

Summer Training at



**Medanta the Medicity
Gurgaon, Haryana
(April 1 – 31 May, 2014)**

A Study to Improve Turnaround Time of Urgent Laboratory Sample

By

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**Under the guidance of
Dr. Nirmal Kumar Gurbani**

**MBA- Hospital & Health Management (MBA-HM)
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2014**

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CERTIFICATE

This is to certify that Dr. Deepika Rehani has undergone her summer training in Medanta –The Medicity Hospital, Gurgaon from 1 April 2014 to 31st May 2014. The candidate herself carried out all the studies related to her summer training. Her approach to the study has been scientific and analytical.

The summer training is partial fulfillment of the course requirement recommended for the award of the Post Graduate Diploma in Hospital and Health management.

I wish her success in all her future endeavors.



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Acknowledgement

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- Lastly, I would like to thank my college, IIHMR Jaipur, for providing me with an opportunity to learn from and work with the best personnel in the Health Industry, and for helping me gain an appreciation of where I currently stand as an administrator and

how much work I would need in order to meet the quality specifications that the health industry seeks.

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1. Acronyms/Abbreviations

- BP: Blood Pressure
- CABG: Coronary Artery Bypass Graft
- Cath Lab: Catheterization Laboratory
- CAP : College of American Pathologist
- DSA Lab: Digital Subtraction Angiography Lab
- ERCP: Endoscopic Retrograde Cholangio Pancreatography
- EUS: Endoscopic Ultra Sound
- GHPL : Global Health Care Private Limited
- Hb : Haemoglobin
- IPD : In- Patient Department
- MLC : Medico-Legal Cases
- OPD: Out-Patient Department
- OT : Operation Theatre
- POCU: Pre Operative Cardiac Unit
- PTCA: Per Cutaneous Trans luminal Coronary Angioplasty
- RH +ve : Rhesus Factor Positive
- RH -ve : Rhesus Factor Negative
- RBC : Red Blood Cell
- TAT: Turnaround time
- UG Floor: Upper Ground Floor
- WB: Whole Blood

2. Observation Learning

2A. Introduction

The summer training is an integral part of the course curriculum of PGDHM at IIHMR Jaipur. As part of the course, students at the end of their first year are required to undergo training of two months to get an in-depth exposure to the various departments in the organization, as well as take up projects as per the requirements of the organization where the students get training. What is most crucial is to build a base of knowledge about the structure and functioning of the hospital, which can be used to understand and apply concepts in the subsequent study tenure at IIHMR Jaipur.

During my summer at Medanta – The Medicity, Gurgaon, there were numerous learning experiences. These were enhanced due to the projects undertaken at the hospital, which are listed as follows:

- *A Study to improve the turnaround time of urgent laboratory samples*
- *A study to streamline the tests ordered with urgent priority*

A brief report of the training of two months is presented below with the details of tasks undertaken and lessons learnt during the training.

2B. Organization Profile

Medanta the Medicity, a multi-super-specialty hospital, is one of India's largest healthcare projects in multi-specialty tertiary care medical treatment, and has been envisioned as an institute that will redefine standards of excellence in healthcare delivery by bringing together the best of infrastructure, technology, training, education and medical intelligentsia. With an investment of over \$350 million, Medanta the Medicity aims to create a world class education and training centre backed by remarkable infrastructure, futuristic technology and the extraordinary vision of the eminent cardiac surgeon, Dr Naresh Trehan – Chairman and Managing director of Global Health Private Limited (GHPL).

Located across 43 acres, Medanta is the new international healthcare destination in the National Capital Region of New Delhi – Gurgaon. Medicity is a 1250 bed medical institute at par with world standards. The objective of the Medicity is to bring in global healthcare

delivery standards at affordable prices, while firmly placing India on the international roadmap as a premier destination for healthcare services, medical research and high-end medical diagnostics.

Specialties covered

Medanta provides integrated primary, secondary and tertiary care services spanning over 29 super specialties and high-end services covering every aspect of human health, housing 10 Institutes, 8 Divisions and 11 Departments.

- Institutes
 - The Medanta Heart Institute.
 - The Medanta Institute of Neurosciences.
 - The Medanta Bone & Joint Institute.
 - The Medanta Kidney & Urology Institute.
 - The Medanta Cancer Institute.
 - The Medanta Institute of Digestive & Hepatobiliary Sciences.
 - The Medanta Institute of Minimally Invasive Surgeries.
 - The Medanta Institute of Transplant & Regenerative Medicine.
 - The Medanta Institute of Critical Care & Anaesthesiology.
 - The Vattikuti Institute of Robotic Surgery.
- Departments
 - Department of Clinical Immunology & Rheumatology.
 - Department of Pathology & Laboratory Medicine.
 - Department of General Surgery.
 - Department of Internal Medicine.
 - Department of Dental Surgery.
 - Department of Physiotherapy & Sleep Medicine.
 - Department of Transfusion Medicine (Blood Bank).
 - Department of Pediatric Gastroenterology, Hepatology & Liver Transplantation.
 - Department of ENT & Head Neck Surgery.
 - Department of Physiotherapy & Rehabilitation.
 - Department of Ophthalmology.
- Divisions
 - Division of Endocrinology & Diabetes.
 - Division of GI & Bariatric Surgery.
 - Division of ENT & Head Neck Surgery.
 - Division of Peripheral Vascular & Endovascular Sciences.
 - Division of Gynaecology & Gynaec-oncology.
 - Medanta Breast Services.
 - Division of Plastic, Aesthetic and Reconstructive Surgery.
 - Division of Radiology & Nuclear Medicine

What is unique about Medanta the Medicity?

- Medanta aims to functionally integrate within one campus and one management, the facilities of medical care, teaching as well as research and development.
- It also offers to explore the possibility of integrating knowledge of traditional and alternative medicine with modern medicine, through means of scientific research.
- Medanta the Medicity is led by Dr Naresh Trehan, one of the leading luminaries in the medical world. Dr Trehan is a recipient of various national and international awards for excellence, including the highest national awards, Padma Shri and Padma Bhushan, in recognition of his distinguished service to the nation.
- Dr. Trehan has also served as the personal surgeon of the President of India since 1991 and was formerly the President of the International Society for Minimally Invasive Cardiac Surgery (ISMIC)
- The Medicity team has attracted some of the most distinguished names in medical and non-medical fields from all over the world.

Infrastructure

Medanta-The Medicity is spread across 43 acres, has 45 operating theatres, 1250 beds and over 350 critical care beds

Education

An initiative is currently underway of building a full-fledged medical college, the objective of which will be to produce highly competent general physicians and specialists who would be socially sensitive and fully committed to the principles of medical ethics. This establishment would also make every attempt to erase the dividing line between clinical and non clinical areas.

Research and Development

The Medicity will have a state-of-the-art research and development centre integrated with the hospital and the teaching establishment. It is planned to be one of the best funded, staffed and managed medical R&D centre in the country. Its Research Advisory Committee will consist of 12 members from amongst the best known names in modern biology, including various areas of medicine.

Traditional Medical practices

An important objective of Medicity is to validate - and integrate with modern medical system – those medical practices in our traditional and complimentary systems of medicine such as Ayurveda, Unani, Siddha, Tibetan and Tribal Systems that are compatible with science.

Vision and Values

‘The Institution is governed under the guiding principles of providing affordable medical services to patient with care, compassion and commitment

Technology

- 256 Slice CT
- Brain Suite, Intra-Operative Imaging Operating Theater
- Da Vinci Robot for Minimal Invasive Surgery
- Artis- Zeego Endovascular Surgical Cath Lab
- 4 Linear Accelerators (provision for IGRT/ IMRT) (Radiation Surgery)
- Tomotherapy
- Integrated Brachytherapy Unit with remote controlled HDR
- 3.0 Tesla MRI
- PET CT
- Gamma Camera
- Digital X-Ray, Fluoroscopy, Bone
- Densitometry
- 3D and 4D Ultra Sound
- Digital Mammography

Affiliations

- Medanta the Medicity has entered into a corporate alliance with 'Duke Medicine' with the objective of providing a platform for high end research practices and clinical trials.
- The Medanta Duke Research Institute (MDRI is a world class early phase clinical research facility at Medanta the Medicity. MDRI guarantees to offer an environment conducive for exploring the technologies of traditional medicines in synchronization with modern medicine aids for research and development in the areas of healthcare and health recovery.
- It is proposed to be a 60-bedded facility built in an area of 27,000 sq. ft. within the premises of Medanta. To unlock its potential, MDRI will be undertaking immediate early phase clinical studies in three countries with diverse populations.
- The results of such a research will be paramount for all subsequent studies that can play a decisive role in changing the face of healthcare across the world.

2C. Data Collection

- With permission from the Senior Vice President of Medanta the Medicity, Mr. Arun Datta, and the Medical Superintendent, Dr. Awadhesh Kumar Dubey, we created a schedule, which we have followed in order to observe and learn the functioning of all the departments of the hospital. This task was made difficult due to the scale of operations being conducted at Medanta the Medicity, as we realized that a significant amount of time would have to be invested in each department in order to glean as much information as possible.

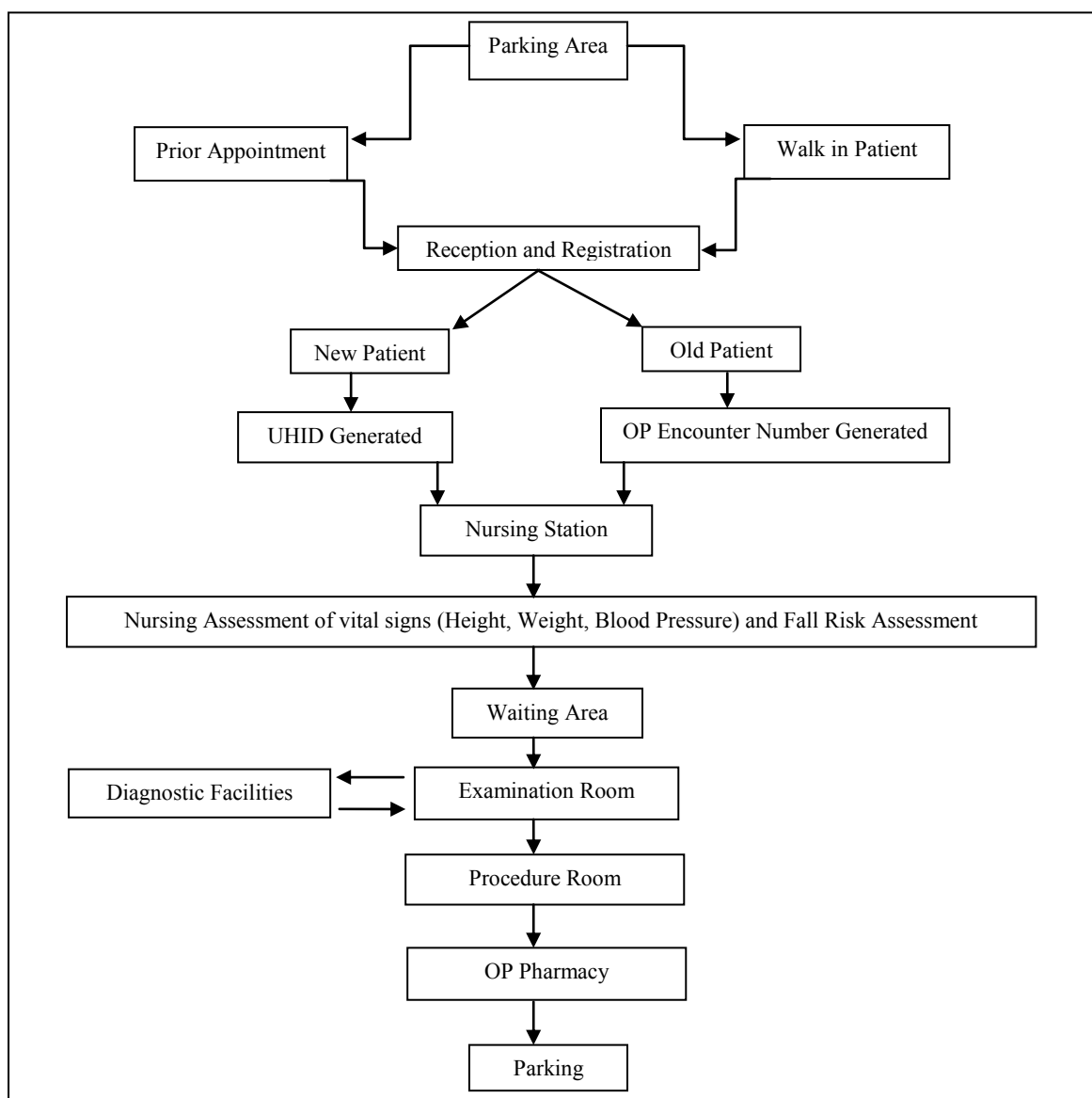
- After permission was secured and a schedule was made to observe the various departments of the hospital, we went and sought appointments from the concerned personnel in the various departments.
- Once these permissions were obtained, we got the details of personnel who would guide us in these departments.
- The schedule of our rotation is attached as Annex 1.

2D. General Findings

I will attempt to present my general findings in the form of process flow sheets, in the order of my visit to the departments.

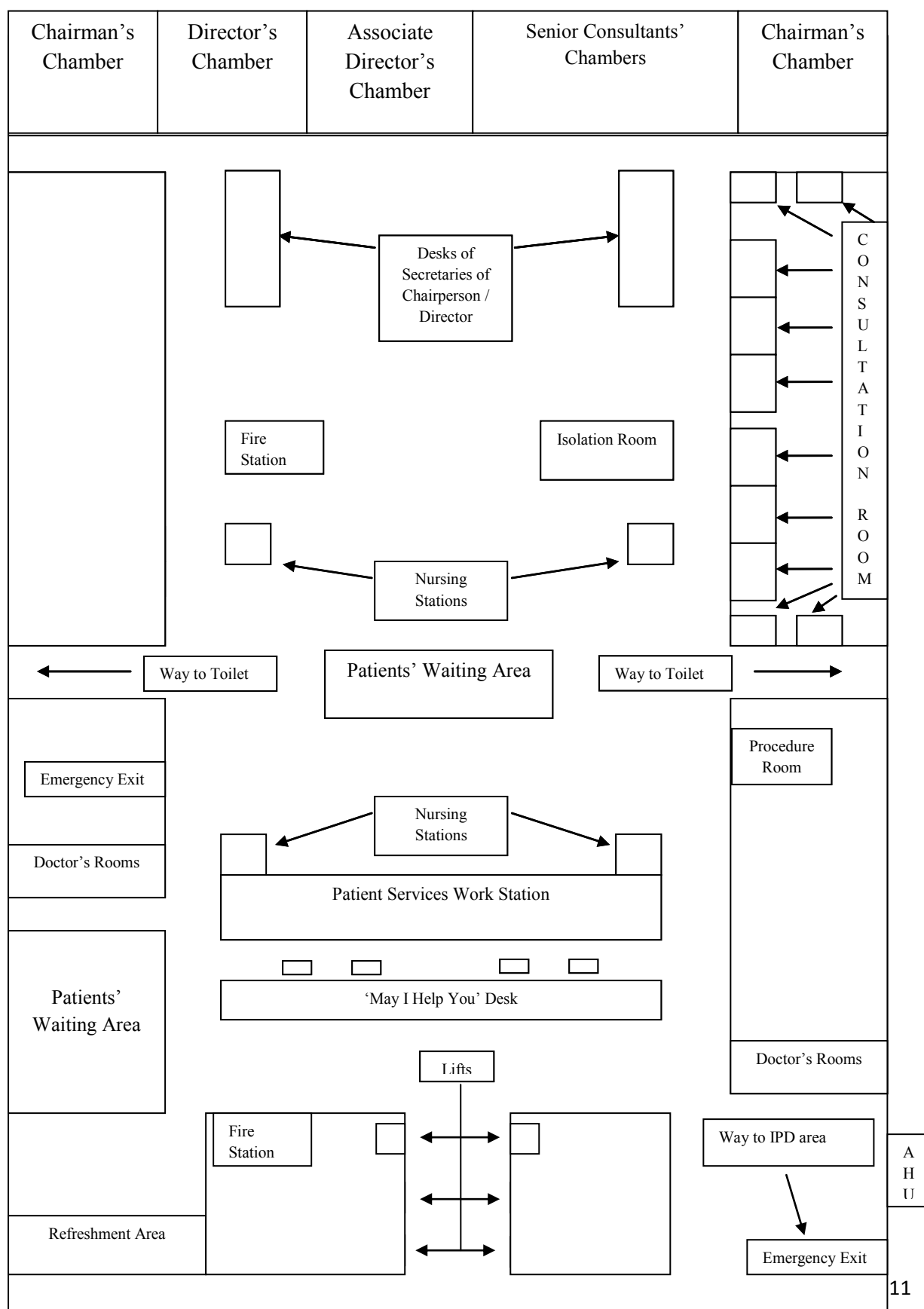
a) **OPD**: As has been mentioned earlier in this report, it can be said that each floor of Medanta houses a separate institute of clinical excellence. Each institute has its own OPD area as well as IPD area / day-care area wherever applicable. The general process flow that is followed in all the OPDs is as follows:

Figure 1: OPD Process Flow



The number of OPDs varies from institute to institute, but each OPD has approximately been planned in the same way. A sample layout of an OPD is as follows.

