

**Summer Training at
Max Super Specialty Hospital, Saket, New Delhi
(April 1–May 31, 2014)**

- **A Study on Effectiveness of Time Management For International Patients Undergoing Renal Transplants**
- **An Observational Study on Infection Control in Dialysis Unit**
- **A Proposal For IT – Enabled Appointment Scheduling System in Dialysis Unit**

**By
Vrinda Sharma**

**Under the guidance of
Col. (Dr.) Ashok Kaushik**

**MBA- Hospital & Health Management (MBA-HM)
2013-2015**



**The IIHMR University, Jaipur
2014**

**INSTITUTE OF HEALTH
MANAGEMENT RESEARCH**

1, Prabhu Dayal Marg
Sanganer Airport, JAIPUR - 302 029, INDIA
Tel. : 3924700, 2791431-32
Fax : 91-141-3924738
E-mail : iihmr@iihmr.org
URL : <http://www.iihmr.org>
Gram : HEALTHINST

CERTIFICATE

This is to certify that **Dr. Vrinda Sharma** has undergone her summer training in Max Super Speciality Hospital, Saket, New Delhi from 1st 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 fulfilment of the course requirement recommended for the award of Post Graduate Diploma in Hospital and Health Management.

I wish her success in all her future endeavours.



Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affairs)

IIHMR Jaipur



Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affairs)

IIHMR Jaipur

SUMMER TRAINING CERTIFICATE

This is to certify that Dr. Vrinda Sharma of IIHMR, Jaipur Batch-18 of IIHMR University (Jaipur) has successfully completed her Summer Internship during 26th April-31st March 2014

The projects were undertaken by her in Renal Sciences Department titled:

1. A study on Effectiveness of Time Management for International patients undergoing Renal Transplants at Max Super Specialty Hospital, Saket
2. An observational study on Infection Control in Dialysis Unit, Max Super Specialty Hospital, Saket
3. A proposal for IT-enabled Appointment scheduling system in Dialysis Unit, Max Super Specialty Hospital, Saket

The Project on evaluation fulfills all the stated criteria and the student's findings are her original work.

I hereby certify her work excellent /good/ satisfactory to the best of my knowledge.



Dr. Gaurav Sharma
Program Manager, Renal Sciences &
Assistant Medical Superintendent
Max Super Specialty Hospital, Saket,
New Delhi

ACKNOWLEDGEMENT

A summer project is a golden opportunity for learning and self development. I consider myself very lucky and honoured to have so many wonderful people lead me through the completion of this project.

I consider myself fortunate for having been provided an opportunity to undergo summer training at Max Super Speciality Hospital, Saket, New Delhi and wish to express my indebted gratitude to Mr. Anil Vinayak (Director Sales & Marketing & GM Operations, Saket).

I also wish to extend a special thanks to Dr. Sahar Qureshi (Assistant General Manager, Operations, Saket) who in spite of being extraordinarily busy with her duties, took time out to hear, guide and keep me on the correct path and allowing me to carry out my project work at their esteemed organization during the training.

I take this opportunity to express my profound gratitude and deep regards to my Mentor, Dr. Gaurav Sharma, Program Manager, Renal Sciences & Assistant Medical Superintendent for his guidance, monitoring and constant encouragement throughout the course of this project.

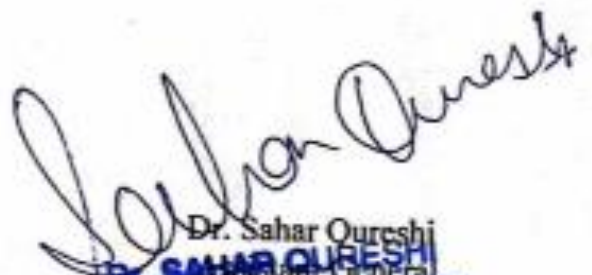
I am obliged to staff members of Institute of Renal Sciences, MSSH, Saket for the valuable information provided by them in their respective fields. I am grateful for their cooperation during the period of my assignment.

Lastly, I thank almighty, my family and friends for their constant encouragement without which this assignment would not be possible.

Dr. Vrinda Sharma



Dr. Gaurav Sharma
Program Manager, Renal Sciences &
Assistant Medical Superintendent
MSSH, Saket, New Delhi



Dr. Sahar Qureshi
Assistant General Manager - Operations
Max Super Speciality Hospital East Block
2, Press Enclave Road, Saket,
New Delhi-110 017

Table of Contents

ABBREVIATIONS	7
OBSERVATIONAL LEARNING	8
INTRODUCTION	8
MODE OF DATA COLLECTION	9
GENERAL FINDINGS.....	10
A STUDY ONEFFECTIVENESS OF TIME MANAGEMENT FORINTERNATIONAL PATIENTS UNDERGOING RENAL TRANSPLANTS AT MAX HOSPITAL, SAKET	39
TITLE	40
EXECUTIVE SUMMARY.....	40
INTRODUCTION	41
BACKGROUND.....	43
REVIEW OF LITERATURE	45
RATIONALE.....	52
OBJECTIVES	53
METHODOLOGY	53
DATA COLLECTION AND ENTRY.....	54
DATA ANALYSIS	55
RESULTS.....	59
DISCUSSION	60
AREAS FOR IMPROVEMENT:.....	63
REFERENCES.....	64
A STUDY ONINFECTION CONTROL IN DIALYSIS UNIT	65
INTRODUCTION	66
REVIEW OF LITERATURE	67
RATIONALE:.....	70
KEY OBSERVATIONS:.....	71
STANDARD PRECAUTIONS	75
AREAS OF IMPROVEMENT	79
REFERENCES.....	80
A PROPOSAL FORIT-ENABLED APPOINTMENT SCHEDULINGIN DIALYSIS UNIT	81
INTRODUCTION	82
PROBLEM STATEMENT	83
RATIONALE.....	83
OBJECTIVES	83

