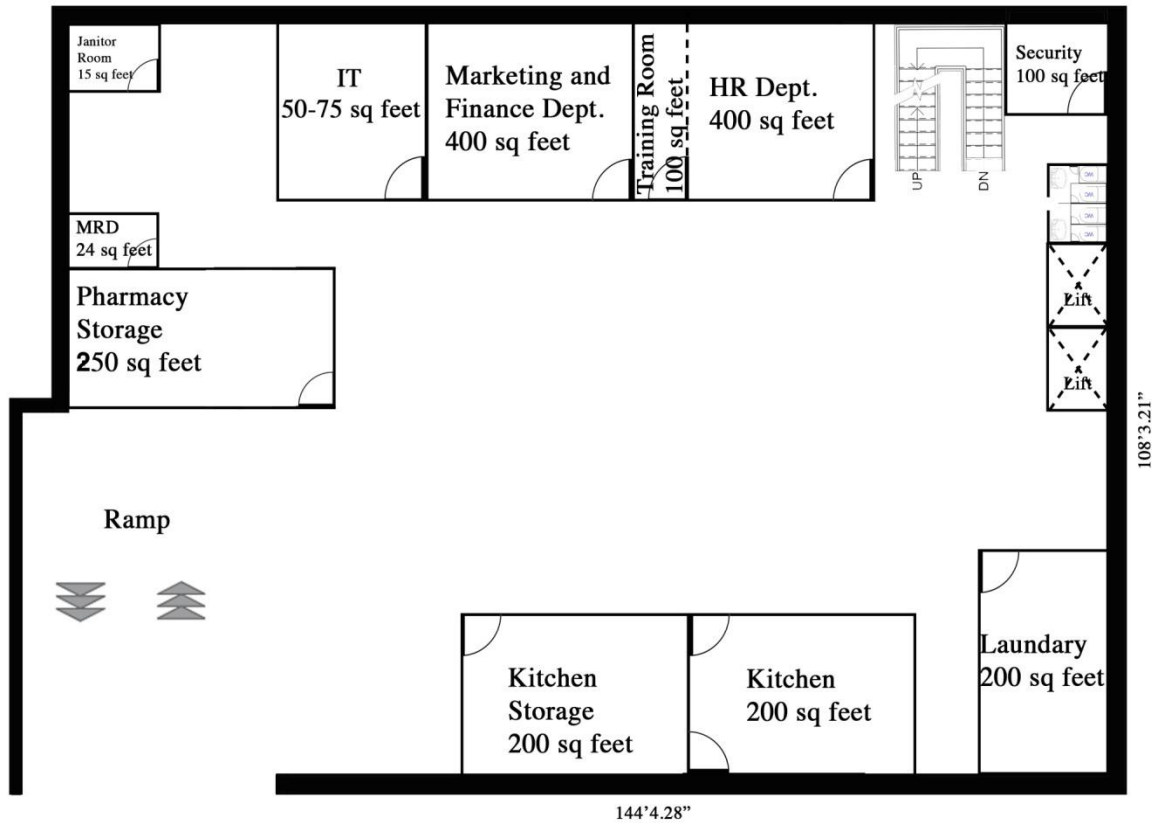
- CAR PARKING
- ENGINEERING DEPARTMENT



Basment 2

BASEMENT 1

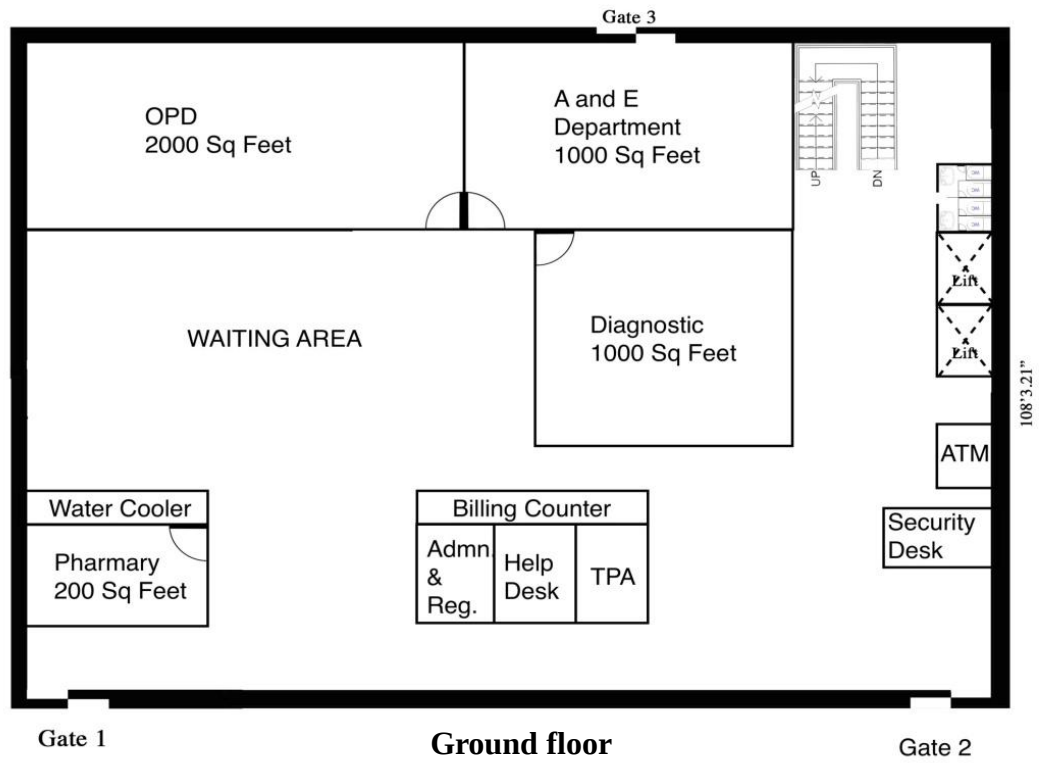
- HR DEPARTMENT
- MARKETING & FINANCE DEPARTMENT
- IT DEPARTMENT
- SECURITY DEPARTMENT
- PHARMACY STORAGE ROOM