Figure 2: OPD Layout



As mentioned earlier, each floor has its own OPD. However, the 10th floor and the 12th Floor have Day care facilities as well. Every floor has a procedure room and its own Front Desk. Appointments are centralized and are recorded on the Hospital Information Management System. As soon as appointments are fixed, a text message is sent to the patient confirming the appointment, and a reminder message is sent on the day before the appointment. No walk-in patient is turned away, and the staffs try to accommodate these patients between the appointments already scheduled for the day. The daily volume is of approximately 2000-2500 patients across all the OPDs. Each floor has the capacity to handle 70-100 patients waiting. For Chairpersons and senior doctors, a junior doctor does the initial assessment of the patient, which not only reduces the workload of the senior doctors (whose slots are always overbooked), but it also gives the junior doctors an opportunity to learn from the best brains in the industry.

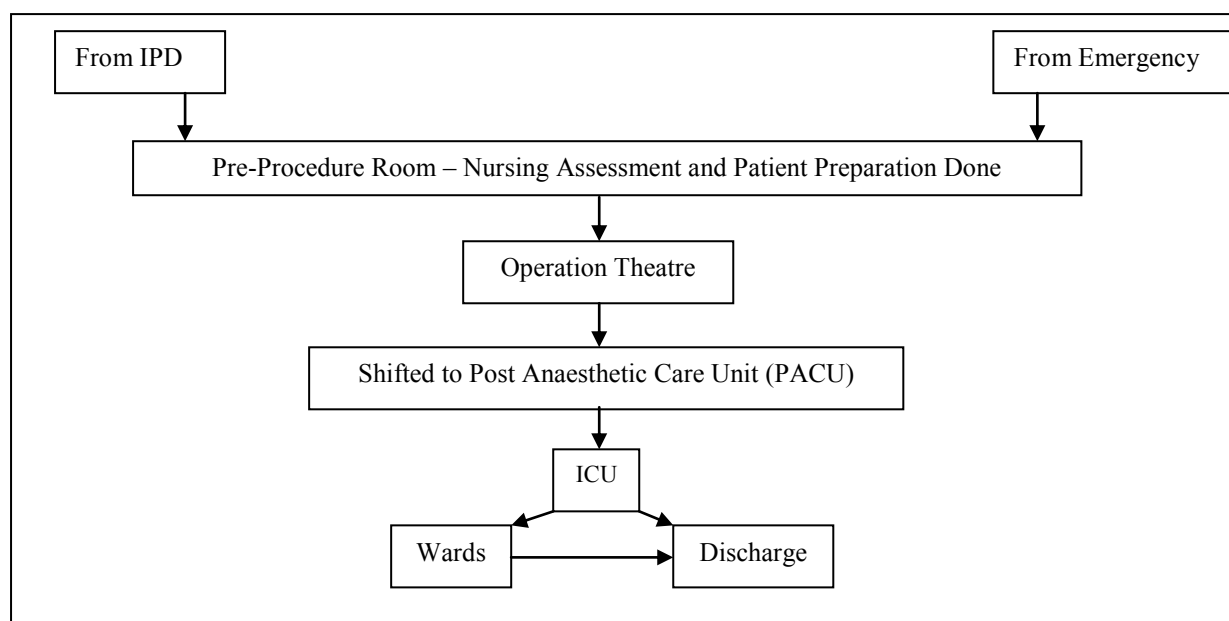
b) Operation Theatre

The OTs of Medanta the Medicity are situated on the 1st floor. There are currently 23 OTs functional. Their break up is as follows:

Sr. No	OT Number	Specialty
1.	1-7	Cardiac OTs
2.	9A, 9B	Ortho OTs
3.	10, 11	Neuro OTs
4.	12 A, 12B	Liver Transplant OTs
5.	14, 15, 16	GI and General OTs
6.	17, 18, 19	Uro OTs
7.	20, 21, 22	ENT, Head and Neck, and Plastic Surgery
8.	Upper Ground Floor OT	Mixed, but majorly for Gynae and Emergency cases

Around 70-80 surgeries are performed daily. The general flow of the patient in the OT is as follows.

Figure 3: Process Flow in OT



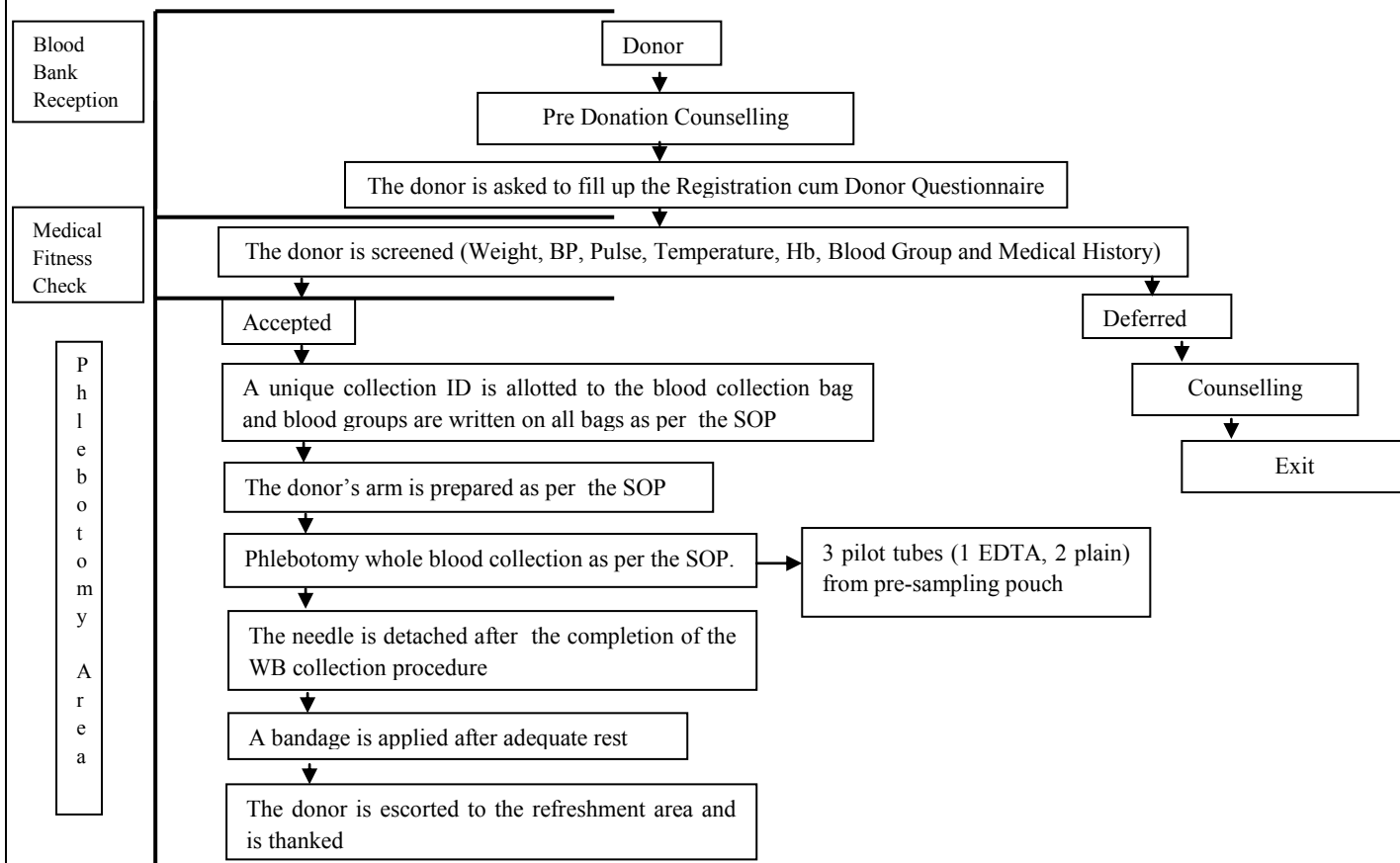
c) Blood Bank

The licensing details of the Blood Bank at Medanta the Medicity are as follows.

Sr. No	Parameter	Details
1.	License Number	67-B (H)
2.	Date	30/11/2009
3.	Validity	5 years
4.	Name of the items on License	• Whole human blood. IP • Concentrate Human RBC (Packed RBC) IP • Platelets concentrates, USP • FFP,BP • Plateletpheresis / Leukapheresis using cell separator • Cryoprecipitate
5.	Name of the competent technical staff	• Blood bank officer • Technical supervisor • Technicians • Registered Nurse
6.	Licensing authority	Haryana State Drugs Controller Under section 1940, Form 28C- Rule 122-G

The Blood Bank of Medanta the Medicity is situated on the Upper Ground floor. Medanta has a policy of asking patients to arrange for a specific amount of blood before their procedures, so that there is no possibility of a situation arising where there is a shortage of blood during a procedure. The general process flow of whole blood donation in this department has been enumerated below

Figure 4: Process Flow of Blood Donation



Instead of beds, the blood donation area had couches where patients are asked to sit and the incline of reclining can be changed as per need. Blood donation consists of WB donation and Platelet Apheresis donation. After the whole blood is collected, the blood is split into separate components, and is stored in walk-in fridges after proper labelling. The blood bags are labelled according to the following legend:

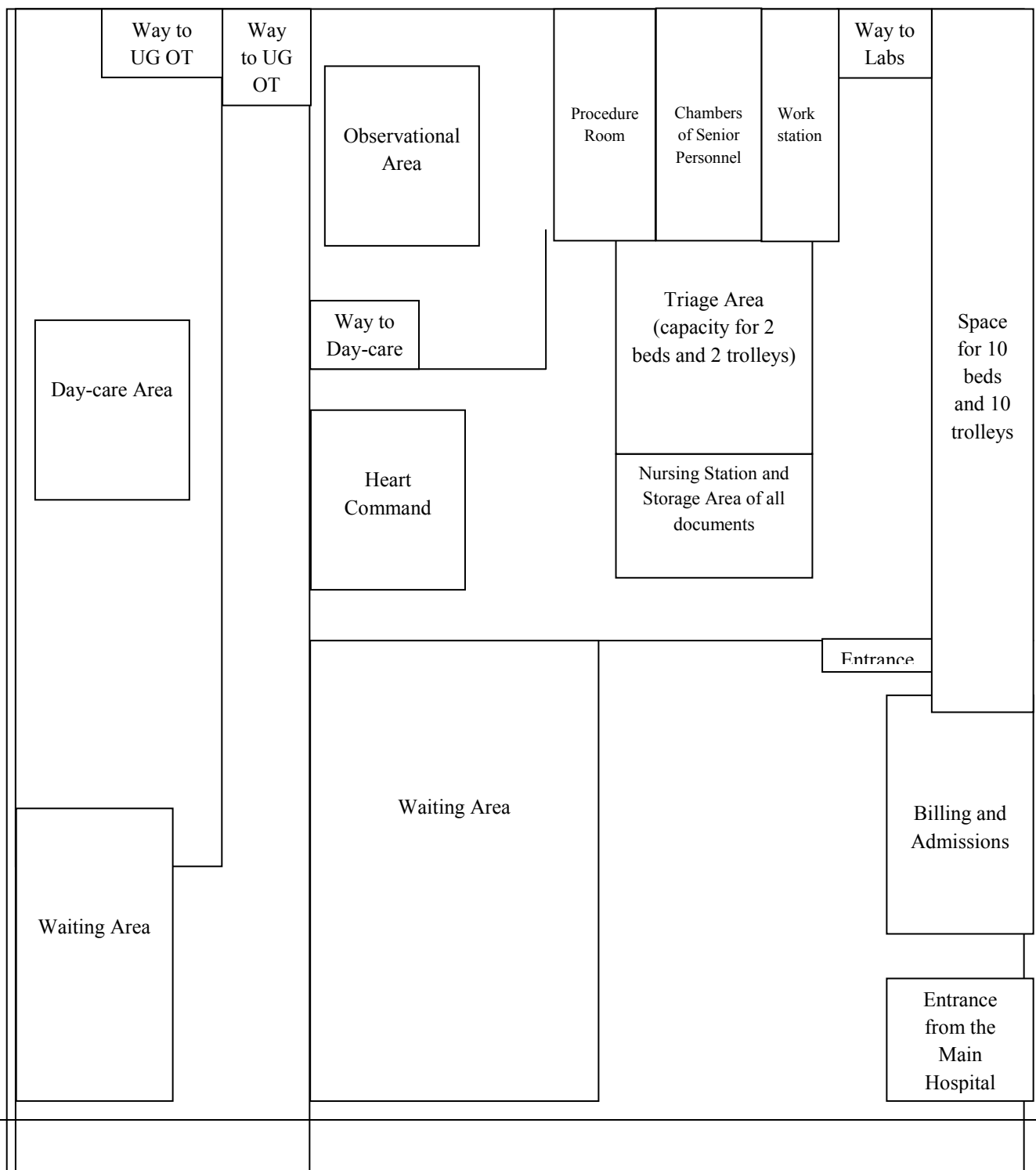
Sr. No	Blood Group	Label Colour
1.	B	Red/ Pink
2.	A	Yellow
3.	O	Blue
4.	AB	White
5.	RH +ve	Black
6.	RH –ve	White

After splitting, the individual components can be stored for differing periods of time. Whole blood can be stored for 35-42 days, platelets can be stored for 5 days in agitators at temperature of 22 degrees Celsius, Fresh Frozen Plasma can be stored for up to 1 year at a temperature below -50 degrees Celsius and RBC can be stored for 4-6 days.

d) Emergency Department

The Emergency Department of Medanta the Medicity is situated on the Upper Ground floor, and the entrance is from a route different than the main entrance to the hospital. The rough layout of the Emergency Department is shown below.