DATA COLLECTION	83
DATA ANALYSIS	84
REMARKS	85
ANNEXURE.....	86

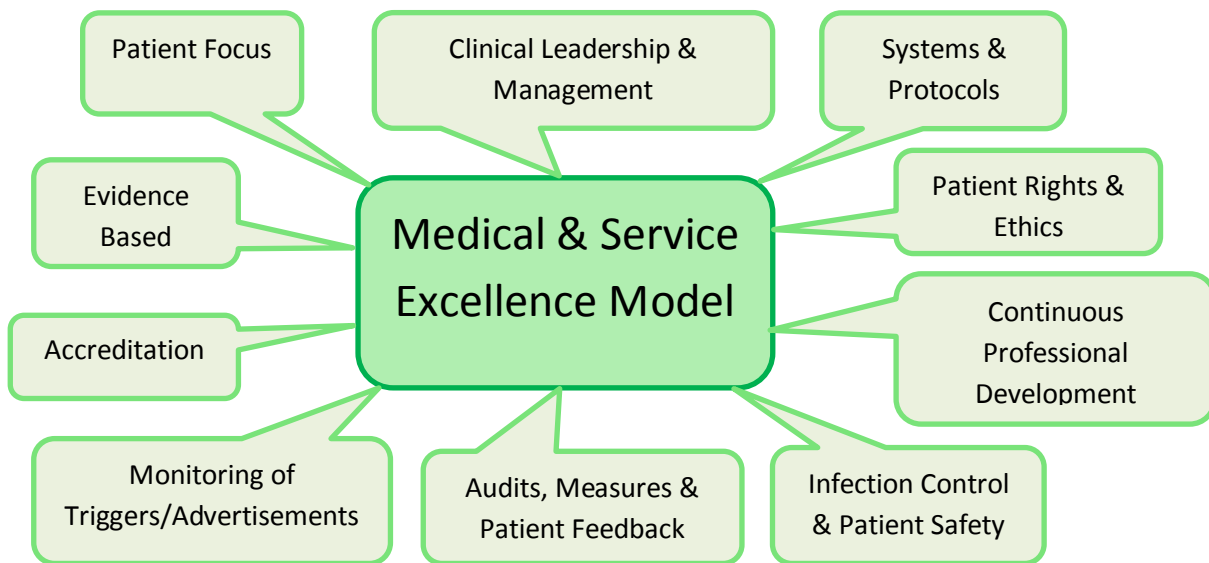
ABBREVIATIONS

S.No.	Abbreviation	Meaning
1.	NABH	National Accreditation Board for Hospitals & Healthcare Providers
2.	IPS	International Patient Services
3.	KTP	Kidney Transplant Packages
4.	DJ Stent	Double J stent or ureteral stent
5.	PP	Plasmapheresis
6.	EKG	Electrocardiogram
7.	PSA	Prostate Specific Antigen
8.	THOA	Transplant of Human Organs Act 2014
9.	ESRD	End Stage Renal Disease
10.	CKD-V	Chronic Kidney Disease Stage V
11.	HIS	Hospital Information System
12.	HD	Haemodialysis
13.	HDF	Haemodiafiltration
14.	PD	Peritoneal Dialysis
15.	CAPD	Continuous Ambulatory Peritoneal Dialysis
16.	MRSA	Methicillin Resistant Staphylococcus aureus
17.	VRE	Vancomycin Resistant Enterococci
18.	ESBL	Extended Spectrum β -lactamase
19.	CRAB	Carbapenem-resistant Acinetobacter baumannii
20.	HBV	Hepatitis B virus
21.	HCV	Hepatitis C virus
22.	AAMI	Association for the Advancement of Medical Instrumentation
23.	ICPs	Infection Control Practitioners
24.	PPE	Personal Protective Equipment
25.	BBV	Blood Borne Viruses
26.	CSSD	Central Sterile Services Department
27.	MSSH	Max Super Specialty Hospital
28.	CDC	Centers for Disease Control and Prevention
29.	NNIS	National Nosocomial Infection Surveillance
30.	HUG	Hôpitaux Universitaires de Genève

OBSERVATIONAL LEARNING

INTRODUCTION

Max Healthcare follows a core of 'Patient Centred Care'. Widely acknowledged nationally and internationally for its quality patient care, Max has successfully implemented the "Medical Excellence Model" through its clinical team of expert physicians and nurses who work together in an integrated manner, assessing patient needs, ordering tests, planning treatments, scheduling surgeries, monitoring progress and planning for early discharge to home.



The pillars of this model include:

- Clinical governance
- Credentialing and clinical privileging of physicians & nurses
- Use of standardized, evidence based protocols
- Patient and staff safety
- Infection control
- A culture of audit and continuous professional development

MODE OF DATA COLLECTION

Data collection involved discussions with the HODs on the managerial issues and talking to the other staff and going through the records.

Sources of Data

➤ Primary

- By interacting with the HODs, executives and other employees of the hospital
- By interacting with the patients and their attendants
- Through direct observations

➤ Secondary

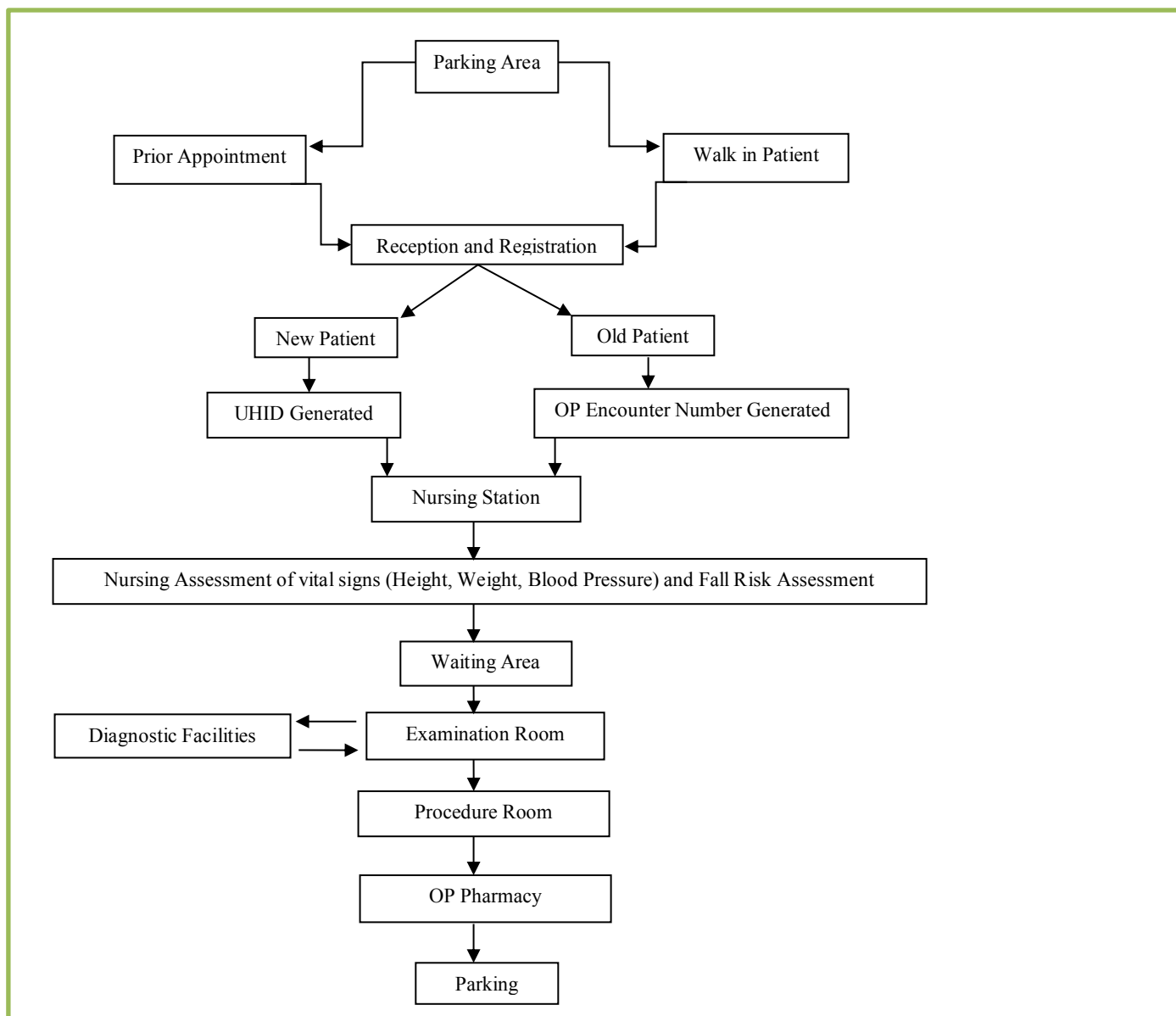
- Through registered records
- Through website of the hospital
- Literature available about the hospital like magazines, pamphlets, brochures, CDs, written documents