- KITCHEN
- LINEN & LAUNDRY
- JANITOR ROOM
- MRD DEPARTMENT



Basment 1

GROUND FLOOR

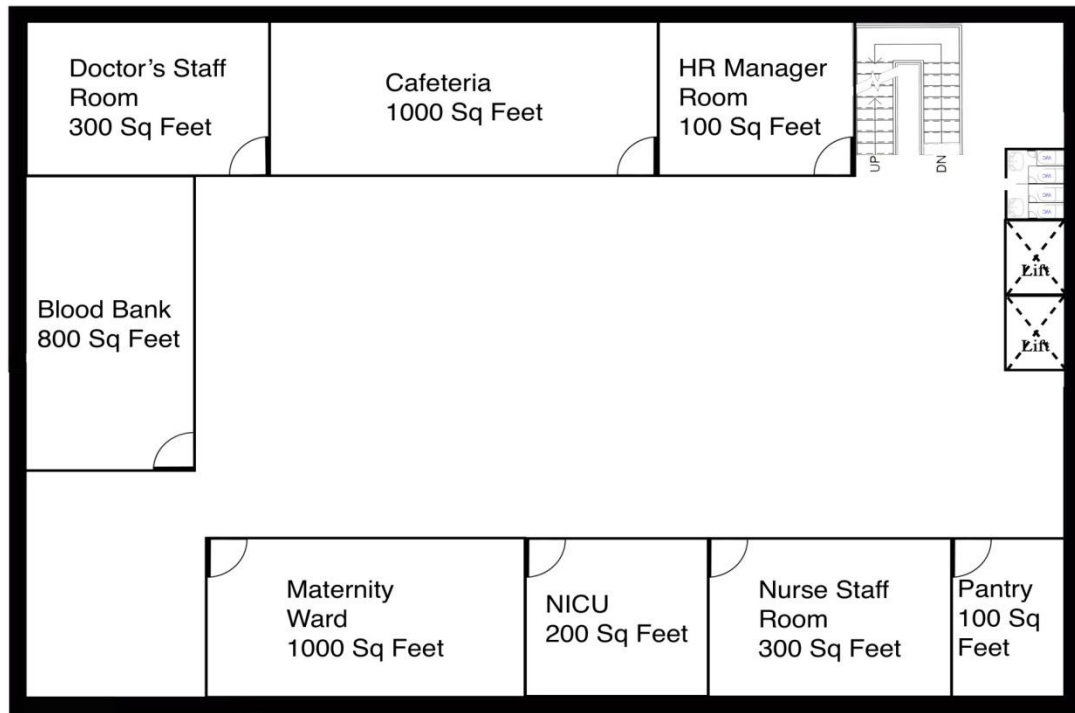
- A & E DEPARTMENT
- OPD CONSULTATION ROOMS
- DIAGNOSTIC SERVICES (LABORATORY & RADIOLOGY)
- BILLING COUNTER
- PHARMACY