Figure5: Layout of Emergency Department

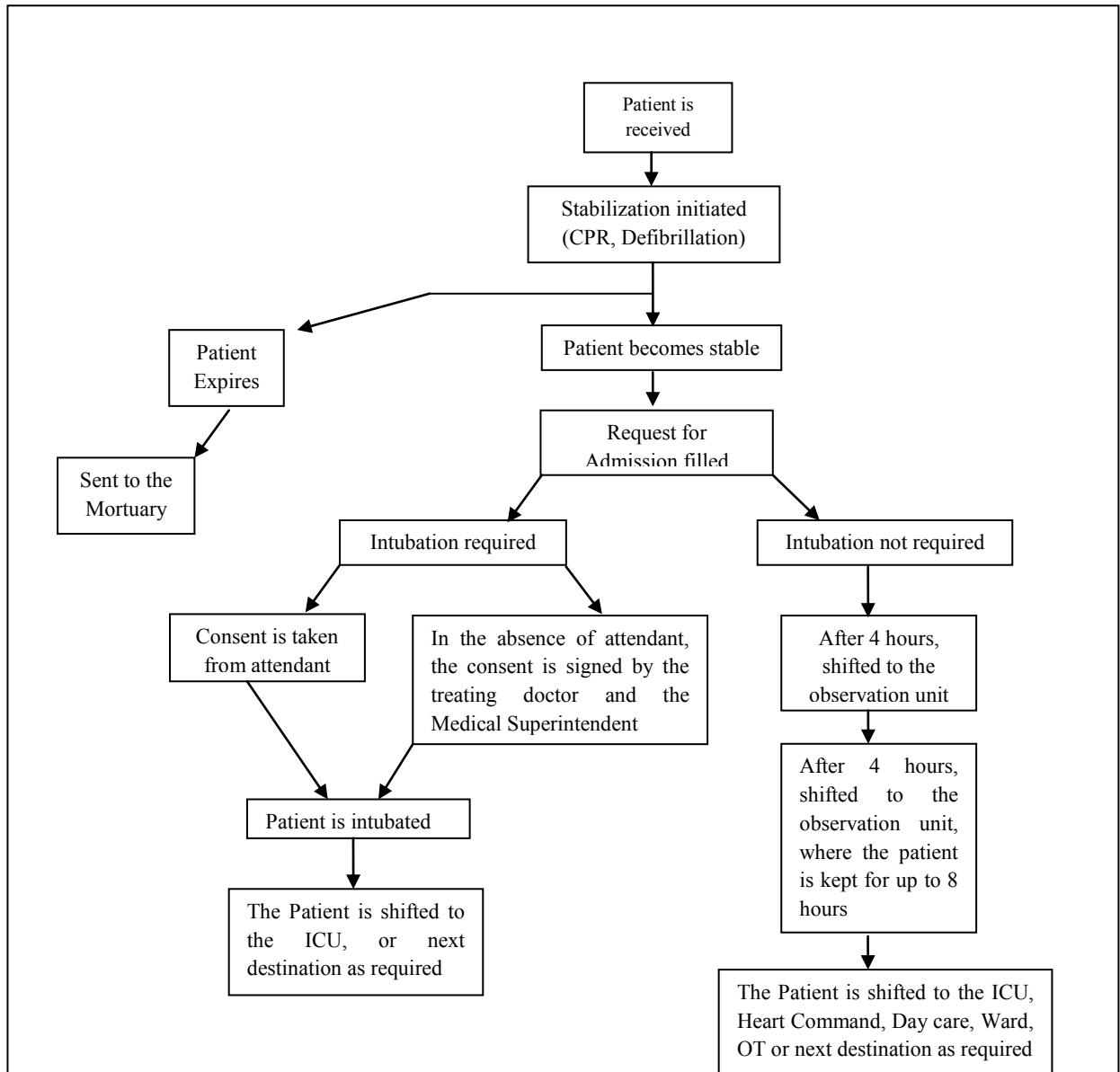


Emergency
Entrance

Emergency Entrance

The flow of information in the Emergency Department is as has been enumerated below

Figure6: Process Flow of Emergency Department



The Emergency Department at Medanta the Medicity receives about 100 cases per day. It is divided into areas as has been enumerated below.

S.No.	Area	Specifications			
		No. of cubicles	No. of beds + trolleys	Mortalities /month	Others
1	Triage	10	10+10	3-9	-
2	Observational area	08	08+08	10-12	-
3	Day care	06	06+02	NIL	Recliners

					- 04
4	Heart command	19	19+00	15-16	-
5	Procedure room	-	01+01	-	-
6	Emergency OT	-	-	Variable	OT's- 2

The patients coming in to the emergency department are triaged according to the Australasian Triage Scale. These patients are then allotted wrist bands for colour identification according to the parameters that have been enumerated below.

COLOR	INDICATION
White Band	Inpatient
Red Band	Allergy
Yellow Band	Diabetes/Kidney disease No I/V prick No measurement of BP
Blue Band	Vulnerable/ High Risk patients

The Emergency Department of Medanta the Medicity offers ambulatory services, the details of which have been enumerated below.

Sr. No	Parameters	Details
1.	Number of Ambulances	8
2.	Types of Ambulances	• Basic life support • Advanced life support • Air Ambulances
3.	Air Ambulance	• Non Scheduled passenger air ambulance • 40-50 patients are brought in by through this method every month
4.	Air Ambulance Staff	• Anesthetist • Cardiologist • Emergency medical officer • Nurse

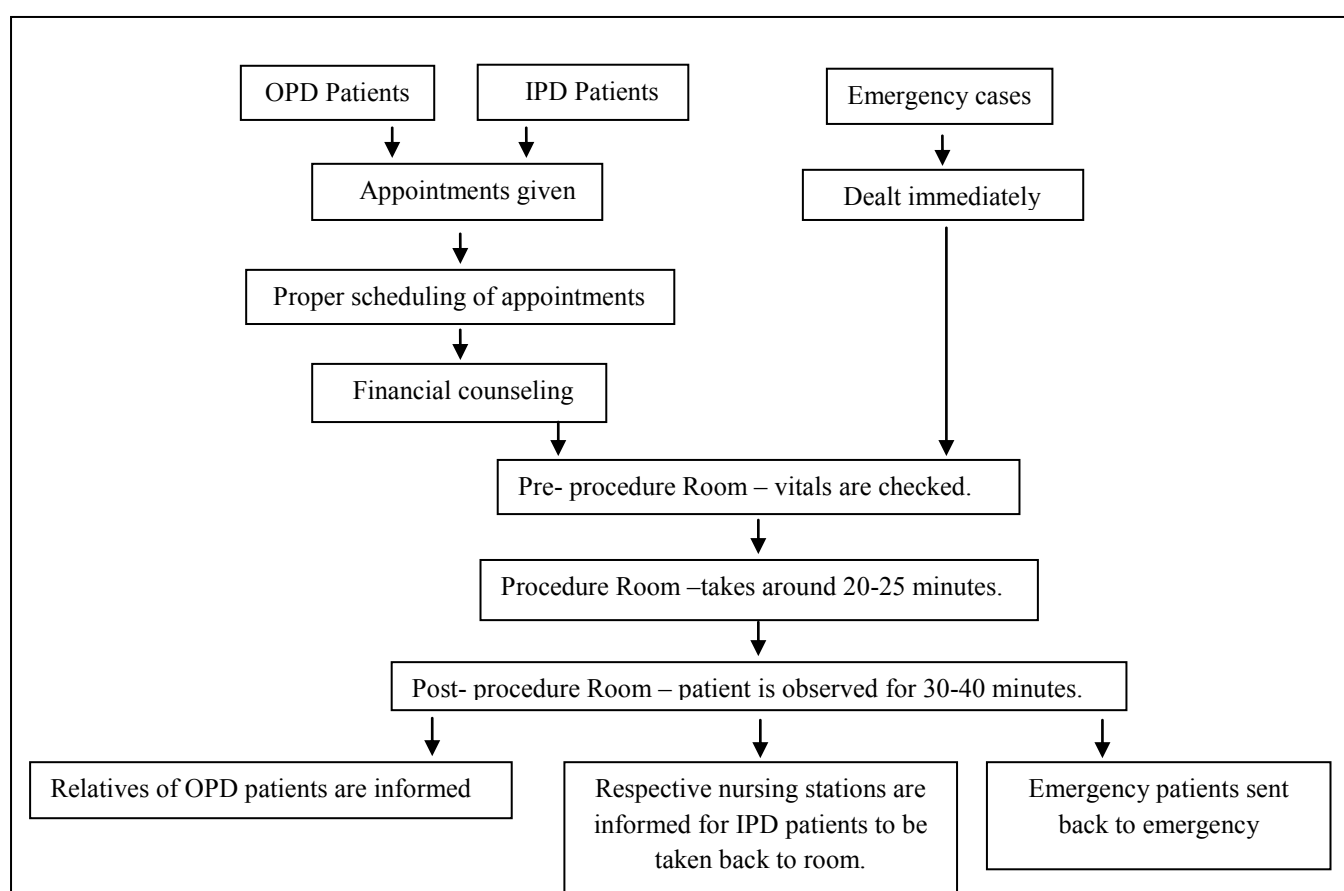
e) Endoscopy

This department is situated on the 11th floor of Medanta the Medicity. On an average, 40-50 procedures are carried out per day, the details of which are as follows:

- 20-25 are endoscopy
- 10-12 are colonoscopy,
- 5-8 are EUS
- 5-8 are ERCP's.

Total time taken for endoscopy inclusive of the patient preparation time is around 45 minutes in which the procedure time of endoscopy is actually just 5 minutes. For EUS, the procedure time is 30-40 minutes and for ERCP the procedure time is 20-30 minutes. The process flow for this department is as follows:

Figure 7: Process Flow of Endoscopy Department



f) Radiology

The Radiology department is situated on the upper ground floor of Medanta the Medicity. The general process flow of the Radiology Department is as has been enumerated below.

g) CSSD

The Central Sterile Supply Department of Medanta the Medicity is situated on the lower ground floor. It is spread over an area of 1250 sq ft and is the biggest CSSD in the Asia Pacific region. This CSSD is capable of catering to all the requirements of the hospital.

The various areas of the CSSD, along with a list of the activities that take place in each department are as have been enumerated below.

Sr. No	Area	Functions
1.	Receiving Area	All the infected instruments are received and their quantity is verified.
		They are washed under water and in ultrasonic cleaners.
		These instruments are then dried with an air gun and subsequently put in a Yorco oven for complete drying.
		All instruments are then put into a washer-disinfection machine. This machine is equipped with double doors in order to facilitate collection directly from the processing area.
2.	Processing Area	This area receives cleaned instruments and in this area, the instruments are separated by the personnel according to the checklists.
		The instruments thus separated are put into trays which are wrapped with a double layer for infection control.
		These trays are then labelled and thrillium indicators are put on these trays as a measure of the quality of sterilization.
		The sterilization method is selected according to the instruments in question. The methods of sterilization that may be used are LTSF (low temperature steam formaldehyde) or Plasma Sterilization.
3.	Sterile Area	All the sterilized instruments are collected in the sterile zone through the doors of the sterilization equipment opening in that area.
		These equipments are separated according as per the quantities received from each department and are put on separate racks.
		Low temperature and positive pressure is maintained in this area for infection control.
4.	Issue Area	Instruments are sent to the OT directly from the sterile area through a lift in the issue area to prevent any kind of cross contamination.

		All the other instruments are loaded on to covered trolleys and are then sent to the issue areas of specific departments, to be issued as and when required.
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h) Dietetics, and Food and Beverages

These offices are situated in the lower ground floor of Medanta the Medicity. These departments are tasked with managing the dietary needs of the patients coming into the hospital. This task is made all the more difficult by the fact that the hospital caters to the needs of over 1200 patients (beds) per day. The enormity of this task can be appreciated by the fact that most five star hotels are able to handle only up to 600 clients per day, and the Food and Beverages Department of this hospital has to be able to serve close to 7000 meals per day.

In order to be able to cater to the delicate yet crucial needs of all the patients coming in to the hospital, most of the Food and Beverage functions are outsourced (the company to which the functions are outsourced shall hence be referred to as the 'Partnering Company'). All heavy equipments in the kitchen are property of GHPL Pvt. Ltd, and the Partnering Company has the responsibility of bringing in only light equipment like cutting knives, etc. All such light equipment are colour coded in order to prevent cross-contamination, so, for example, the equipment used for cutting poultry (coded yellow) will not be used for cutting fish (coded blue).

With respect to ensuring quality of services, GHPL Pvt. Ltd maintains service level agreements with the Partnering Company, and both strive jointly towards maintaining the quality standards. Both GHPL Pvt. Ltd. and the Partnering Company have representatives present on each floor, and these representatives jointly keep a check on any issue that may crop up on a floor.

The Dietetics department is tasked with the specialized function of ensuring that a patient is not presented with a meal that may not be in compliance with the treatment that the patient has come to Medanta for. To be able to deliver on this front, the dietician's role includes checking the diet of all the patients periodically, going on rounds of the patients with the chairpersons, solving patient queries related to diets, planning the diets of the patients and coordinating with the kitchen in order to ensure the provision of the right quality food to the patients.

Finally, these departments also maintain a chart of the amount of food wasted per day (wasted food is discarded) and thus, a strict control is maintained on the inventory of all food items.

i) Marketing

This department is situated on the lower ground floor of Medanta the Medicity. The chief function of this department, as the name suggests, is to market the services of Medanta the Medicity.

Medanta is now at such a stage of its life cycle that it need not indulge in extensive marketing activities. Medanta the Medicity is a brand name recognized internationally, which is evident from its large international patient base. In fact, this brand is so well known that Medanta the Medicity has not even invested in large billboards (to be erected on top of the building) and does not spend too much on Out-Of-Home advertising. This hospital does have a strong presence on Facebook, and is followed on Facebook by many.

This uniqueness of the hospital lies in the services that it offers, and the quality of services offered. This is why most of the marketing that this hospital enjoys is through 'word of mouth'. The clinical team employed at Medanta the Medicity is among the finest in the Asia Pacific region, and the technology used here is among the finest in the world. All these factors have come together to make Medanta the Medicity the strong brand it is.

A majority of the activities of the marketing department comprise of CSR initiatives. Medanta the Medicity has partnered with a number of charitable organizations and conducts periodic camps in various areas. Medanta has acquired a mobile van titled 'Sanjeevan', which is used to carry out camps in distant areas. This van is equipped with all modern diagnostic facilities, and includes equipment for Mammography, X-Ray and other facilities.