GENERAL FINDINGS

OUT-PATIENT DEPARTMENT

- Each INSTITUTE of Max saket hospital has its own OPD area as well as IPD area / day-care area wherever applicable.
- Every OPD 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.
- Each OPD waiting area 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.

The general process flow that is followed in all the OPDs is as follows:



IN-PATIENT DEPARTMENT (IPD)

- IPD is distributed over five floors (2nd-6th) in the east wing of Max hospital including a total number of 201 beds.
- Every bedside has:
 - Details of Consultant, Nurse and Mentor written at the top of every bed
 - Room equipment checklist – side rails, Oxygen, Suction
 - Important Instructions
- The rooms available in IPD have the following structure of beds per room:
 - 6 in 1
 - 4 in 1
 - 2 in 1
 - Single Deluxe
 - VIP suite
- Every floor has a central nursing station with
 - Information Board covering:
 - Designation & Contact numbers of
 - Duty doctor
 - Administration Staff
 - Support Staff
 - Nurses' names with shift timing and designation
 - Crash Cart parked next to the nursing station
 - Computer on wheels (COW) - 4
 - Cupboards with forms- down time form, investigation track sheet, blood request form, PAC sheet, informed consent, inventory files and registers
 - Medication rooms – 2 ;Pantry – 1
 - Records room
 - Biomedical Waste Disposal
- Process for admission & discharge of new patient to IPD:
 - IPD receives intimation call from the department from where patient is referred
 - Duty doctor is informed
 - Room is assigned by the floor mentor
 - Patient is admitted and vitals are checked by the nursing staff
 - Physical assessment is done
 - History is taken
 - Concerned doctor is informed and medications & instructions are entered in Computerized Patient Record System (CPRS), reviewed by IPD Pharmacy
 - Patient bill is consolidated at IPD billing
 - Discharge intimation given by doctor and processed by Nursing staff
 - Clearance from pharmacy required
 - Discharge process TAT = 30 minutes for cash payment patient
- Nurse to bed ratio = 1:4 or 1:6
- General Duty Assistants (GDAs) = 2-3 in every shift
- Average Length of Stay (ALOS) for normal Laparoscopic surgeries = 2-3 days
- Quality Indicators are: Patient Fall, Hypoglycaemia, Needle stick Injury

EMERGENCY DEPARTMENT

Due to the unplanned nature of patient attendance, this department provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be life-threatening and require immediate attention, except for major burns. It is located at the ground floor with its own dedicated entrance and operates for 24 hours a day.

Ambulance- 2 ACLS (with CCTV camera for telemedicine) and 4 BCLS

Patients are either transferred to other departments or are discharged within 4 hours. Max Super Speciality Hospital, Saket had made a world record for management of MI patient in emergency department from entrance to the balloon time in cath lab, in less than 35 minutes.

Response time:

- EMO response time <1 min
- Consultant response time <60 min
- Code blue response time <3min
- Ambulance response time <10 min

Infrastructure:

- Total 16 bedded triage
- Resuscitation suite -1 bed
- Urgent care area – 4 beds
- Observation area – 9 beds
- Clinical decision unit – 2 beds
- Doctors work station-is located in the centre of the urgent care area
- Store room- is located behind the reception. Medications are filled twice a day and stock of two days is kept in advance for Sunday. Narcotics are also available and kept in safe.
- Hospital information system and CPRS
- COWS(computer on wheels)
- Waiting area for patient's attendants is outside the department.

Staffing:

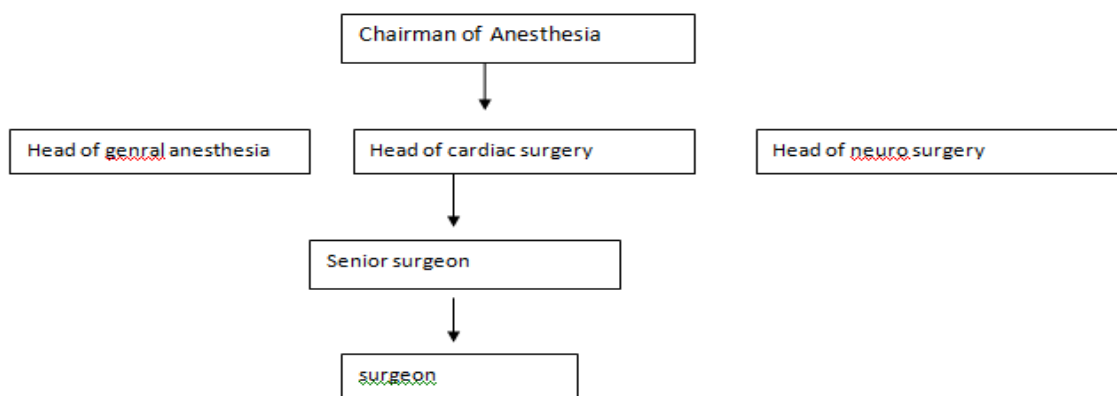
1. Senior consultant (Emergency medical officer)
2. Team leader
3. Emergency physicians - 3
4. Nurses : Male- 4 to 5
Female- 2 to 3
5. 2 personnel at reception
6. Paramedical staff for ambulance
7. 2 GDA
8. Outsourced staff : security personnel.