Ground floor

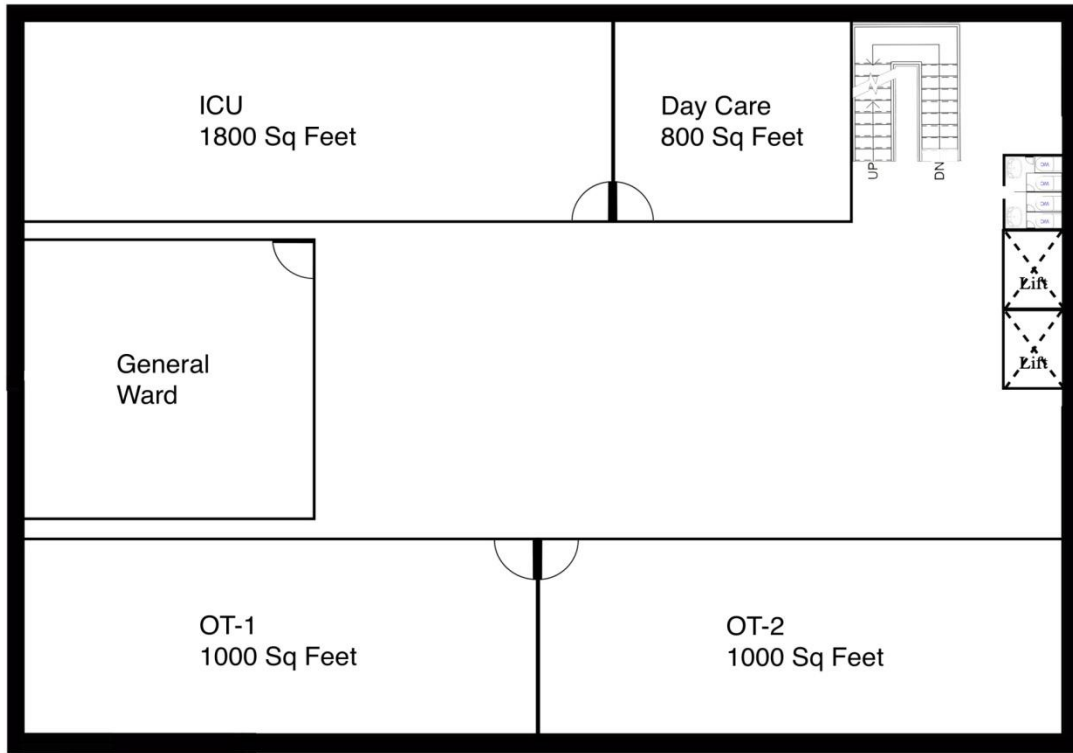
First Floor:

- NICU
- Maternity Ward
- Doctor's Staff Room
- HR Manager Room
- Nurse Staff Room
- Cafeteria
- Pantry



Second Floor:

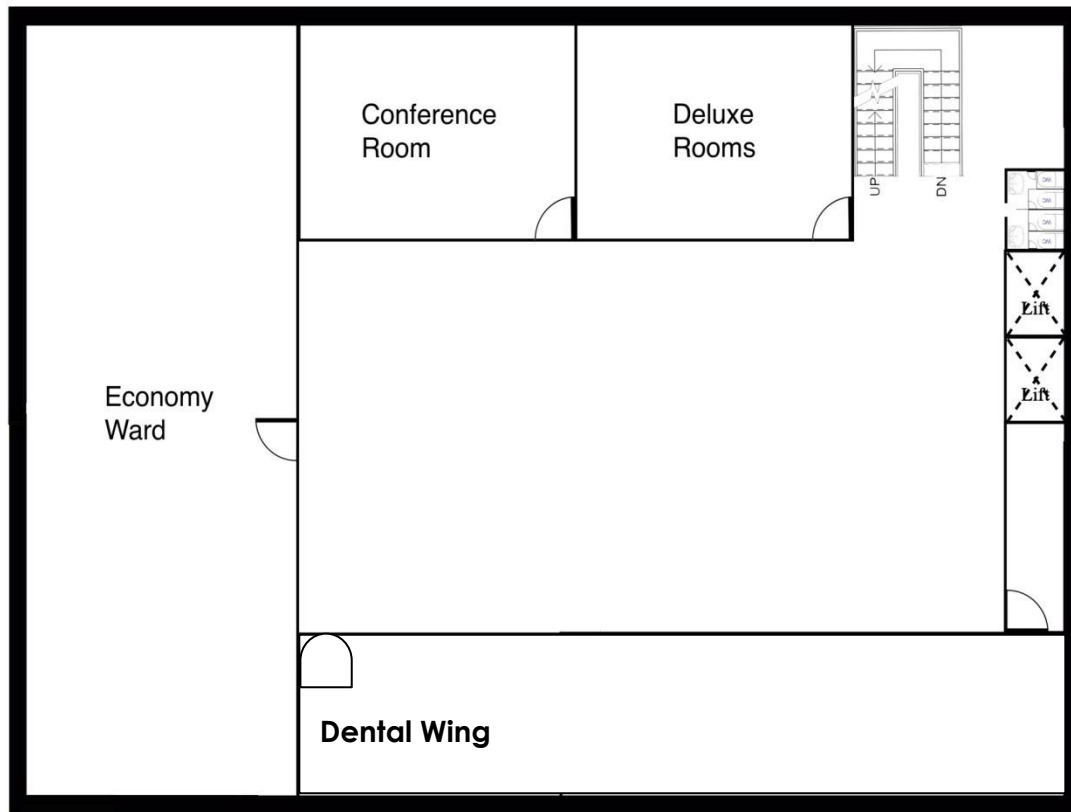
- ICU
- Day Care
- General Ward
- OT Complex



Second Floor

Third Floor:

- Private Wards:
 - ✓ Deluxe Room
 - ✓ Economy Room
- Dental Wing
- Conference Room



Construction of the Hospitals on the basis of well-conceived plans is important, not only because of the large capital outlays involved but also because of the long-term cost implications associated with construction decisions. New health facilities absorb billions of dollars/ rupees worth of resources each year in various countries. A careful design and implementation of the needed facilities to maximize efficiency and productivity can limit operating cost substantially.

Hospital costs depending on the locality, availability of capital, and interest rates charged. Estimation of the availability of funds for hospital construction is a complex art.

The planning of this 75-bedded Tertiary Care Hospital started in January 2018 and the hospital is planned to be commissioned in July 2019 .