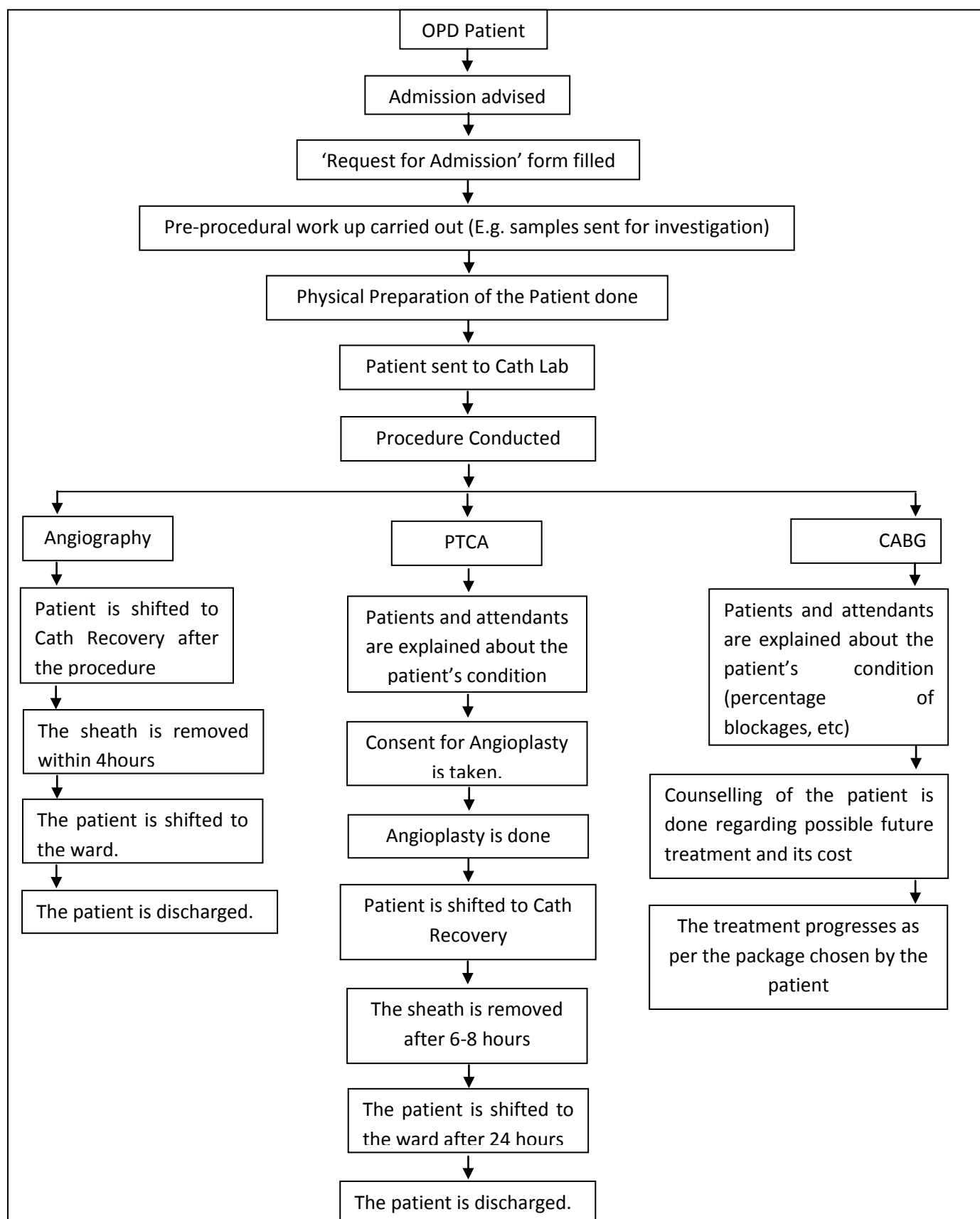
j) Engineering

The Engineering department is situated on the first basement of Medanta the Medicity. This department is responsible for catering to all the electrical needs of the entire hospital. The Engineering department is responsible for centrally providing water, electricity and air to the entire hospital. Eighty percent of the Engineering Department is outsourced, and the staff employed by Medanta the Medicity is tasked with supervising the functions of the outsourced staff and ensuring that quality work is delivered, as these requirements of water, electricity and air are crucial to any enterprise, and especially in hospitals.

The engineering department of Medanta the Medicity has employed 6 generators of 2000kva, to provide electricity back-up to the entire hospital.

k) Cath Lab: The Cardiac Cath Lab is situated on the third floor in the IPD area. There are a total of four Cath Labs and one DSA Lab. The flow of the Cath Lab takes place through the POCU, the Cath Lab and the Cath Lab recovery area as has been enumerated below.

Figure8: Process Flow



l) Radiation Oncology

This department is situated on the lower ground floor. It has an Integrated Brachytherapy Unit (IBU) for intra operative and post operative treatments for cancer related to the cervix and soft tissue sarcomas along with prostate seed implants. The procedure rooms have been made keeping in mind the AERB (Atomic energy regulatory board) standards.

Innovative techniques such as Robotic Radio Surgery with the world's first Cyberknife VSI system; Image Guided Radiotherapy (IGRT) with X-Ray Volume Imaging are some of the super-specialty treatments offered by this department of Medanta the Medicity.

m) Intensive Care Unit

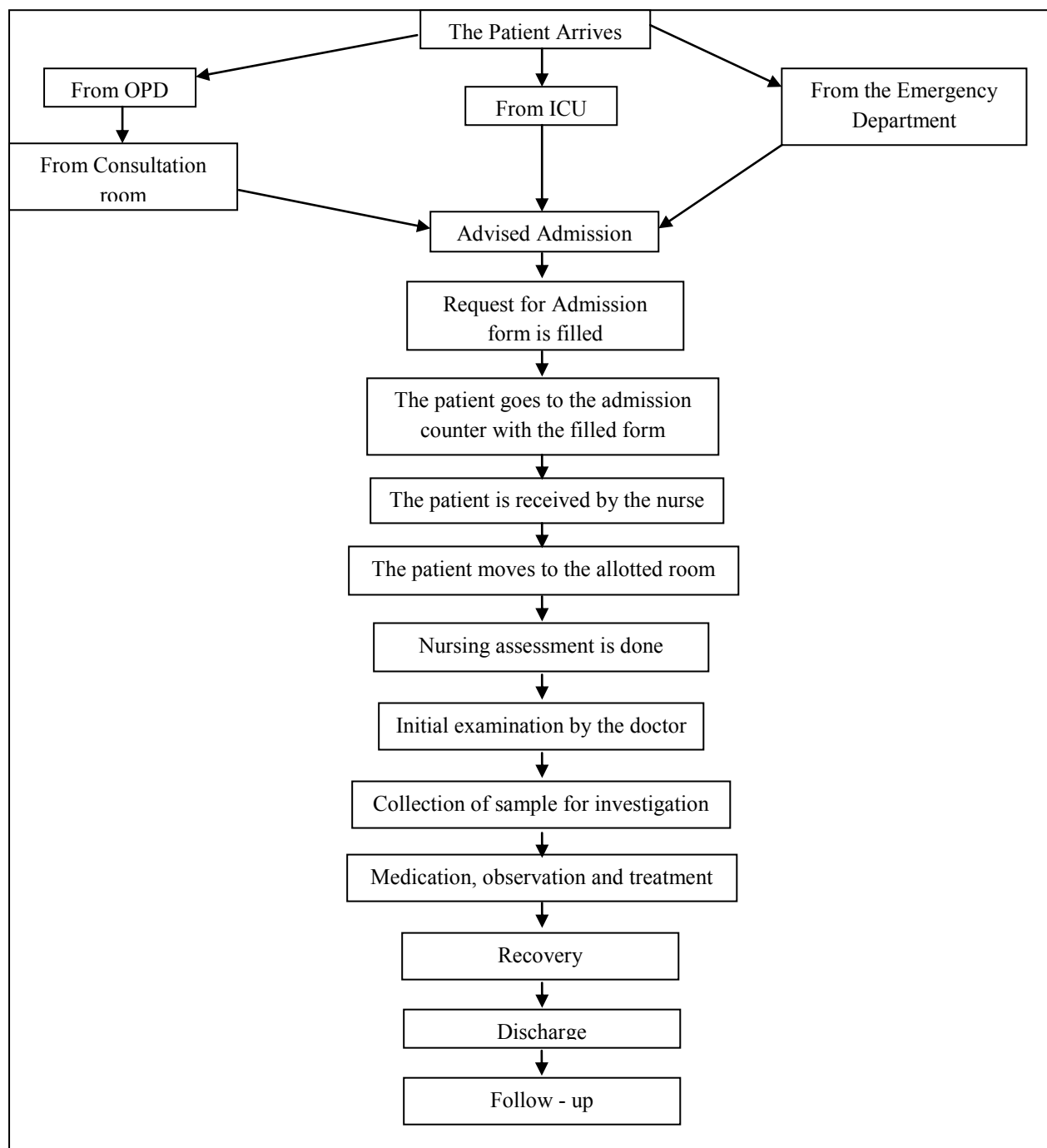
The distribution of the Intensive Care Units of Medanta the Medicity is as has been enumerated below.

ICU Number	Details
ICU 1	22 beds, (16 for Cardiac and 6 for Pediatric)
ICU 2	22 beds, (CTVS)
ICU 3	22 beds, (General 10, Neuro Surgery 10, Dialysis 2)
ICU 4	22 beds, (liver Transplant 8, Gastro + GI 14)
ICU 5	24 beds, (Medical ICU 18, General Paediatrics 6)
Ortho ICU	12 beds
HCC	18 beds
ICCU	22 beds, (CTVS 12, Cardiac 4, Kidney Transplant 6)
Pre and Post Cath Lab	26
HDU	10th floor (10 beds)
	Total Beds = 200 beds

n) In-Patient Department

Each clinical institute of Medanta the Medicity has its own In-Patient Department. Thus, there is an In-Patient Department in each floor of Medanta the Medicity. The general process flow is as has been enumerated below.

Figure 9: Process Flow of IPD



o) Medical Records Department

The Medical Records Department of Medanta the Medicity is situated on the lower ground floor of the hospital. This department is tasked with storing all the physical medical records generated in the hospital. Once a medical record is received by the department, a unique reference number is generated through Microsoft Excel, and the medical record is stored according to this number. MLC records are stored in a yellow file, and the records of expired patients are stored in a red file.

The Medical Records Department maintains the records of each patient file it receives for a period of 5 years. During this period, if a certain file is requested for reference/research purposes by any department of the hospital, the clock of storage is restarted. Apart from these functions, the personnel of the Medical Records Department may also be required to attend to calls from the courts of law, with the files of any patient as and when required.

p) In-Patient Pharmacy

The In-Patient Pharmacy of Medanta the Medicity is situated on the lower ground floor. This department is tasked with handling the responsibility of helping ensure that the correct medication is available with the IPDs of all clinical departments at all times. The medicines procured by the In-Patient Pharmacy are decided by the Pharmacy and Therapeutic Committee of this hospital.

The IPDs of all departments use a system of indenting to procure medication. These indents are sent to the In-Patient Pharmacy as and when required by the IPD. The indents are then ranked according to urgency by the dispensing pharmacist and these medicines are taken out from the stores and the change in quantity of the inventory these medicines is recorded by the pharmacist.

There are 4 types of licenses maintained by this department, obtained from the Excise Office, Gurgaon, with regard to the retail and wholesale of the following:

- Narcotics
- Denatured Spirit
- Morphine
- Fenetanyl (2ml and 10ml)

The In-Patient Pharmacy department maintains 16 days worth inventory of medicines with it for emergencies, and ensures that medicines are returned to vendors 3 months prior to their expiry.

q) Dialysis

The Dialysis unit is situated on the 12th floor. There are 12 dialysis machines and the number of cases done per day is around 55 cases (45 OPD + 10 IPD)

r) Housekeeping

This office of this department is situated on the lower ground floor of Medanta the Medicity, and is tasked with managing the sanitation needs of the patients coming into the hospital. This task is made all the more difficult by the fact that the hospital caters to the needs of over 1200 patients (beds) per day. The enormity of this task can be appreciated by the fact that most five star hotels are able to handle only up to 600 clients per day.

In order to be able to cater to the delicate yet crucial needs of all the patients coming in to the hospital, most of the Housekeeping functions are outsourced (the company to which the functions are outsourced shall hence be referred to as the 'Partnering Company'). All the cleaning material is the property of GHPL Pvt. Ltd. The Stores of Medanta the Medicity issue cleaning material to the personnel on the different floors as per levels decided through an exercise that was conducted, to ensure that such material is not wasted. Any extra requirement requires permission and explanation. This exercise had been conducted to determine the room-wise and floor-wise requirement of cleaning inventory.

With respect to ensuring quality of services, GHPL Pvt. Ltd maintains service level agreements with the Partnering Company, and both strive jointly towards maintaining the quality standards. Both GHPL Pvt. Ltd. and the Partnering Company have representatives present on each floor, and these representatives jointly keep a check on any issue that may crop up on a floor.

s) Medical Gases

This department is situated on the first basement of Medanta the Medicity. This department's chief responsibility is to ensure the timely provision of all the medical gases wherever they may be required. This department is responsible for the inventory control of the following gases:

- Oxygen
- Carbon Dioxide
- Nitrous Oxide
- Vacuum (for suction purposes)
- Medical Air

This department is also responsible for maintaining inventories of the cylinders that may be used during patient transport. The colour coding of these cylinders is as has been enumerated below.

Sr. No	Item	Colour Code Used
1.	Oxygen	White
2.	Nitrous Oxide	Blue
3.	Vacuum	Yellow
4.	Medical Air	Black
5.	Carbon Dioxide	Grey

The cylinders have a black body, but the top of the cylinder of the cylinder is painted according to the above legend. The pipes used for transporting these gases within the hospital also follow the above colour coding.

3. Specific Project Learning

These projects were assigned to me by Mr. Akhil Gawar, Senior Manager, Operations, Medanta as a part of the Pathology and laboratory medicine department's requirements focussing on improvement in quality of laboratory.

PROJECT 1: A Study to improve turnaround time of urgent laboratory samples

The scope of the project was as follows:

- All laboratory investigations ordered as “urgent” from inpatient areas of the hospital including daycares
- Not included
 - Outpatient samples
 - Mediclinic samples
 - Cybercity samples
 - Point of care testing

3. I.A Introduction

Accuracy, precision, timeliness, and authenticity are the four pillars of efficient laboratory services. Sometimes timeliness is overlooked by pathologist as an important attribute and instead attention is laid only on improving the analytical intricacies of sample processing.

However, timeliness expressed as the turnaround time (TAT) is often used by the clinicians as the benchmark for laboratory performance. Inspection of the literature reveals a variety of different approaches to definition of TAT. TAT can be classified by test (e.g. potassium), priority (e.g. urgent or routine), population served (e.g. inpatient, outpatient, ED) and the activities included. This last area is the greatest source of variation in reporting of TAT. The total TAT for laboratory assays includes the entire interval from ordering of the test to the clinician's awareness of the result (i.e. “brain-to-brain”).[1] The steps in performing a laboratory test were outlined by Lundberg, who described the brain to brain TAT or “total testing cycle” as a series of nine steps: ordering, collection, identification, transportation, preparation, analysis, reporting, interpretation and action. [2]

Depending on the priority, tests can be ordered as urgent and routine wherein urgent results must follow a turnaround time of one hour and routine should follow 5.5 hours.[3] Urgent tests are ordered for obtaining timely reports of critically ill and unstable patients but failure to meet urgent expectations can lead to a delay in their diagnosis and treatment thereby increasing the average length of stay. This has a direct impact on patient satisfaction and revenues of the hospital. In a Q-probes survey from the College of American Pathologists on Emergency Department (ED) TAT, laboratory TAT was felt to cause delayed treatment and increased length of stay in the ED more than half of the time. [4] The statement "Justice delayed, Justice denied" can be rephrased in clinical setting as "Report Delayed, Treatment denied".

The graph in annex 2 clearly illustrates that the median TAT for urgent laboratory tests in Medanta has been fluctuating between 3 and 3.5 hours between March 2013 to March 2014. This is quite high as compared to the College of American Pathologist (CAP) benchmark of 1.5 hours. Despite advances in analytical technology, transport systems and computerization, the laboratory is still having difficulties in improving its TAT for urgent samples. Hence this study aims to find out the reasons for the delay and provide solutions to the same to achieve the CAP benchmark of 1.5 hours median TAT.

3.I.B: Objectives:

GENERAL:

To reduce the present median turnaround time of 3 hours to CAP benchmark of 1.5 hours for urgent laboratory tests

SPECIFIC:

- To study the process flow of clinical laboratory department
- To identify the major delay causing areas in all phases of sample processing
- To identify the reasons for delay in those areas
- To suggest solutions to overcome the delays

3.I.C. Approach

1. Identify the most ordered urgent tests : Refer annex 3, 4, 5

- Hematology and biochemistry tests constitute 90% of urgent tests ordered
- Among hematology CBC+Diff is the most ordered test
- Among biochemistry RFT and LFT are the most ordered test

2. Identify the floors ordering maximum no. of urgent tests: Refer annex 6

Emergency and trauma services; Pre- cath floor (W-10th floor) are the areas with maximum number of urgent tests being ordered.

3. Observational study in identified areas

3. I.D. Methodology (Data Collection)

- **Type of study:** Descriptive quantitative and qualitative cross -sectional study
- **Sample population:** Urgent biochemistry and hematology tests
- **Sample area :** Emergency department and Pre-cath area
- **Sample size :** 130 samples 65 in each department
- **Type of sampling:** Purposive sampling
- **Data collection method :** Observational

3. I.E Data Analysis and Compilation

- i. Out of the data collected, the median time taken for each step of the turnaround time was calculated utilizing MS excel
- ii. On the basis of above data the most time consuming areas were identified and assessed to find out the reasons for delay.
- iii. The reasons identified were discussed with experts in the laboratory quality meeting to work out the possible solutions.