OPERATION THEATER COMPLEX

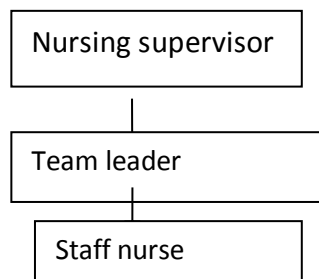
Operation theater complex of East wing is located on first and second floor. Operation theater complex has 11 operation theater assigned to various departments. Cardiac, oncology , bariatric laparoscopic, gynecology, ENT and plastic surgeries are performed in these operation theaters. Operation theater complex of west wing is located on first floor. It has 7 operation theaters for various departments. Orthopedic, neurology and general surgeries are performed here.

Organization of staff: The staff of Operation Theater is organized into four groups: Anesthetist and surgeon, nursing staff, technician, supportive staff.

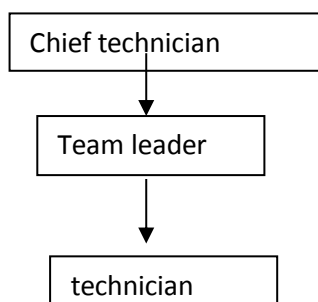
Organogram of doctors:



Organ gram of nursing staff :



Organogram of operation theater technicians:



CATH LAB

Catheterization laboratory or cath lab is an examination room with diagnostic imaging equipment used to visualize the arteries of the heart and the chambers of the heart and treat any stenosis or abnormality found.

Diagnostic procedures performed here are:

- Angiography
- Electrophysiology study
 - Cath study

Out of these 3 angiography and cath study is done in cath lab 1 and EPS is done in cath lab 2.

Other procedures are:

- Percutaneous Transluminal Coronary Angioplasty
- Peripheral Transluminal Angioplasty
- Radio Frequency Ablation
- Permanent Pacemaker Implantation
- Intra Cardiac Defibrillation
- Cardiac Resynchronisation Therapy Defibrillator Device
- Cardiac Resynchronisation Therapy Pacemaker
- Left and right sided pressure studies
- Closure of some congenital heart defect

Units of cath lab:

1. Cath lab 1
2. Cath lab 2
3. Technical room
4. Observation area
5. Technician room
6. Store room and utility room
7. Observation area
8. Instrument washroom

Location: Cath lab is located on the first floor with the vicinity areas as

- Emergency department
- Operation theatre
- Cath recovery
- Coronary care
- CTVS OT
- SICU
- PICU
- MICU

Staffing:

- 9 interventional cardiologists
- 19 nurses
- 9 technicians
- 1 person from store

ONCOLOGY DEPARTMENT

Oncology is a branch of medicine that deals with cancer.

Oncology in MAX is concerned with:

- The diagnosis of any cancer in a person (pathology)
- Therapy (e.g. surgery, chemotherapy, radiotherapy and other modalities)
- Follow-up of cancer patients after successful treatment.
- Palliative care of patients with terminal malignancies.
- Ethical questions surrounding cancer care.

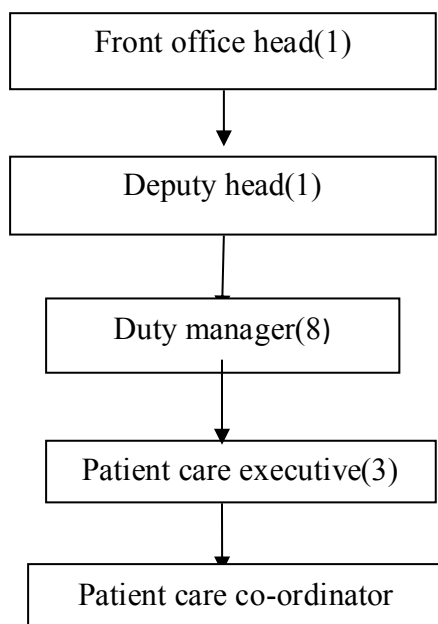
The Oncology Day Ward/Day Care (ODW) as the word implies, provides care for people who need to receive treatment as day cases and do not require staying in hospital as inpatients. Its main function is to assess and treat the patients who are receiving chemotherapy.

In the Oncology Day Care 9 beds, 8 recliners and 4 dummy beds are available. Before chemotherapy is commenced, the patient is assessed to make sure that he/she understands and consents to the planned treatment. Blood tests are performed to ensure that their levels are at the required limits. The patient's weight and height needs to be measured as most chemotherapy doses are calculated according to one's body surface area.

FRONT OFFICE

Front office is the first point of contact between the hospital and its customer.

Organization chart of the dept.