Civil Works

As the building was a pre-existing one, many limitations were faced during the architectural planning of the hospital. The pre-existing building was constructed till ground floor. The project plan proposed construction till third floor . The building structure was found to be incapable to bear the load of the extra three floors so 17 new columns are constructed and 5 Existing columns had to undergo jacketing for increasing their weight bearing capacity . Also Siporex (cement bricks) are used for construction instead of the red bricks, as the Siporex are lighter in weight as compared to the red bricks. Also, Gypboard is being used in the project .

In O.Ts mosaic flooring will be provided along with a Vinyl flooring on it while in the main reception area vitrified tiles flooring will be done. Porcelain flooring is planned to be provided, in all the remaining areas. In the staircases Kota flooring is to be done . Adequate space has been provided for ducting passages that cater to all the needs of the services such as electric installations, piped medical gases, etc. The air-conditioning system will be centralized .

Public health work

In order to put minimum load on the scarce water resources of the place, particularly during the summer months, an independent bore well has been provided in the hospital premises along with the pre-existing well. Also water connection from corporation will also be taken .

A sewage treatment plant has been provided to adequately treat the effluent before being discharged it to the sewage line .

Adequate provision has been made for both under ground and overhead water storage tanks to ensure uninterrupted water supply. An overhead tank of 30,000 litres capacity is being constructed on the seventh level for the storage of water. Geysers will be used for the hot water supply system .

Electric installations

Whereas electricity is being made available by the local government, but at the same time in view of the frequent power failures, provision has been made for 200 KVA standby diesel generating set (to ensure uninterrupted power supply) which are used in the case of emergency .

These generators cater to the needs of the operation theaters, lifts and other essential areas. Stabilizers have been provided to take care of frequent voltage and frequency problems

Equipment

The hospital is providing care of the highest order and is planned to be equipped with sophisticated equipment for the diagnostic and treatment of the rare diseases in the specialties included .

Support Services

The services like CSSD, Laundry and Linen, Dietary Service. Electric Substation Medical Gas section, medical and general stores supply service etc. (directed towards the development of replenishment system within the hospital) contribute towards the effectiveness of patient care. A great emphasis has been laid on the optimum performance of this supply line and the repair and maintenance of equipment in the design of the institute. Linen & Laundry, Security and Housekeeping services will be outsourced .

Hospital economics

While developing the investigative, operating sterilization, laundry, dietetics and other such Services, a very careful analysis of the workload in relation to patients needs has been made and the layout planning of these services has been done to satisfy the total needs of the hospital. All the investigative, therapeutic, support and utility service departments have been thoroughly investigated in terms of their scope of work before physical designs have been prepared

The physical plans of this health facility have been so structured over the functional system that the design goes well with quality of service and the economy and promptness at which it can be rendered .

Operation Theater complex

In order to create an environment free from the hazards of infection, the OT Complex and the ICU are located on the second floor. The OT Complex has two Operating rooms .

DENTAL WING DESIGN

We will be *making open operatory that would be identical*. This includes those to be used by the dental hygienist, as this provides for maximum flexibility of the clinic. This will help to eliminate the problem of health professionals using "favourite rooms" the majority of the time, which can have a negative effect on dental clinic efficiency.

Placing windows in the operatories to facilitate the selection of tooth colour shades and to provide a pleasant atmosphere for patients and staff. North-facing windows are best, and East-facing are second best. Be cognizant of the exposure (when three people are in the operatory it can get warm quickly).

The venting system will be planned so that there is proper air exchange in each operatory. The dental operatory will be setup, so that it is easily converted for use by either a right-handed or left-handed health professional.

The laboratory should have a door, due to the noises and odours that originate there, and an exhaust fan.

Provide adequate overhead lighting in the operatories to prevent eyestrain.

Clinics must be able to provide care to patients with disabilities. Thirty-two inches is the minimum size for a space that will allow wheelchair access. Depending on the width of the side counters, this space is obtainable in the standard 10 foot by 11 feet operatory.

Each operatory will be having sinks.