3. I.F Findings

i. Process flow in testing of sample in laboratory

The process is divided into three parts:

1. Pre analytical
2. Analytical
3. Post analytical

Refer to annexe 7 for detailed process map

ii. Median time taken at various steps of urgent sample processing

The median time for all the samples was found to be 210 min. ~ 3.5 hour

Refer annex 8 for the breakup of all the steps of the process

iii. Identified delay areas

The following areas of delay were found out on analysis:

- Dispatch of sample (Outside Lab)
- Receiving window (In lab)
- First validation point(In lab)
- Second validation point (In lab)

iv. Reasons for delay

I. DISPATCH OF SAMPLE

- Vacutainer were kept by nurses with them after sample collection
- GDA availability was the major cause of delay in dispatch (Return after average **10 min.** from lab & blood bank and **20 min.** from elsewhere for emergency, **20-30 min** for IPDs)

II. RECEIVING WINDOW & FIRST VALIDATION

- Delay in picking up of samples from pneumatic chute
- No separate sorting of urgent samples from routine on arrival
- Urgent samples were centrifuged in batch with routine samples
- No priority given to urgent samples during In-lab transportation
- Batching of urgent samples with routine samples during analysis

III. SECOND LEVEL VALIDATION

Urgent test results pending for doctor's review are displayed later in series than routine results

3. I.G. Recommendations / Interventions

Issues identified	Solutions Suggested/Implemented
1.Lack of designated place for samples pending dispatch	Setting up of sample dispatch station and allocating responsibility of dispatch to HIS/ Medicine in charge nurse or brother who has duty at nursing station (Refer annex 9)
2.Lack of visual cues on urgent sample vacutainers (Refer annex 10)	1. Training session with preceptors, head nurses & above to encourage utilization of urgent stickers and find reason for non-utilization 2. Survey conducted on all the floors to check the quality of stickers, meeting with supply chain department to procure better quality stickers (Refer annex 11)
3.Low utilization of pneumatic chute	1. Training session with preceptors, head nurses & above to encourage utilization of pneumatic chute and find reason for non-utilization 2. Issue related to pneumatic chute discussed with biomedical department 3. Return slip designed to be put into the pneumatic chute capsule and signed by the person receiving the sample in lab and returned to the source of capsule as confirmation of receipt of sample. 4. (Refer annex 12)

4. Preview of urgent results at 2 nd validation	Matter discussed with IT team for necessary alterations
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3.1.H Limitations

- Hawthorne effect can alter the results
- Selection bias due to purposive sampling
- Limited time for study
- Samples processed in later time of the day may take longer due to fatigue of staff
- Malfunctioning of machines for processing can lengthen process

PROJECT 2: A study to streamline the list of urgent priority tests

3. II.A Introduction

Clinicians desire a rapid, reliable and efficient service delivered at low cost. Of these characteristics, timeliness is perhaps the most important to the clinician as it helps them decide further course of treatment in less time. This in turn also has an impact on patient satisfaction and ALOS. This timeliness is measured in TAT is one of the most noticeable signs of a laboratory service and is used by many clinicians to judge the quality of the laboratory.

Clinical laboratories generally offer at least 2 turnaround priority levels—routine and urgent. Urgent tests have a TAT of 1 hour and routine 5.5 hours. Urgent samples are ordered by operating physician /surgeon .A sample is considered Urgent if:

- The doctor prescribes the same (documented in patient file)
- During an ongoing surgery
- Patients who are critical
- Patients from emergency department
- Patient undergoing radiation therapy
- To assess level of a critical drug like Tacrolimus

Failure to meet urgent expectations is a frequent source of dissatisfaction for both physician and nursing users of laboratory services.

In order to obtain faster results of the tests ordered, at times physicians may over prescribe urgent priority tests. These increased urgent testing rates may increase costs relative to routine central laboratory testing. The overuse of urgent testing may also create a situation in which the urgent test request is no longer handled in a significantly different fashion from a routine test. This leads to the loss of priority of urgent tests and impacts the TAT of urgent tests as they may no longer be any different from routine tests. Furthermore the patients actually in need of urgent priority testing are deprived of its benefits.

The graph in annex 2 illustrates the progressive increase in the number of urgent tests ordered in Medanta over a period of one year i.e. from March 2013 to March 2014 .There has been an increase by 68 percent over this period which is quite alarming as the urgent tests constitute almost 15 percent of total test ordered (Refer annex 13).

3.II.B Objectives

- To streamline and compile a list of urgent test
- To recommend solutions to limit excessive ordering of urgent samples

3. II.C. Methodology (Data Collection)

- Sample size : 50 doctors from various specialties of various ranks
- Sampling method : Purposive
- Survey area : Top 10 specialties areas
 - Cardiology
 - Internal Medicine
 - Gynecology
 - Oncology
 - Orthopedics
 - Hepatobiliary
 - Intensive care
 - Gastrology
 - Nephrology & urology
 - Emergency and Trauma services
- Tool : Urgent test checklist prepared from directory of services (Refer annex 14)
- Method: Personal interview

3. II.D Data Analysis, Compilation and Interpretation

- i. Compilation and summarization of most ordered test in each specialties using MS excel
- ii. Review of international literature :
 - CAP checklist
 - San Francisco general hospital lab manual
 - Calgary lab services lab manual
 - Fremont Rideout Health Group Laboratory Services lab manual
- iii. Discussion with clinical pathology quality team and final review by Director of labs

3. II.E Findings

- Refer annex 14 for compiled list
- There were no test in histo cyto pathology which was considered for urgent testing by the laboratory quality team
- There were 14 tests which were not considered clinically urgent by doctors as well by international reference but were ordered as urgent in hospital
- 25 percent of tests which did not satisfy the laboratory criteria of urgent testing were being ordered (Refer annex 15)

3. II.F Recommendations

- A list of tests which can be ordered as urgent along with the TAT should be made available to the doctors
- The tests which have In lab TAT of 2 hrs. or less should be restricted for ordering in HIS on urgent priority

4. References

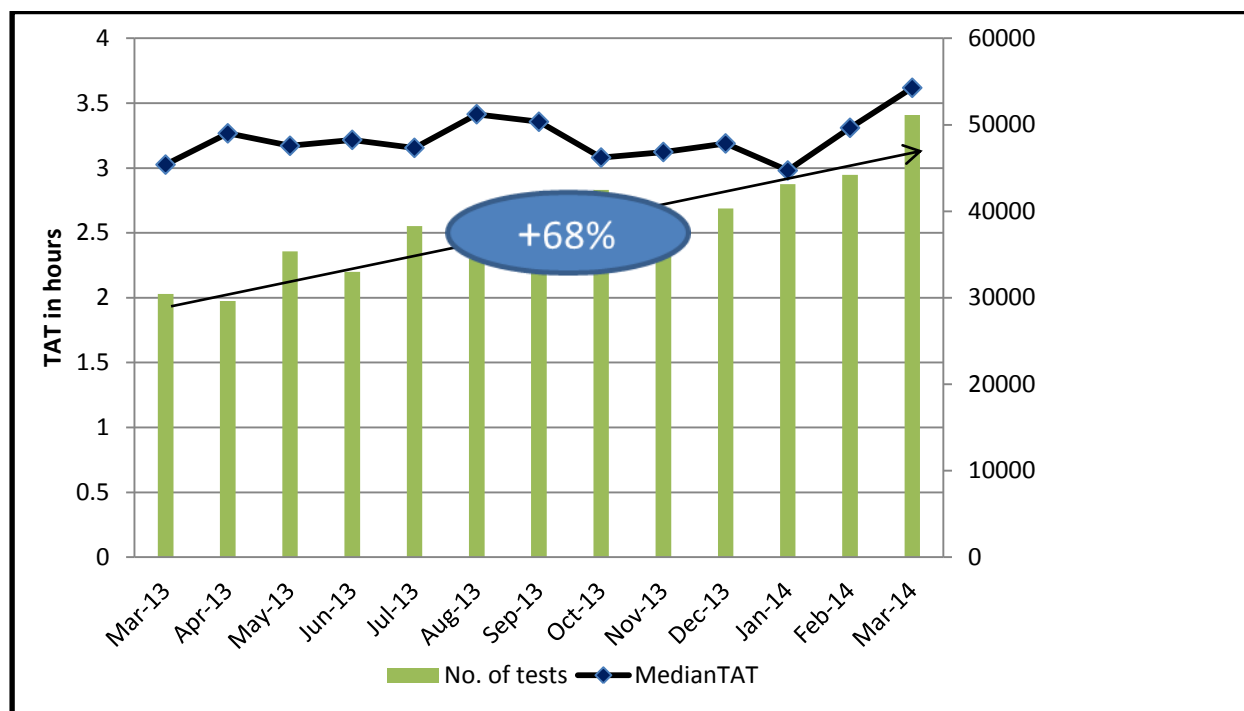
1. Stotler BA ,Kratz A., Determination of Turnaround Time in the Clinical Laboratory“Accessioning-to-Result” Time Does Not Always Accurately Reflect Laboratory Performance , Am J Clin Pathol., 2012;138:724-729
2. Kilgore ML, Steindel SJ and Smith JA Evaluating stat testing options in an academic health center: therapeutic turnaround time and staff satisfaction, Clinical Chemistry,44:8 ,1597–1603 (1998)
3. Goswami B.,Singh B. ,Chawla R., Gupta V. K., and Mallika V., Turn Around Time (TAT) as a Benchmark of Laboratory Performance , Indian J Clin Biochem, Oct 2010; 25(4): 376–379
4. Steindel S, Howanitz P. Physician satisfaction and emergency department laboratory test turnaround time, Arch Pathol Lab Med ,2001;125:863–71
5. Volmar KE , Wilkinson DS , Wagar EA, Lehman CA . Utilization of Stat Test Priority in the Clinical Laboratory, Arch Pathology Lab Med—Vol 137, February 2013
6. Lundberg GD., Acting on significant laboratory results, JAMA, 1981 May 1; 245(17):1762-3.
7. Hawkins R C , Laboratory Turnaround Time, Clin Biochem Rev, Nov 2007; 28(4): 179–194.
8. Howanitz JH, Howanitz PJ. Laboratory results. Timeliness as a quality attribute and strategy. Am J Clin Pathol,2001;116:311–5.
9. Thomas J. and Lanoue C., Education in turnaround time for stat specimen within a regional health system clinical laboratory, Workstation Design Project , North Dakota State University
10. Holland, L. L., Smith, L. L., & Blick, K. E., Reducing laboratory turnaround time outliers can reduce emergency patient length of stay, American Society for Clinical Pathology, 2005, 124, 672-674.

5. Annexe

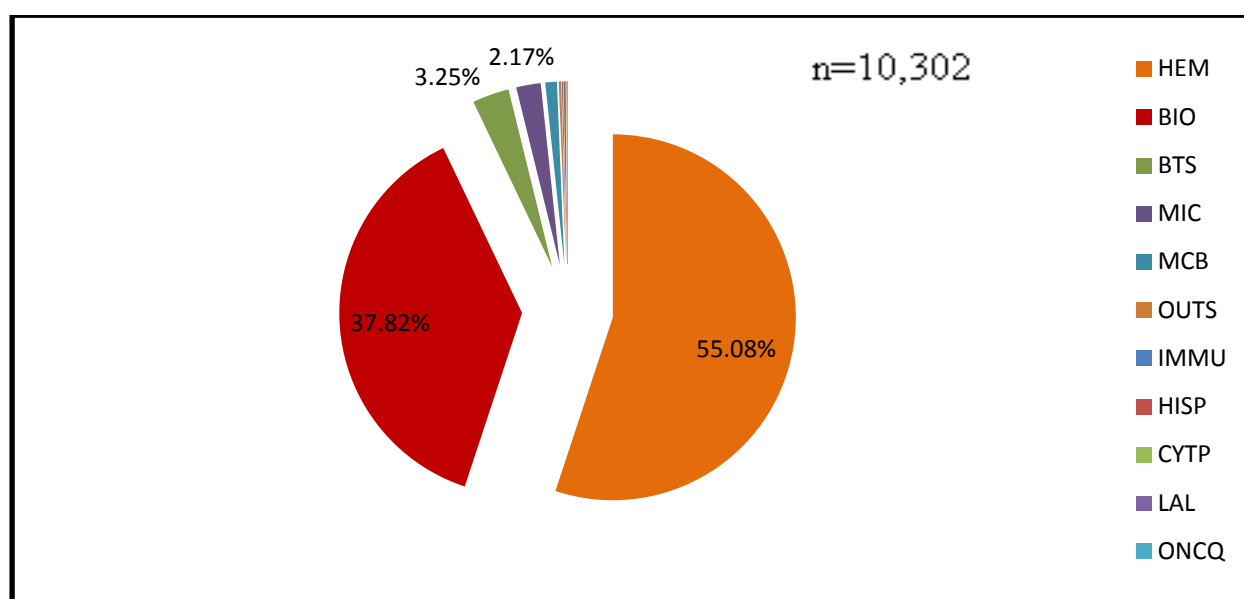
Annex 1 – Schedule of our Rotation

Name of the Department / Area	Date(s) of visit	People Met
OPD	1 st April 2014	Manager - Medical Administration
Blood Bank	2 nd April 2014	Senior Technologist
Emergency	2 nd April 2014	Assistant manager Medical Administration
Radiology	2 nd April 2014	Assistant Manager – Operations
CSSD	30 th May 2014	Executive
Dietetics Food & Beverages	30 th May 2014	Senior Manager General Manager
Marketing	30 th May 2014	Associate Vice President
Engineering	30 st May 2014	Associate Vice President – Engineering Services
Cath Lab	3 rd April 2014	Assistant Manager– Medical Administration
ICU	3 rd April 2014	Assistant Manager - Medical Administration
IPD	4 th April 2014	Assistant Manager - Medical Administration
Clinical Lab	4 th April 2014	Operations Manager

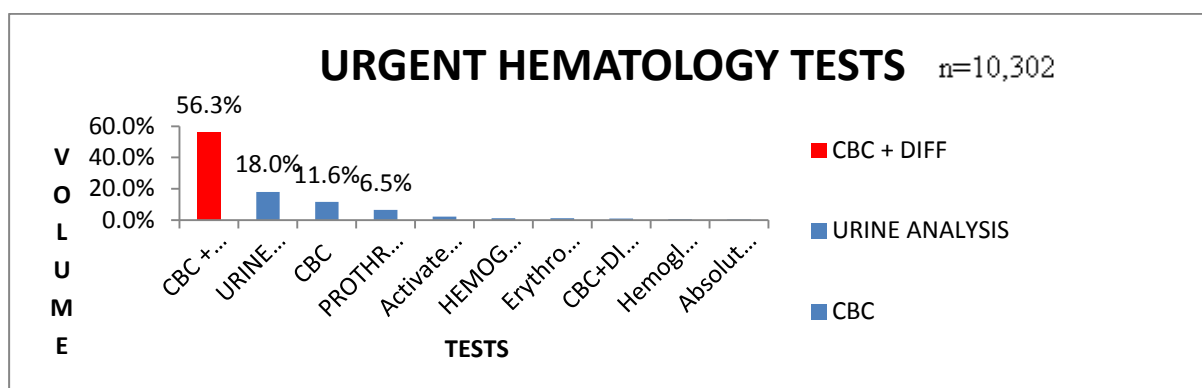
Annexe 2 – Trend for median Turnaround time for urgent lab tests in Medanta