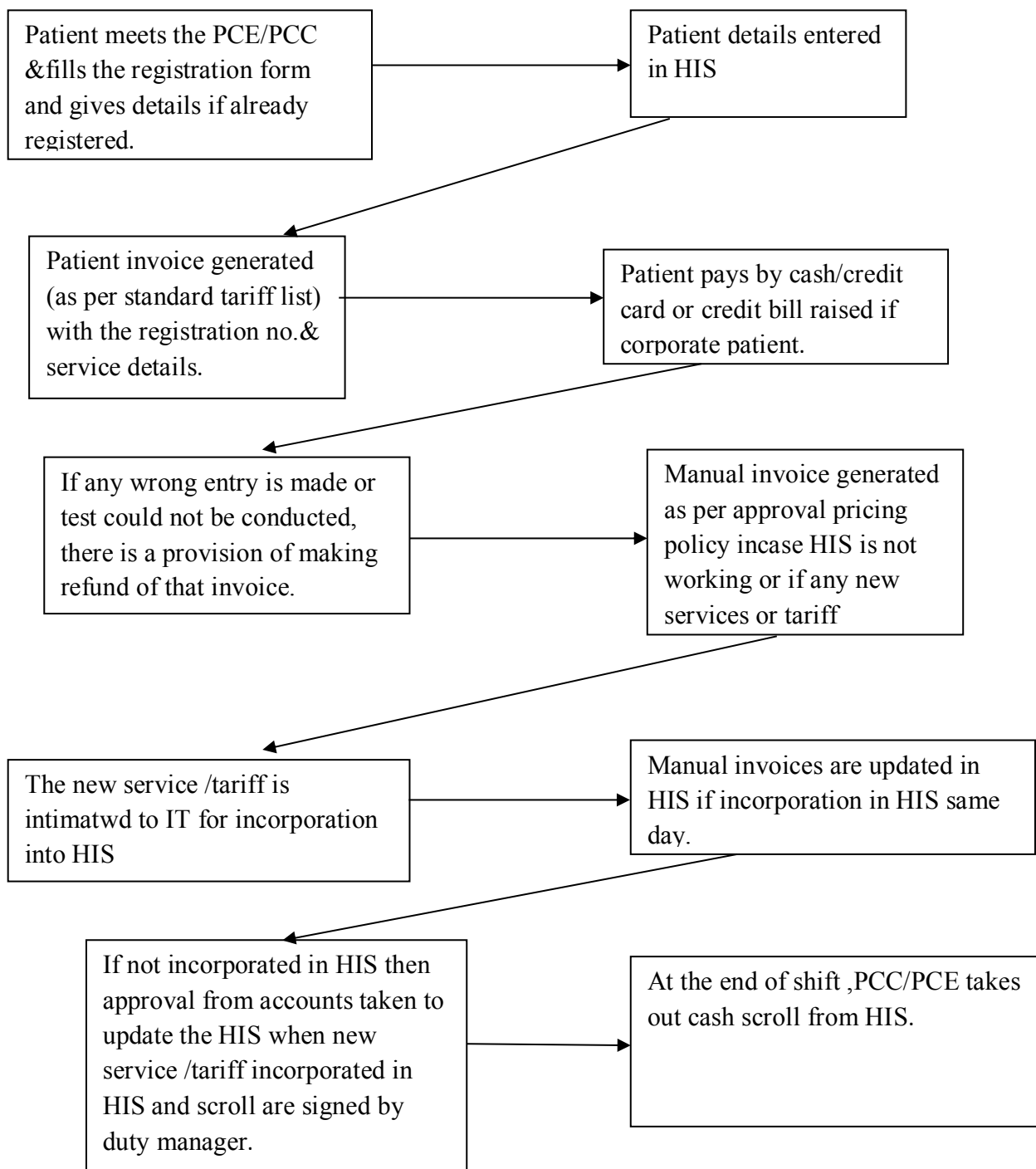


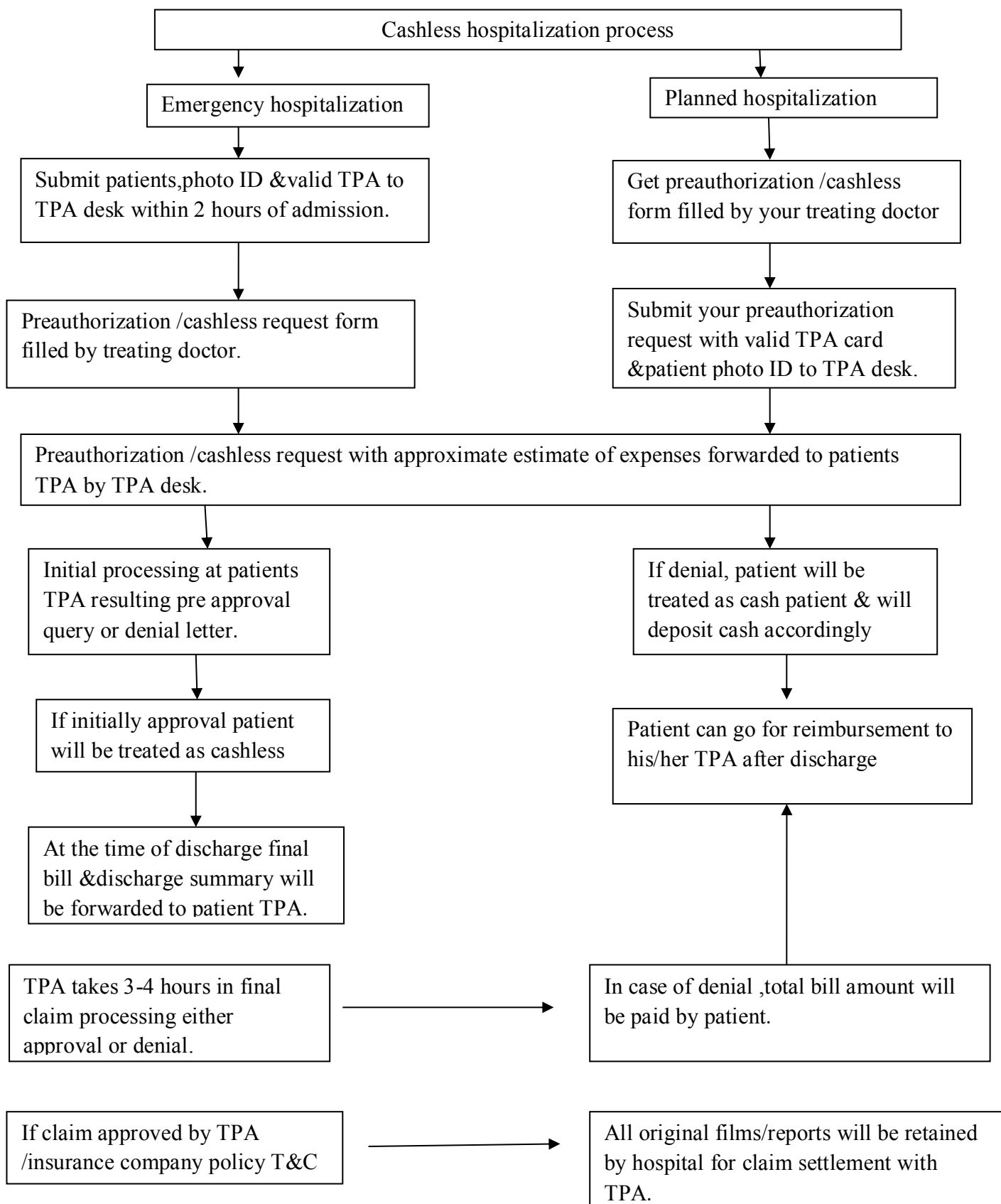
Services provided by front office

- 1) in patient and out patient registration.
- 2) IP admission and discharge
- 3) medical alert details

- 4) appointment scheduling
- 5) doctors schedule summary
- 6) patient billing(IPD,OPD)
- 7) insurance management
- 8) patient visit history
- 9) medical records movements
- 10) appointment for diagnostic tests
- 11) preventive health program registration and scheduling.

Patient registration process:





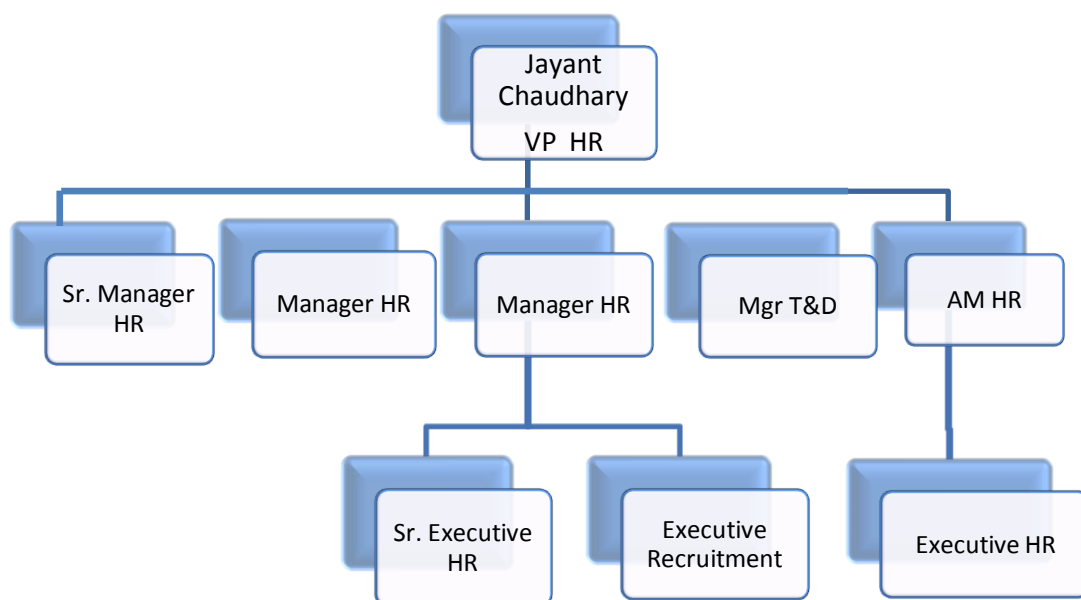
HUMAN RESOURCE MANAGEMENT

Human resource management (HRM or simply HR) is a function in designed to maximize employee performance in service of their employer's strategic objectives. HR is primarily concerned with how people are managed within organizations, focusing on policies and systems.

Following are the policies undertaken by the Human Resource Management Department: -

- Human Resource Planning Policy.
- Job Profile Format.
- Recruitment policy.
- Training and development policy.
- Induction and Orientation policy.
- Performance appraisal Policy.
- Complaint & Grievances Redressal Policy.
- Disciplinary Policy.
- Medical Discount Policy.
- Annual Medical Check-up Policy.
- Clinical credentialing and privileging Policy.
- Nursing Credentialing and Privileging Policy.

HR Structure



INTERNATIONAL PATIENT SERVICES (IPS) DEPARTMENT

It takes a lot to be a world-class health care services provider and as per patient registration data, over 11 lac overseas patients have been helped to get back to their normal lifestyle. This department, situated in East wing, is exclusively dedicated for the services of international patients.

Contact Procedure:

- Patient sends a query and/or reports
- IPS Team consults the relevant consultant and provides diagnosis, proposed treatment and estimate
- If required, a telephonic meeting may also be arranged
- Patient confirms if he wants to have treatment at Max Healthcare to provide Visa Facilitation Letter
- Patient confirms the arrival date and time
- IPS Team, in the meantime, books room, OT etc. for the patient
- Patient is received at the Airport and then, brought to the Hospital/Guest House/Hotel

Also, another contact procedure is as follows:

- Max hospital conducts free outreach OPDs in other countries, at least 1-2 per year
- Max hospital also has tie ups with different hospitals in these countries

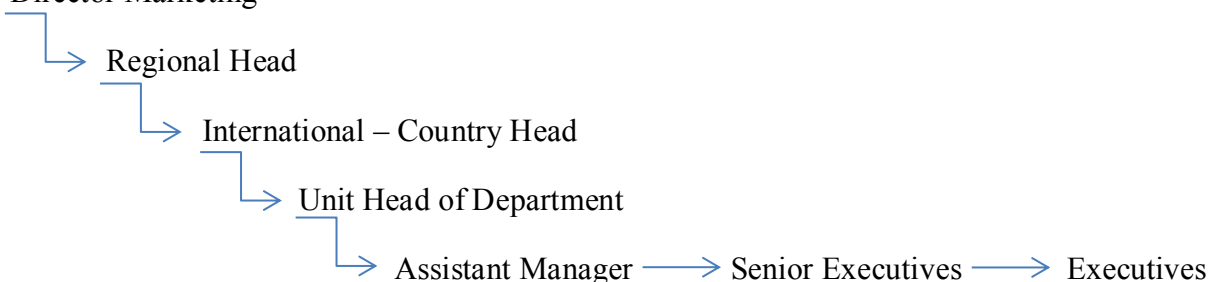
International patients avail treatment in India mainly because these facilities or treatments are not available in their respective countries, and are available at a much cheaper price in India than other countries such as US, UK or European countries. The countries from where patients come to seek treatment most commonly are Iraq, African countries (Nigeria, Congo), Oman, Uzbekistan, Afghanistan, Nepal, and Bangladesh.

The hospital provides:

- Various Regional Translators such as Arabic, Persian, Iraqi, Bangladeshi and Russian (In house interpreter).
- Assistance in ground transportation such as finding a shuttle, hiring a car or choosing any other mode of transportation within the city.
- Relationship Managers, who closely work with over 50 Diplomatic Missions and numerous Expat bodies to ensure that international patients have a comfortable and memorable stay in India.

Staffing:

Director Marketing



DEPARTMENT OF LAB SERVICES

INTRODUCTION-

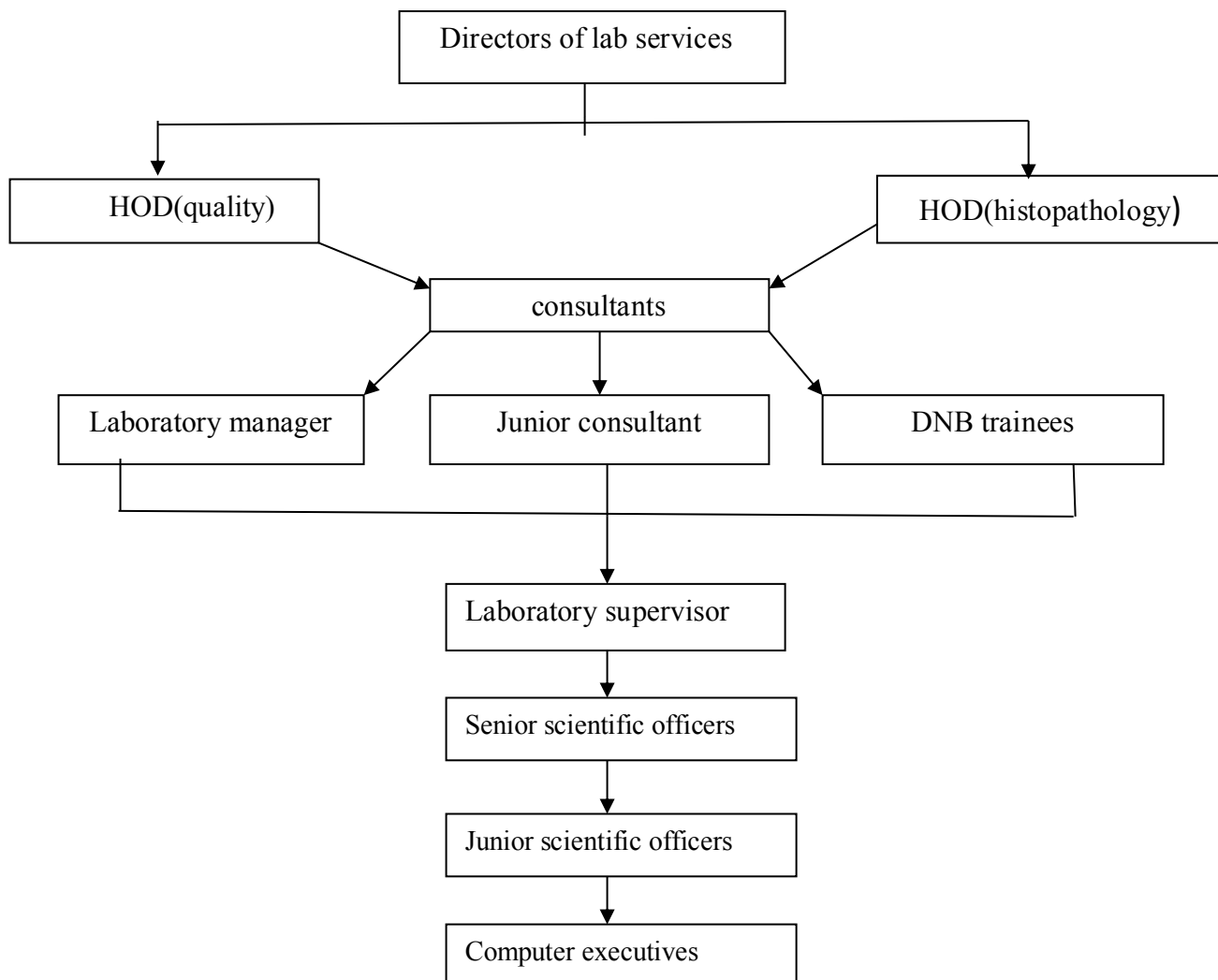
An ISO 9001:2000 certified lab, it is open 24 hrs a day. It's a high-tech lab with fully automated instruments which are directly interfaced with **hospital information system** and **laboratory information system**. Facility of stat tests (emergency) and sample collection from home is also available.