Each operatory will have access to an X-ray machine. (One X-ray head can be shared between two operatories if designed with a pass-through and permitted by state law.)

The standard X-ray arm will extend to allow the far side of the patient's head to be 72 to 75 inches from the mounting point. This must be considered when locating the dental chair in the operatory. Plenty of electrical power points will be given for each operatory for future expansion.

X-ray equipment and sterilizers often require dedicated electrical circuits.

Providing a staff changing area, with lockers, within the dental clinic area. This will facilitate the separation of clothing used to treat patients from clothing that is worn outside of the clinic, which is important for infection control.

Considering future expansion by laying out the clinic so that additional operatories can be added at minimal cost to existing space or by adding space at a later date. Many clinics do plan to expand and have the foresight to provide the plumbing and electrical wiring to make expansion easier. Do not build the operatories until you can afford to staff them.

The sterilization area will have a "dirty" and "clean" area to meet infection control guidelines. The construction of a new dental clinic requires careful planning to ensure that the resulting facility is functional and a pleasant place to work. Without proper planning, major and minor problems can occur during the construction phase. Dentists, unlike physicians (unless specialists), are locked into their environment. For a dentist to treat a patient, he or she uses extensive instruments and dental equipment that require fixed or semi-fixed plumbing and other built-in operating pieces and services. The plumbing services that will be installed are to facilitate the operation of water, compressed air, suction, a waste line, and electricity.

The compressor and suction pump need to be isolated from the clinic due to the noise they make when operating. Sterilization, laboratory, darkroom, and reception will be located so as to allow the most efficient movement between them and the treatment rooms .

Operatory Layout

The operatory final layouts must be based on the type of oral-health-care-delivery system and the brand that is selected for the clinic. It is best to have the operatory layout done by the manufacturer or dental supply company where the dental equipment is purchased .

Chair– The adjustable seat in which patients receive treatment. Dental chairs installed will be hydraulically or electrically operated by foot controls or touch keypads. They can be positioned at every possible angle from fully upright to fully reclined. The major function of the chair is to situate the patient so that the oral health professional has comfortable, unobstructed access to the oral cavity from all angles.

Delivery Unit - (also known as hand piece control). The suite of powered instruments used by the dentist. The instruments (hand pieces) comes attached to the moveable platform by flexible tubes containing air, water, fiber optic, and electrical lines. The delivery unit would be located at the side or the rear of the dental chair or can be mounted on the chair itself .

Operatory - The dental treatment room. The simplest operatory layout containing a dental chair, stools for the dentist and his or her assistant, and a hand piece delivery system .

MAJOR PLANNING CONSIDERATIONS

- Operational work flow
- Occupational safety and Health
- Infection control
- Ergonomics
- Barrier Free Access
- Comfort
- Professional image
- Esthetic

Infection control should be considered in the design stage of a dental department. Rectification work may be very difficult after operation of a dental department.

BASIC PRINCIPLES OF PLANNING A DENTAL DEPARTMENT

1. **Zoning**-clean and dirty zones, clinical area and support area
2. **Flows**-from clean to dirty
3. **Simple**-to decrease contact surfaces
4. **Seamless**-to avoid un-cleansable area
5. **Smooth**-to allow easy disinfection
6. **Durable material** able to withstand repeated disinfection

Zoning

- **Clinical area**-dental surgeries, sterilization room, x-ray room, recovery room.
- **Supportive area**-reception office, waiting area, server room, pantry, toilets.

BUILDING SERVICES

1. Heating, Ventilation and Air Conditioning
2. Fire services
3. Water supply and drainage
4. Electrical supply
5. Compressed air and suction system

BUILDER'S WORK

1. Ceilings
2. Walls
3. Floor
4. Cabinets
5. Doors

Humidity, ventilation and air conditioning

1. Temperature: 22°C for clinical area(25.5°C for general offices)
2. Relative Humidity: 50-60%
3. Air Change per Hour (ACH): 2-6
4. Air flow: from clean to dirty area
5. Air Pressure: +ve for clean room, -ve pressure for dirty room e.g toilet

Water supply

- The quality of the water supplied by Water Supplies Department (WSD) conforms to the Guidelines for Drink-water Quality recommended by WHO.