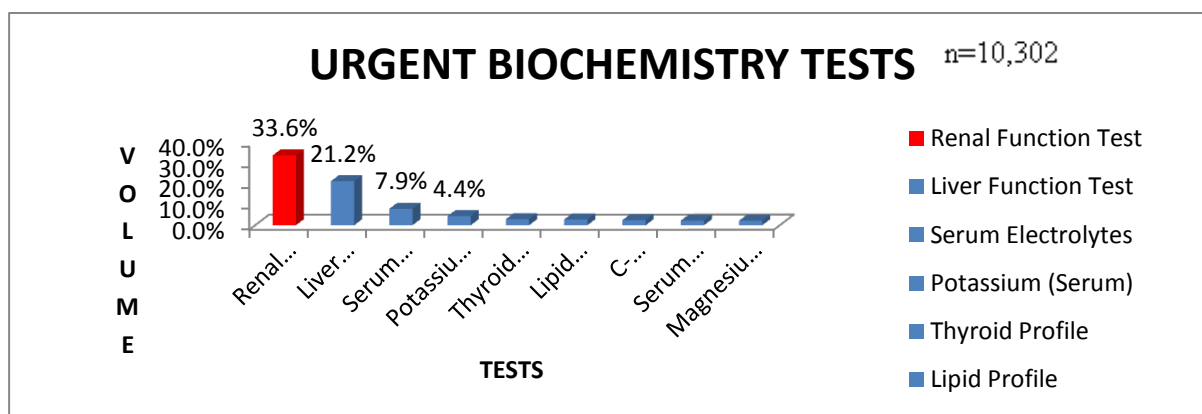
Annex 3 – Distribution of urgent tests on the basis of pathology departments



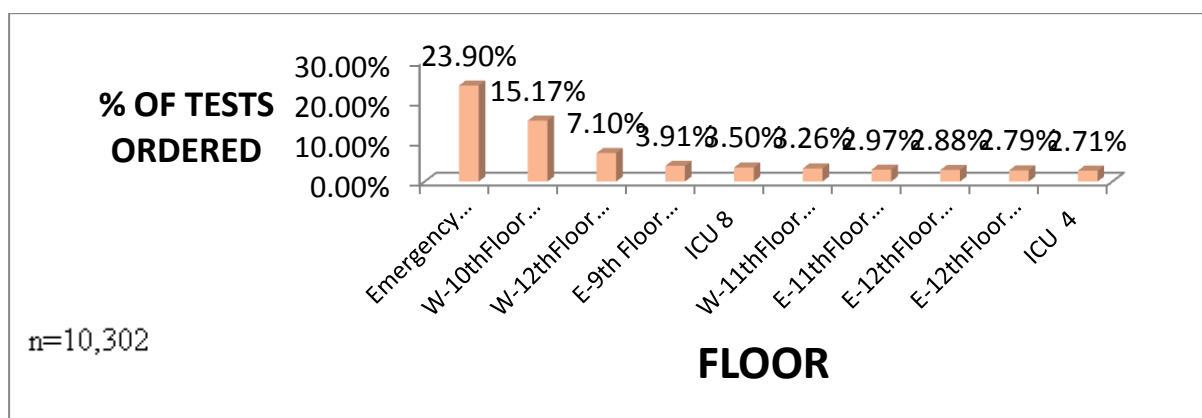
Annex 4 – Distribution of urgent haematology tests



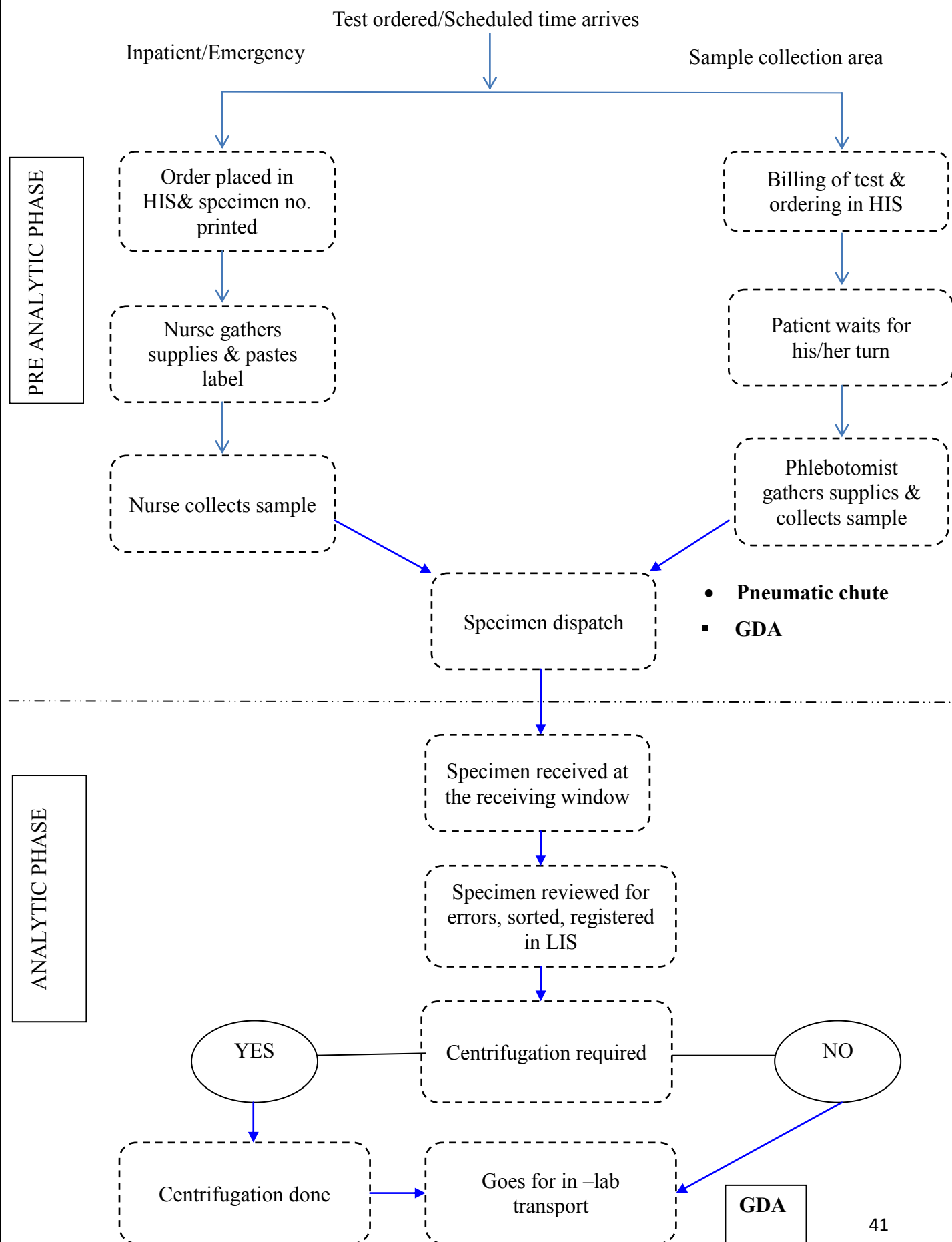
Annex 5- Distribution of urgent biochemistry tests