LABORATORY COMPRISES OF THE FOLLOWING DEPARTMENTS-

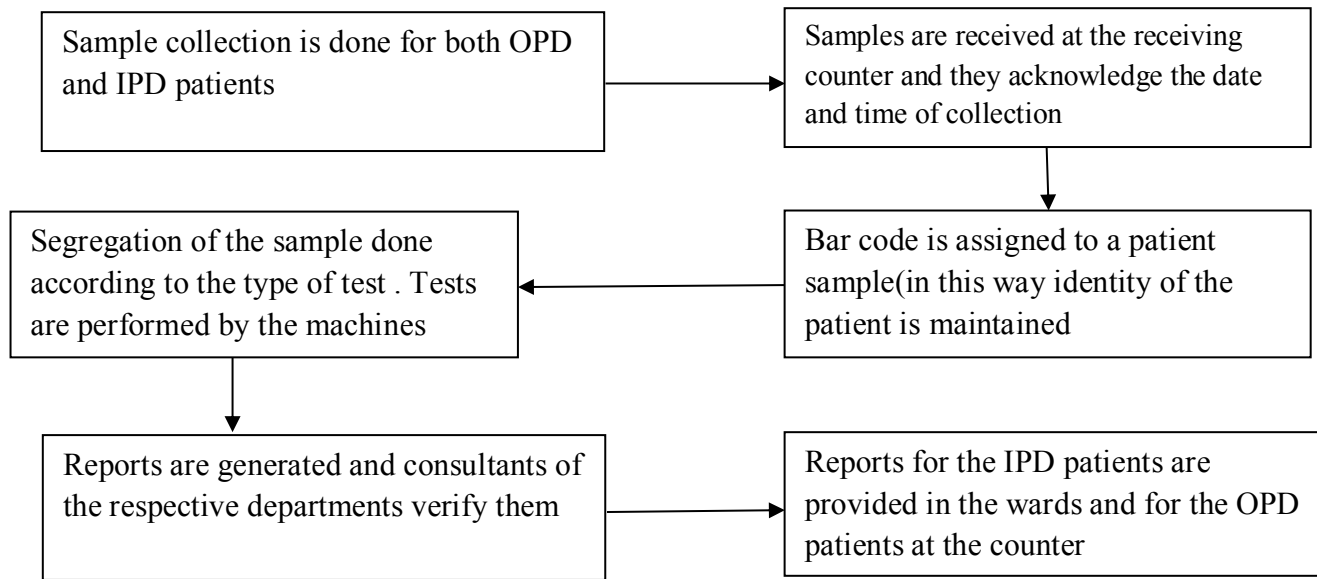
- Biochemistry
- Haematology
- Immunoassay
- Histopathology
- Clinical pathology
- Serology
- Microbiology

HIERARCHY- The Department Of Lab Is Broadly Divided In Two Departments

- Lab medicine
- Histopathology



PROCESS FLOW-



LABORATORY INFORMATION SYSTEM- It is connected with with hospital information system

- Sample received-red color
- Samples acknowledged-yellow color
- Test done-blue color
- Result verified-green color
- Billing done-pink color

RADIOLOGY DEPARTMENT:-

Situated at the ground floor of the west wing of the hospital.

Procedures done in the department:-

(1) Routine X-Ray studies

- (a) Plain - e.g. chest, spine, etc
- (b) Routine fluoroscopic procedures e.g. Barium studies

(2) Routine ultrasound studies

- (a) Ultrasonography - e.g. Abdomen, Pelvis
- (b) Doppler studies peripheral (B/W & colour) e.g. 2 D echo, vascular studies, etc

3)Mammography

4)Dexascan

5) Special imaging techniques

- (a) CT Scan (Computerized Axial Tomography)
- (b) MRI (Magnetic Resonance Imaging)

Divided into two parts:-

- 1) For ultrasonography, mammography, dexascan
- 2) For CT Scan, MRI, X ray, fluoroscopy

Consist of:-

- 1) Reception:-Counter for appointment and billing
- 2) Waiting room with general facilities like toilets, drinking water, air conditioning
- 3) Diagnostic room
- 4) Counseling room
- 5) Changing room
- 6) Film processing room
- 7) Radiologist office
- 8) Report collection room

There are two MRI and one CT scan machine in the department.

Timings for OPD patients:- 8am to 8pm

In between this IPD and Emergency patients are also taken.

Main OPD hours: - 8am to 6pm and after 8pm only IPD and Emergency patients are taken

Report collection: - If the scan is done before 12pm, reports are ready by the evening and can be collected in the same evening. And if done after 12pm, report will be delivered next day.

Patient who comes in the radiology department either walks in or takes the appointment.

Appointment patients are given preference whereas walk in patients have to wait. Emergency, doctor's referred patients or ICU patients scan is done as soon as possible.

Process flow in radiology department(OPD)



Figure:-Process flow in radiology department for outpatients.