We will be putting into practice -

- Potable water supply for domestic use.
- Break tank (non-potable water) for clinical water supply for medical use, include dental unit, instrument sinks, autoclaves and film processor etc.

Drainage

- Standard gravity drainage system will be provided in general.

Electrical supply

- Emergency power supply may be needed for normal functioning.
- 3 phase power supply for operator room.
- Dental clinics need 3 times electrical power supply

Quality requirement

- “The compressor will be fitted with an air-intake filter and a post compression filtration and dry system, to ensure that the air is clean and dry, minimizing the risk of contamination of the system by micro-organism.”

CEILING

- False ceiling with acoustic features to reduce the growth of fungus.
- Arranging the “air return” near the entrance to avoid dropping of dust over the clean area

WALLS

- Cleansable, smooth and anti-fungal.
- Non-VOC emulsion paint, vinyl sheet, compact board, or ceramic tiles
- Avoiding too much texture.

FLOOR COVERINGS

- All joins sealed.

CABINET

- Simple, smooth and seamless.
- Closed shelf.
- Drawers would be deep enough to enhance flexibility and placement of covered trays.

HAND WASHING BASIN

- 1 in every dental operator, not to share with instrument cleaning sink.

DOORS

- Door knobs can serve as a fomite to indirectly transmit infectious organism
- Need regular disinfection

FUNCTION ROOMS

- Dental operator
- Central sterilization room (instrument reprocessing area)
- X-ray room and film processing area
- Laboratory

DENTAL OPERATORY

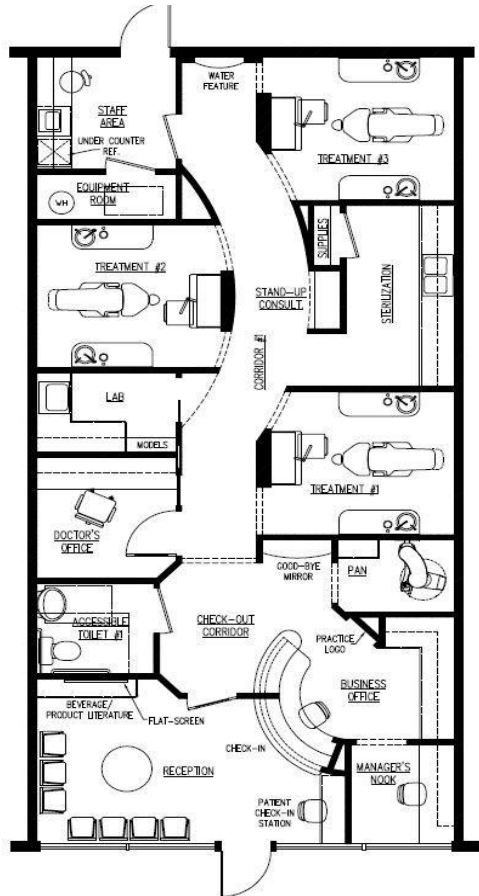
- Simplified cabinets to minimized contacts.
- Zoning would be clearly delineated.

STERILIZATION ROOM

The central processing area should be divided into sections for

- 1) receiving, cleaning, and decontamination;
- 2) preparation and packing;
- 3) sterilization; and
- 4) storage

LAYOUT



CONCLUSION

This report talks about the infrastructure upgradation, understanding infrastructure related requirements from the patient's point of view and from the provider's point of view .

The detailed facility assessment helped in revealing a gaps in the infrastructure planning. Schematic layout of concept plans has been prepared subsequently in accordance with the recommended plan and space program .

The Design plans would incorporate the best practices in healthcare facility design including patient friendly infrastructure and nationally accepted safety protocols .

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