Annex 6- Distribution of urgent tests on the basis of site of order



Annex 7- Process flow of laboratory tests



HEMATOLOGY

Scanning of barcode for verification

Placing in machine for analysis

BIOCHEMISTRY

De-capping of vacutainer & placement in circular tray

Scanning of barcode for verification

Placing in machine for analysis

Analysis in machine

Retrieval of tray & first level release of result

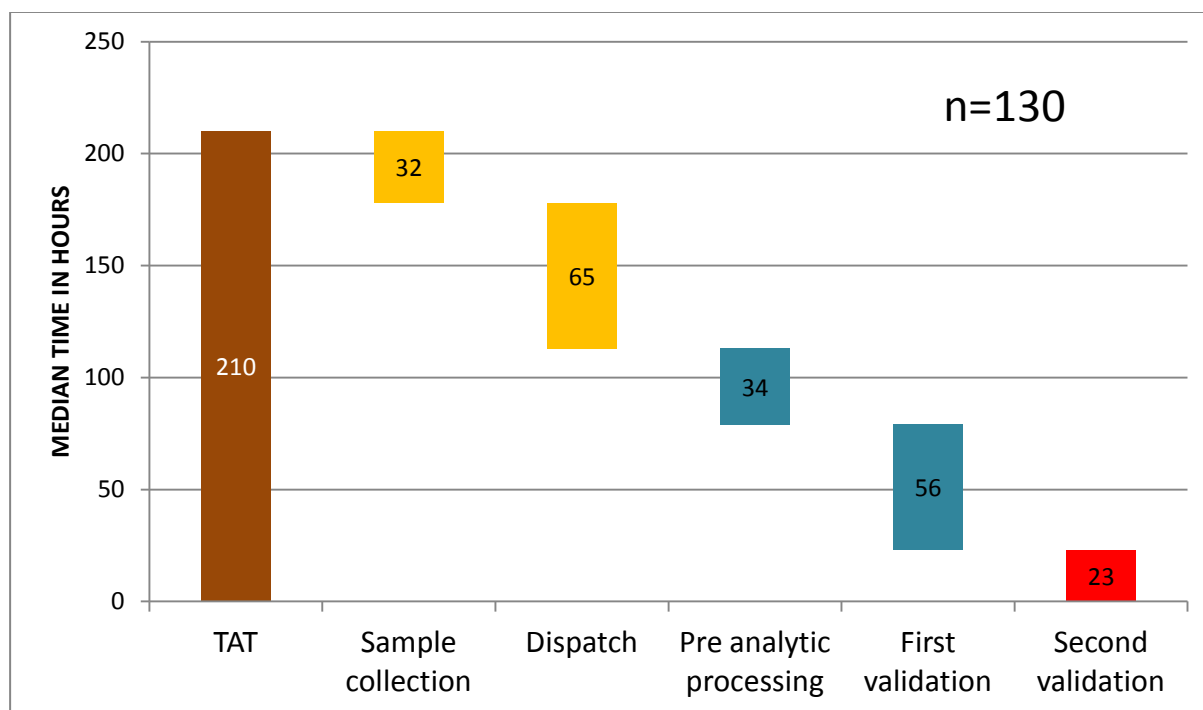
Review of result by doctor

Second level release of result

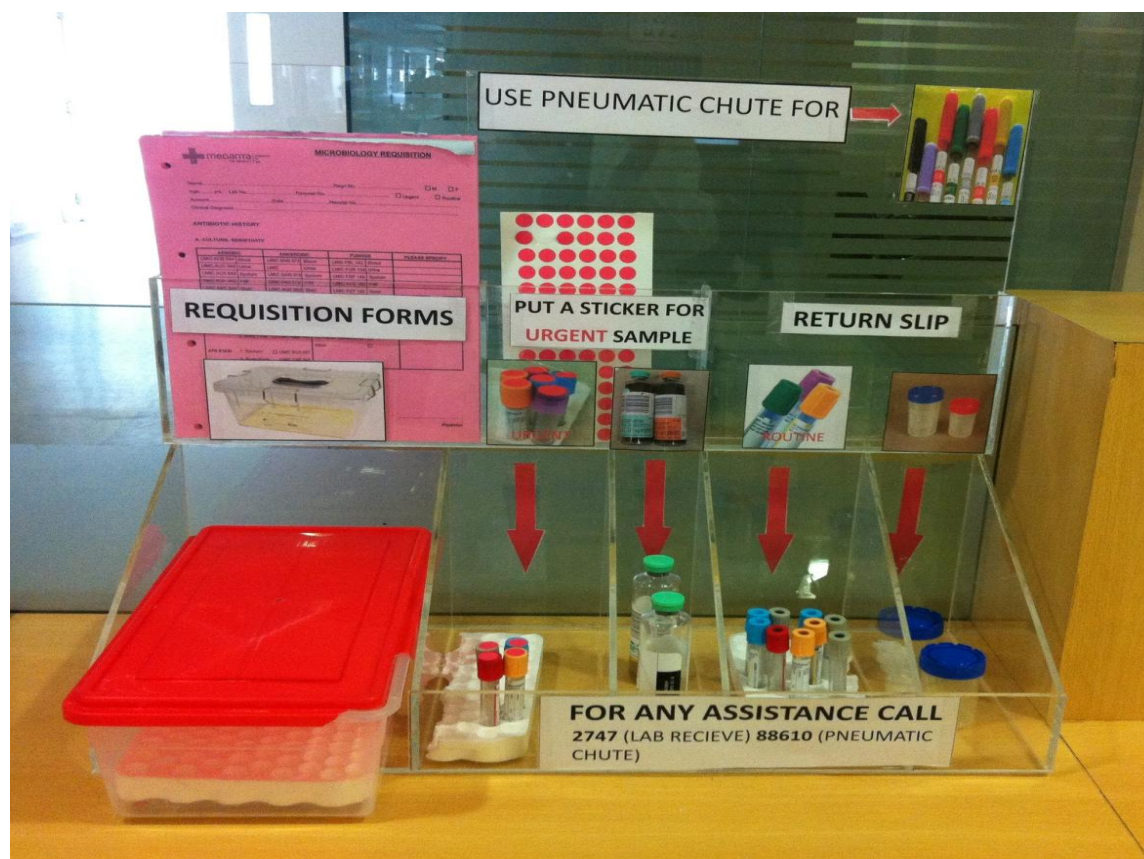
Result available on HIS

POST ANALYTIC PHASE

Annex 8 - Break up of median time taken at various steps



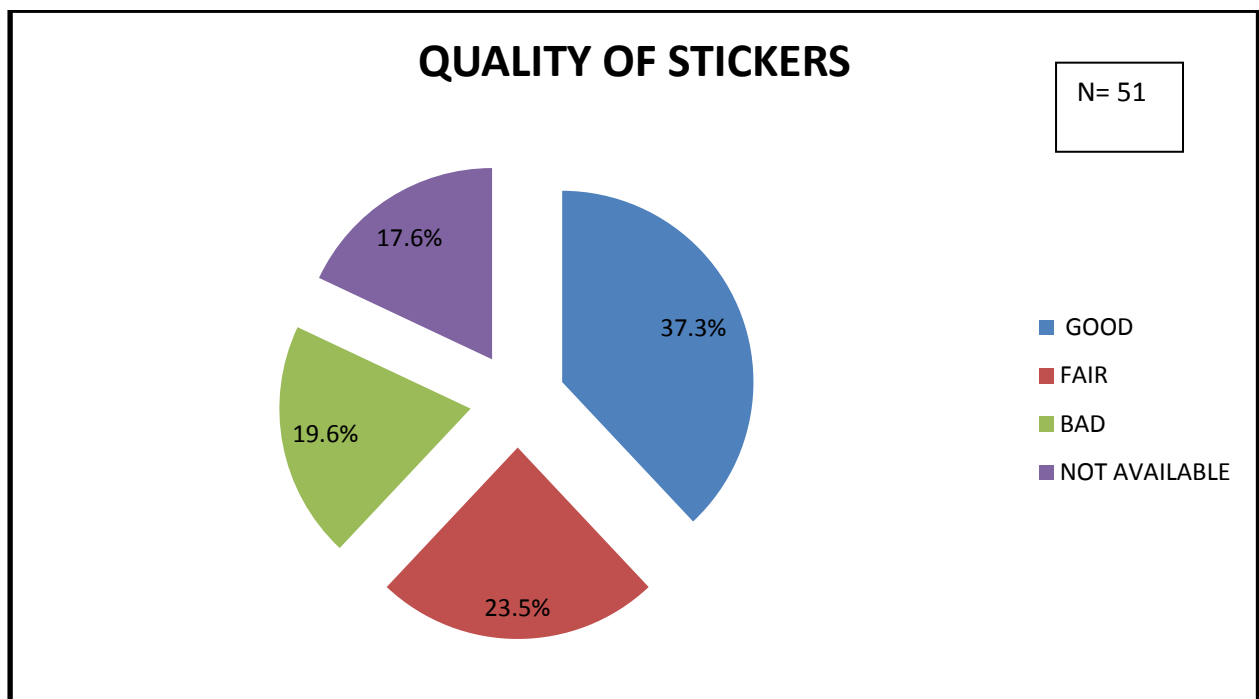
Annex 9 – Sample dispatch station



Annex 10 – Visual cue on urgent test vacutainer



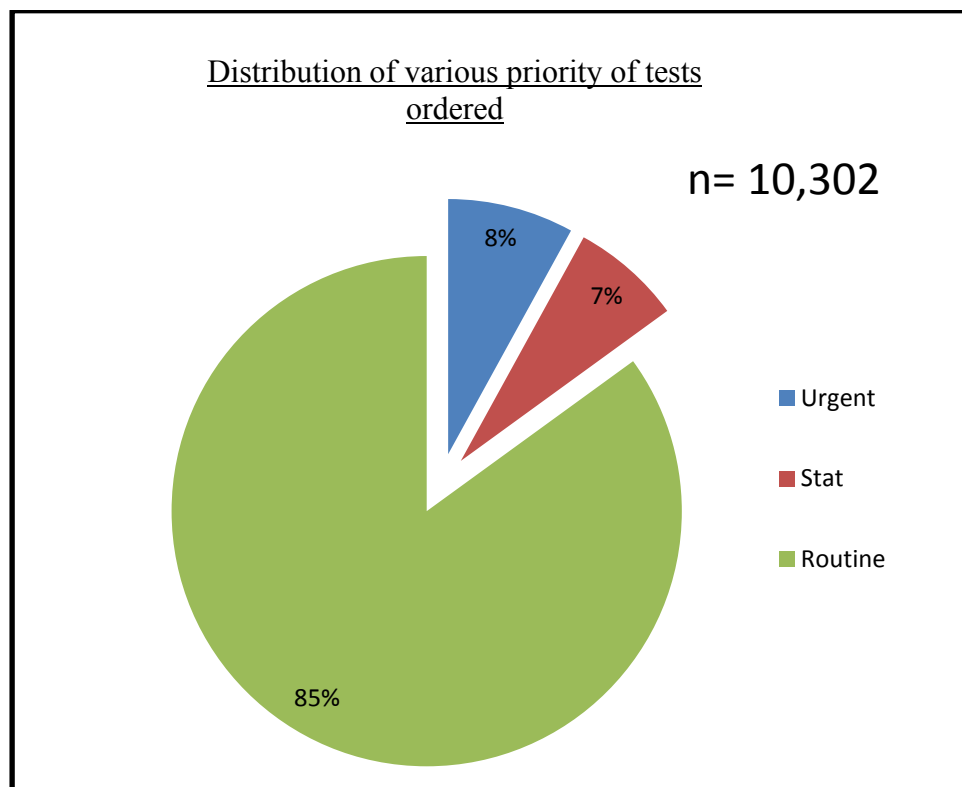
Annex 11- Survey to assess quality of stickers



Annex 12 – Return Slip

<u>RETURN SLIP</u>	
Pneumatic chute station no. XYZ	
NU no. XXX	
No. of samples sent _____	
Priority: Urgent/Routine	
Sign of sender _____	
Date: _____	Sign/stamp of recipient _____

Annex 13 – Distribution of priority of test ordered



Annex 14 – Checklist for urgent test list

Survey for assessing clinical test classified as urgent and stat

Name:

Department :

Designation:

Please select the tests for which results are needed urgently / stat

Biochemistry

TEST NAME	STAT	URGENT	DESIRED TAT
Albumin			
Alkaline Phosphatase			
Bilirubin Total			
Bilirubin Direct			
Bilirubin Indirect			
SGOT (AST)			
SGPT (ALT)			
Gamma GT			
Total Protein			
Globulin			
A/G RATIO			
Blood Urea			
Serum Creatinine			
Uric Acid(Serum)			
Total Cholesterol			
Triglycerides			
HDL - Cholesterol			
LDL - Cholesterol			
VLDL - Cholesterol			
Sodium(Serum)			
Potassium(Serum)			
Chloride			
Serum Amylase			
Calcium(Serum)			
Creatine phosphokinase			
Creatinine kinase MB(Serum)			
Iron, serum (Fe)			
Lactate Dehydrogenase			
Lipase			
Magnesium (Serum)			
Phosphorus (Serum)			
Bicarbonate			
TSH			

Free T3			
Free T4			
Vitamin B12			
Serum Iron binding capacity			
Glucose (Fasting)			
Glucose (Post Prandial)			
Glucose (Random)			
Glucose (CSF)			
Renal Function Test			
Lipid Profile			
Serum Electrolytes			
Liver Function Test			
Basic Metabolic Panel			
Comprehensive Metabolic Panel			
Serum Myoglobin			
Troponin-I			
Urine Protein(Random)			
Urine Protein(24 hr)			
Rheumatoid Factor			
Protein(CSF)			
Ammonia			
Amylase Urine			
Urine Urea			
Calcium Urine			
Urine Creatinine			
Creatinine(IDMS)Serum			
Creatinine(IDMS)Urine			
C-Reactive Protein			
High Sensitivity C-Reactive Protein			
Potassium(Urine)			
Microalbumin			
Magnesium(Urine)			
Sodium(Urine)24 Hour			
Sodium(Urine)Random			
Phosphorous(Urine)			
Uric Acid(Urine)			
Direct % Glycated Hemoglobin			
CA125			
CA15.3			
CA19.9			
CEA			
CKMB (Mass)			
Prostatic Specific Antigen			

Ferritin			
Free Beta HCG			
Tacrolimus			
Total Beta HCG			
Antistreptolysin O			
Aspartate Aminotransferase			
Glucose Urine (24 hour)			
Glucose Urine(Random)			
Urea/Creat Ratio			
Cholesterol/HDL Ratio			
% MB (CKMB/CK Ratio)			
Percent Iron Saturation			
Cardiac Profile			
CSF for Biochemical Analysis			
Thyroid Profile (FT3+FT4+ III TSH)			
Blood urea			
Body Fluids Biochemistry			
Troponin T			
NT pro-BNP			
Glucose Tolerance Test			
Glucose Challenge Test			
Carbon dioxide (CO2)/ Enzymatic CO2			
Gentamicin			
Vancomycin			
Alpha Fetoprotein			
Folate			
Methotrexate			
Troponin I			
Vitamin B12			

Survey for assessing clinical test classified as urgent and stat

Name:

Department :

Designation:

Please select the tests for which results are needed urgently / stat

HEMATOLOGY

TEST NAME	STAT	URGENT	DESIRED TAT
Hemoglobin			
Hematocrit			
RBC Count			
WBC			
Platelet Count			
Erythrocyte Sedimentation Rate			
Prothrombin Time			
Activated Partial Thromboplastin Time			
Peripheral blood Smear			
COMPLETE BLOOD COUNT			
HEMOGRAM(CBC+DIFF+PS)			
CBC + DIFF			
CBC+RET			
CBC+DIFF+RET			
CBC+NRBC			
CBC+DIFF+NRBC			
CBC+DIFF+RET+NRBC			
Reticulocytes			
D-dimers			
Bone Marrow Aspiration			
Bone Marrow / Peripheral Bld Cytochemistry			
Nucleated RBC			
Absolute Basophil Count			
Absolute Eosinophil Count			
Absolute Lymphocyte Count			
Absolute Neutrophil Count			
Absolute Monocyte Count			
Malaria Antigen			
Sickling Test			
PROTHROMBIN TIME & INR			
Semen Analysis			
Malarial Parasite			

Survey for assessing clinical test classified as urgent and stat

Name:

Department :

Designation:

Please select the tests for which results are needed urgently / stat

MICROBIOLOGY

TEST	STAT	URGENT	DESIRED TAT
Anti-HAV IgM			
Anti-HBc			
Anti-HBe			
Anti-HBs			
Anti-HCV			
Anti-HIV 1+2			
HBeAg			
HBsAg			
Aerobic C&S Blood			
Aerobic C&S Blood (Paediatric&Neonat)			
Aerobic C&S Body Fluids (Sterile)			
Aerobic C&S Broncho-alveolar Lavage			
Aerobic C&S Conjunctival Swab			
Aerobic C&S CSF			
Aerobic C&S Nasal Swab			
Aerobic C&S			
Aerobic C&S Pus			
Aerobic C&S Sputum			
Aerobic C&S Stool			
Aerobic C&S Throat Swab / Washings			
Aerobic C&S Tips Catheter,Suction,Tracheal			
Aerobic C&S Urethral Swab			
Aerobic C&S Urine			
Aerobic C&S High Vaginal Swab/Cervical			
Aerobic C/S Semen			
AFB Culture Body Fluids			
AFB Culture BAL			
AFB Culture CSF			
AFB Culture			
AFB Culture Pus			
AFB Culture Sputum			
AFB Culture Stool			

AFB Culture Urine			
AFB Culture High Vaginal Swab/Cervical			
AFB Stain (Z N) / Smear Exam			
AFB Stain (Z N) / Smear Exam.- Urine			
AFB Stain (Z N) / Smear Exam.-BAL			
AFB Stain (Z N) / Smear Exam.-CSF			
AFB Stain (Z N) / Smear Exam.-Pus			
AFB Stain (Z N) / Smear Exam.-Sputum			
Albert's Staining - Throat Swab			
Anaerobic C&S Blood			
Anaerobic C&S Body Fluids			
Anaerobic C&S Broncho-alveolar Lavage			
Anaerobic C&S CSF			
Anaerobic C&S Pus			
Anaerobic C&S Endometrial Tissue			
Anaerobic C&S others			
Chalmydia Ag Detection(Cerv/ Uret Swabs)			
Comb. Antigens CSF			
Cryptococcal Ag detection (Quantitative)			
Cryptococcus Antigen Detection in CSF			
Cryptococcus Antigen Detection in Serum			
CSF N. Meningitidis Antigen			
CSF Strept. pneumoniae capsular antigen			
Anti CMV IgG Antibodies			
Anti CMV IgM			
Anti HBe / HB 'e' Antigen Combine			
Anti HBs titres(Post Vaccination)			
Anti Rubella IgG			
Anti Rubella IgM			
Anti Toxoplasma IgG			
Anti Toxoplasma IgM			
Hepatitis B Profile			
Total Anti HAV Antibodies (Total)			
Fungal C&S Blood			
Fungal C&S Body Fluids			
Fungal C&S Broncho-alveolar lavage			
Fungal C&S Conjunctival Swab			
Fungal C&S CSF			
Fungal C&S			
Fungal C&S Pus			
Fungal C&S Sputum			
Fungal C&S Stool			
Fungal C&S Throat Swab			
Fungal C&S Tips Catheter,Suction,Tracheal			
Fungal C&S Urethral Swab			
Fungal C&S Urine			

Fungal C&S High Vaginal Swab/Cervical			
KOH Mount - Body Fluid			
KOH Mount - CSF			
KOH Mount			
KOH Mount - Pus			
KOH Mount - Sputum			
KOH Mount - Throat Swab			
KOH Mount - Urine			
KOH Mount -BAL			
Gram's Stain - BAL			
Gram's Stain - Body Fluid			
Gram's Stain - CSF			
Gram's Stain			
Gram Stain - Pus			
Gram Stain - Sputum			
Gram Stain - Stool			
Gram Stain - Throat Swab			
Gram Stain - TIP			
Gram Stain - Urine			
H. Influenzae B Antigen - Blood			
H. Influenzae B Antigen - CSF			
Dengue Virus IgM			
India Ink Preparation			
Leptospira Antibody			
Mantoux (Tuberculin) Test			
Mod.Z.N.Staining for Nocardia-BAL			
Mod.Z.N.Staining for Nocardia-CSF			
Mod.Z.N.Staining for Nocardia-Pus			
Mod.Z.N.Staining for Nocardia-Sputum			
Mod.Z.N.Staining for Nocardia-TIP			
Mod.Z.N.Staining for Nocardia-Urine			
Mod.Z.N.Staining for Nocardia-Body Fluids			
Mod.Z.N.Staining for Nocardia-Stool			
Mod.Z.N.Staining for Nocardia-Throat			
Procalcitonin assay Quantitative			
Toxoplasma Avidity Assay(IgG)/ELISA/ELIFA)			
Water Analysis(Per Sample) For Coliforms			
Widal Test			
Rapid test for Strp Gp A antigen			
Rapid test for Influenza A+B			
Rapid detection of ROTA/ADENO virus			
Chikungunya IgM			
Dengu Virus IgG/IgM, NS1Ag			
Malaria Antigen			
Stool Examination Hanging drop Preparation			

Typhidot IgG/IgM			
Rapid card test Leptospira antibody IgG/IgM			
Echinococcus detection for scolices in hydatid cyst fluid			
Peripheral blood smear for parasites.			
Stool Analysis			
Occult blood			

Survey for assessing clinical test classified as urgent and stat

Name:

Department:

Designation:

Please select the top three tests for which results are needed urgently / stat

HISTOCYTOPATHOLOGY

TEST	STAT	URGENT	DESIRED TAT
Body Fluids Cytology			
Cell Block			
FNAC			
Frozen Section/Intra Operative Cytology Per Specimen			
Diagnostic Biopsy			
Excision Biopsy			
Large Specimen Biopsy			
Radical Specimen Biopsy			
Interventional FNAC			
PAP Smear			
IHC Marker Panel			
Estrogen and Pregesterone Receptors			
Hercept Test			
EGFR			
Immunofluorescence antibody			
Kidney Biosy wirh Special Stains			
Kidney Biosy wirh Special Stains+ Immunofluorescence			
Muscle Biosy with Enzyme Histochemistry			
Nerve Biopsy with Special Stains			
Liver Biopsy with Special Stains			
Renal Transplant biopsy+Sp. Stains+C4d IF			
Prostatic Core Biopsy IHC IFRequired			
Radical Prostatectomy			
Bone Marrow Biopsy			
Frozen Section/Intra Operative CytologySpecimen			
Lymph Node Biopsy with IHC if needed			
Sputum For Malignant Cells (day 1)			
Stool For Malignant Cells (Day1)			
Tru Cut Biopsy- Urgent			
Ultrasound/ CT Guided FNAC Report(Histopath)			
Urine For Malignant Cells (Day 1)			

Annex -15 Compiled lists of urgent tests

List of urgent test in Biochemistry

TAT is from the time sample is received in laboratory till released on HIS

S.NO.	TEST NAME	TAT
1	Albumin	2 hrs.
2	ALT	2 hrs.
3	AST	2 hrs.
4	ALP	2 hrs.
5	Bilirubin Total	2 hrs.
6	Bilirubin Direct	2 hrs.
7	Calcium	2 hrs.
8	Amylase	2 hrs.
9	Urea	2 hrs.
10	Creatinine	2 hrs.
11	CSF Glucose	2 hrs.
12	CSF Prot	2 hrs.
13	CSF Chloride	2 hrs.
14	Serum Sodium	2 hrs.
15	Serum Potassium	2 hrs.
16	Serum Chloride	2 hrs.
17	CK	2 hrs.
18	CK MB	2 hrs.
19	E CO2	2 hrs.
20	Troponin I	2.5 hrs.
21	NT PRO BNP	3 hrs.
22	Myoglobin	3 hrs.
23	Magnesium	2 hrs.
24	Phosphorus	2 hrs.
25	Ammonia	2 hrs.
26	Blood Glucose	2 hrs.
27	Lipase	2 hrs.

LIST OF URGENT TEST IN HEMATOLOGY

TAT is from the time sample is received in laboratory till released on HIS : 2 hrs.

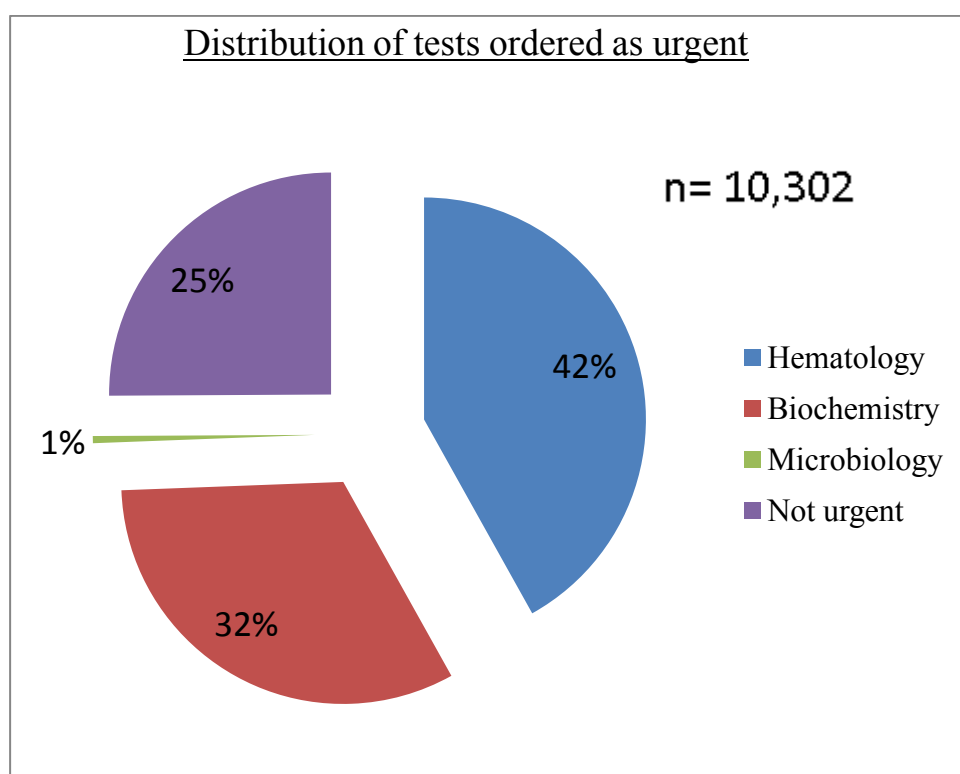
S.NO.	TEST NAME
1	Hemoglobin
2	Hematocrit
3	WBC count
4	Platelet Count
5	Prothrombin Time
6	Activated Partial Thromboplastin Time
7	Peripheral blood smear
8	CBC
9	Hemogram (CBC+DIFF+PS)
10	D-Dimers
11	Absolute neutrophil count
12	Prothrombin time & INR
13	RBC Count
14	CBC+DIFF
15	CBC+DIFF +RET
16	CBC+NRBC
17	CBC+DIFF+NRBC
18	CBC+DIFF +RET+NRBC

LIST OF URGENT TEST IN MICROBIOLOGY

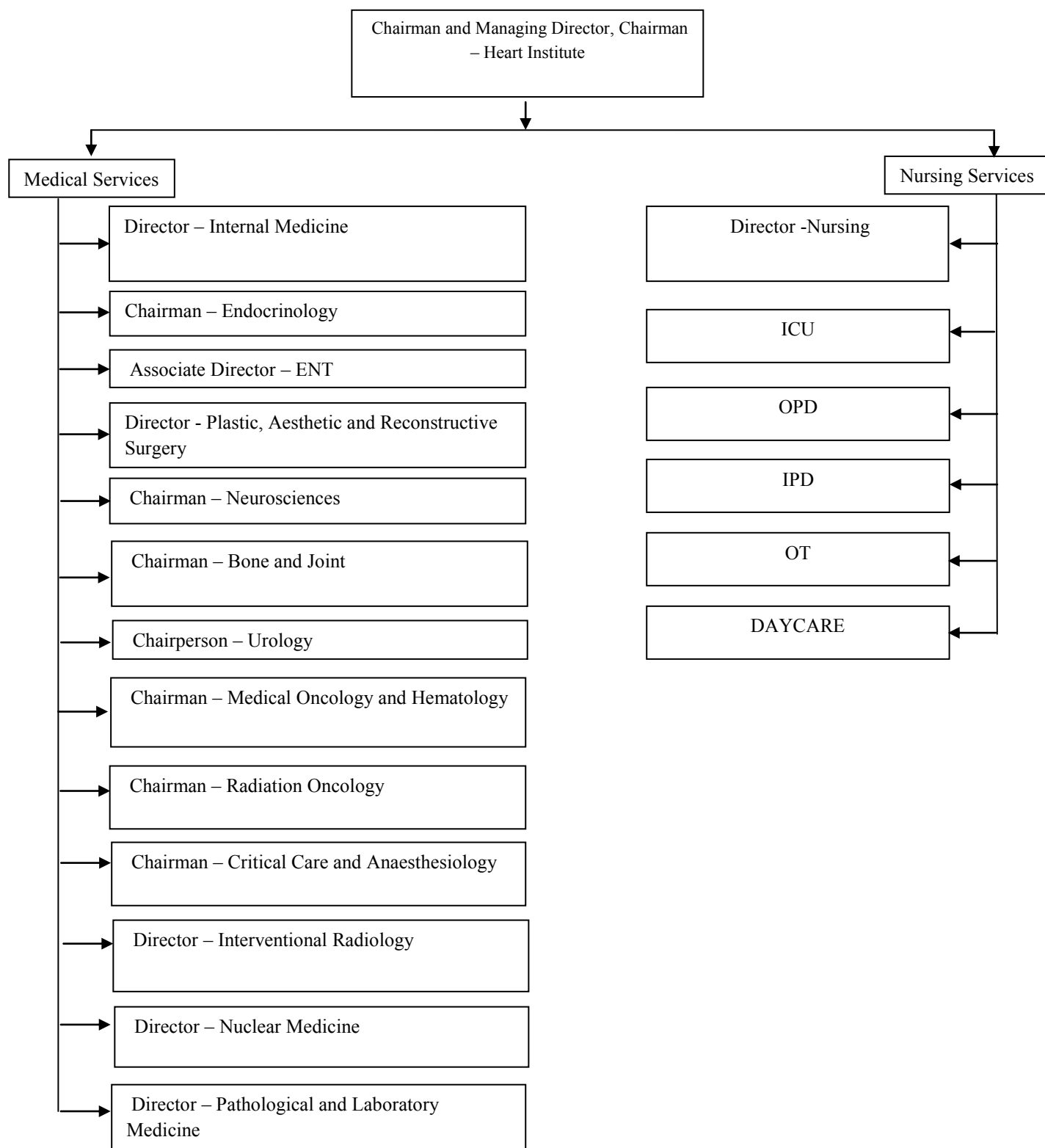
TAT is from the time sample is received in laboratory till released on HIS

S.NO.	TEST NAME	TAT
1	Gram stain CSF	2 hrs.
2	Gram stain any specimen	4 hrs.
3	Procalcitonin Assay Quantitative	2 hrs.
4	Dengue virus IgG/IgM,NS1Ag	2 hrs.
5	Stool examination hanging drop for vibrio cholera	2hrs.
6	Occult blood	4 hrs.
7	AFB Stain (ZN)/Smear exam any specimen	4 hrs.
8	Cryptococcus Antigen Detection in CSF	2 hrs.
9	INDIA INK preparation in CSF	4 hrs.

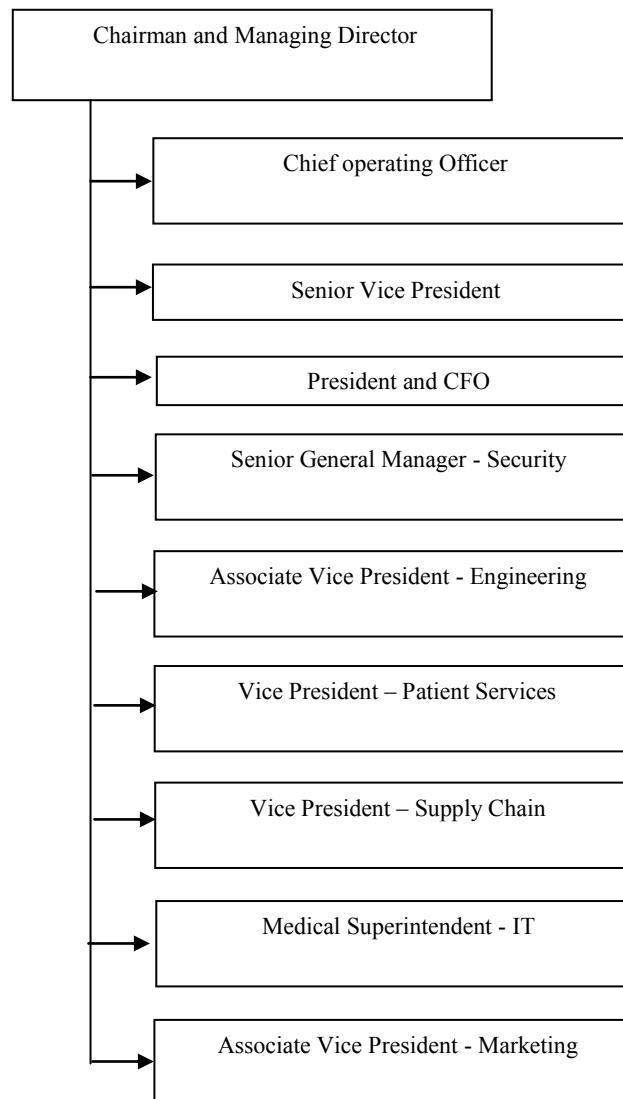
Annex -16 Distribution of urgent tests on the basis of departments of pathology



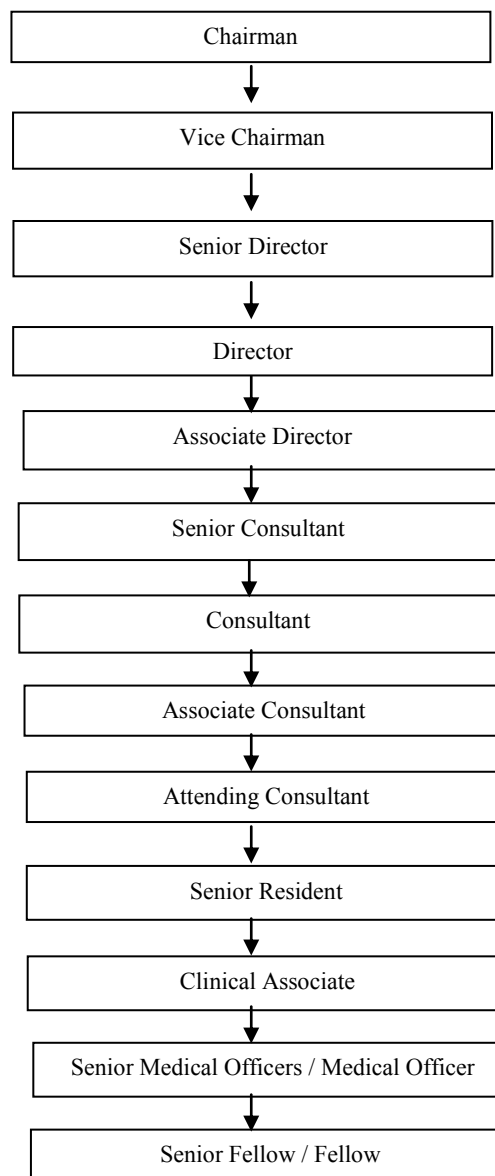
Annex 17– Clinical Organogram



Annex 18 – Non-Clinical Organogram



Annex 19 – Organizational Hierarchy followed by Clinical Team



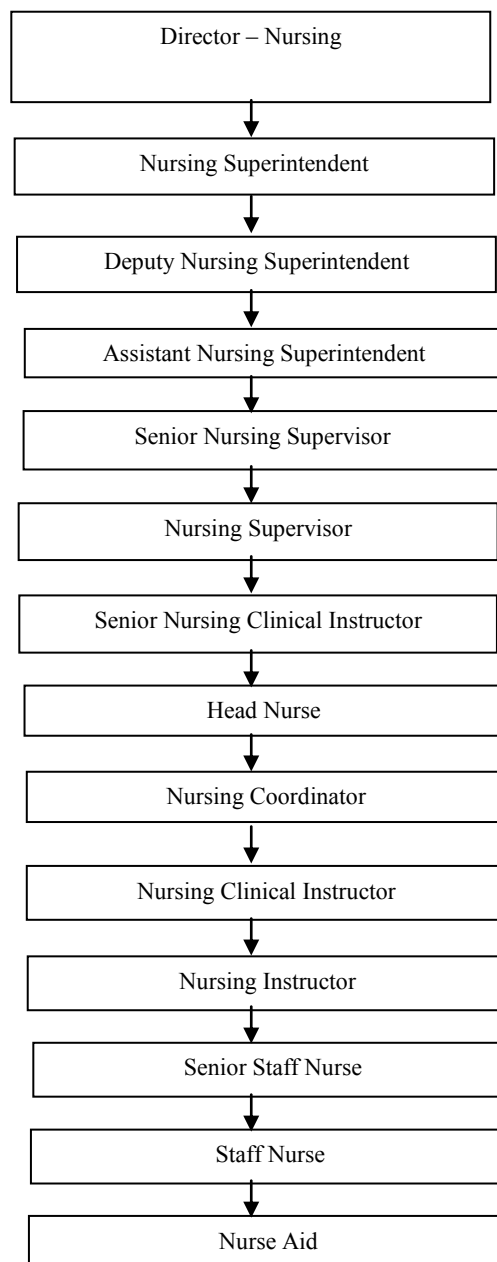
Annex 20 – Floor-wise Clinical Layout

Floor	Specialties Available/ Institute
Lower Ground	Radiation Oncology
Upper Ground	Blood Bank, OPD Pharmacy, Emergency, Sample Collection, International Patient Services, Admissions, Radiology, Nuclear Medicine
1	Operation Theatres and Intensive Care Units
2	Preventive Health Check-up
3	Heart Institute
4	ENT and Head and Neck Surgery, Institute of Plastic and Reconstructive Surgery, Institute of Mental Health and Quality, Gynaecology and Gynaecology, Minimally Invasive Surgery and Department of Integrative Medicine
5	Department of Endocrinology and Diabetes, Dermatology, Rheumatology and Clinical Immunology, Respiratory and Sleep Medicine, Peripheral, Vascular and Endovascular Sciences
6	Institute of Neurosciences
7	Bone and Joint Institute
10	Cancer Institute
11	Institute of Digestive and Hepatobiliary Sciences
12	Institute of Nephrology and Urology
14	Liver Transplant

Annex 21 – Manpower Form

MANPOWER PLANNING															
LAST UPDATED :										NEXT UPDATION :					
CLINICAL															
INSTITUTE	SUB-SPECIALITY	Chairman	Vice Chairman	Sr. Direc.	Director	Asso. Direc.	Sr. Cons.	Cons.	Asso. Cons.	Att'g Cons	Sr. Resi	Clin. Asso.	Sr. M.O/M.O	Sr. Fellow/ Fellow	Total
PARAMEDICAL															
INSTITUTE	SUB-SPECIALITY														Total
ADMINISTRATIVE															
INSTITUTE	SUB-SPECIALITY														Total
Category	Current Strength	Proposed Streng	Justification for additional requirement												
Clinical															
Paramedical															
Administrative															
TOTALS															

Annex 22 – Nursing Manpower Hierarchy



Annex 23 - The Australasian Triage Scale

DESCRIPTION OF SCALE

ATS CATEGORY	TREATMENT ACUITY (Maximum waiting time)	PERFORMANCE INDICATOR THRESHOLD
ATS 1	Immediate	100%
ATS 2	10 minutes	80%
ATS 3	30 minutes	75%
ATS 4	60 minutes	70%
ATS 5	120 minutes	70%