Firstly, the patient comes to the radiology front desk after been prescribed by doctor for the scan; patient is either taken prior appointment or walk in patient. The availability of the slot required is then checked for the walk in patient by the front desk. Once the slot is checked, the requirements for the scan i.e. condition of the patient required to undergo the scan is checked.(E.g. proper creatinine level for renal patients).After that the patient is been provided the appointment and been told to wait for his turn. Finally the procedure is been performed

CENTRAL STERILIZATION SERVICE DEPARTMENT

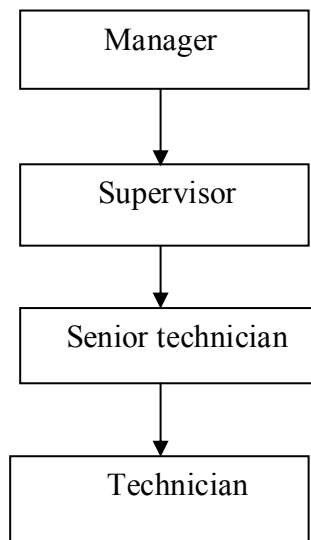
INTRODUCTION-

CSSD is the heart of the hospital infection control and the most important unit of the clinical support services. CSSD role lies in receiving, cleaning ,packing, disinfecting, sterilizing, storing and disinfecting instruments as per well-delineated protocols and standardized procedures.

CSSD department in max healthcare ,saket is a centralized department and the location of the department is in the basement

The main aim of the CSSD department is to reduce the level of micro-organisms from 10^6 to 10^{-6} .

HIERARCHY OF THE DEPARTMENT-



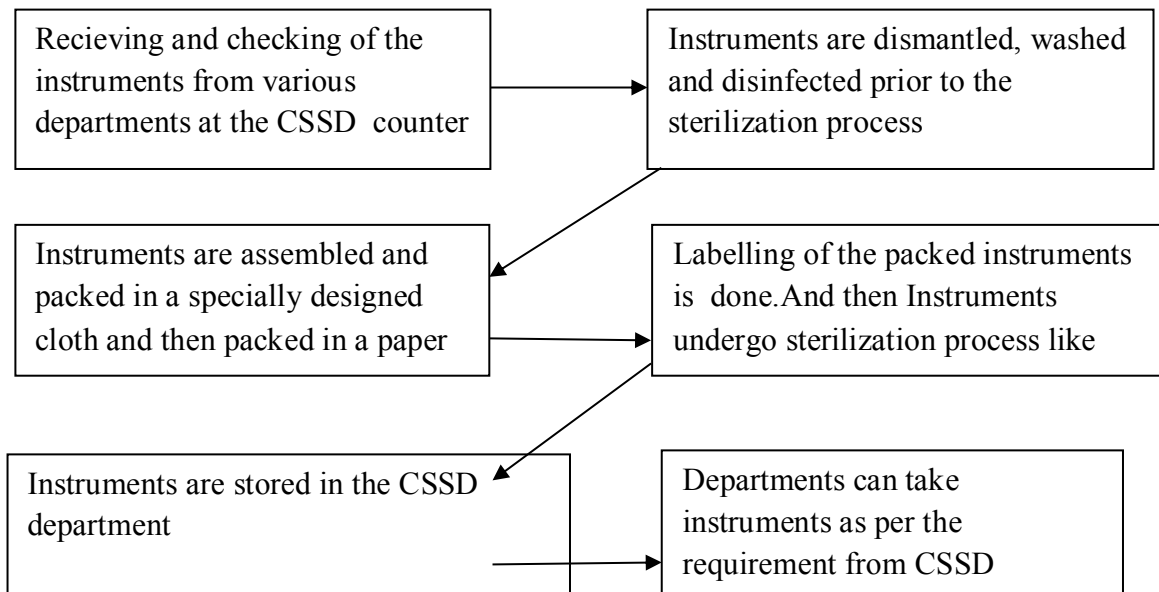
ZONES PRESENT-

- Decontamination
- Clean
- Sterile

Colour coding for the following zones -

- Decontamination area-red colour
- Clean area-blue colour
- Sterile area-green colour

PROCESS FLOW-



- At the time of receiving the instrument at the CSSD department, the instruments are counted, checked for any damage, segregated according to the method of sterilization required for the instrument.
- Instruments used for the washing of the instruments are fully automated and according to the European standards.
- For packing of the instruments medical grade paper and cloths are used which are specifically designed for the purpose(they have a zig -zag pattern)
- Once sterilized and packed instrument can be used within 6 months.

EQUIPMENT LIST-

- Washer-
- Autoclave -
- Plasma sterilizer-
- ETO sterilizers-
- Dryers-
 - Air-guns-
 - Water-guns-
 - Ultrasonic cleaners-

QUALITY INDICATORS-

Various quality indicators used in CSSD are-

- **Batch monitoring strip-** a yellow colored strip which is attached to every lot which on exposure to right temperature and pressure turns black

PHARMACY

Max pharmacy is self-owned with Central Pharmacy situated at corporate office, Okhla. There are 2 In-patient pharmacy stores and 2 Out-patient stores in the hospital.

PURCHASE

Auto purchase requisition is given to central purchasing team which is forwarded to vendor (outsourced). For purchasing the items ABC method is followed. Weekly requisition is done and vendors take minimum 3 days for delivery of drugs to hospital.

STORING OF DRUGS

Medicines are arranged according to VISTA (e-care) in Client patient record system via generic name in alphabetic order in racks, shelves, cupboards and drawers. Oral, parenteral and topical items are stored separately. Near expiry (expiry within 3 months) is stored in separate designated area to expedite the consumptions.

INDENT AND DISPENSE OF MEDICATIONS.

In patient pharmacy-

In CPRS, Medication orders posted by the clinicians is verified by pharmacist on PUTTY System labelled with (patient info, SSN no., drug name,) then the medications are dispatched after Billing via HIS (Hospital information system) and finally handover to GDA to dispense medicines. The Stat orders required immediately are dispensed within 30 minutes. The normal order is dispensed within 1 hour and routine order is delivered by 1 round per day.

NARCOTICS DRUGS

They are kept in double lock and key system. Documentation of narcotic drugs is appropriately maintained.

Narcotics drugs under statutory regulation being used in max hospitals includes: injection and transdermal patch of Fentanyl and injection and tab. of Morphine.

LOOK ALIKE AND SOUND ALIKE DRUGS

Look alike and sound alike medications have high medication error due to similarities in nomenclature and packaging.

In the main pharmacy stores, (SALA Medications) are stored separately in 2 adjacent racks with blue coloured sound alike and pink coloured look alike medications warning stickers to avoid confusion while dispensing.

Medication Recall: If a drug is found to be defective, it is reported to the Okhla office where the records for that particular series of drugs dispensed is checked and verified for medication recall.

Licences acquired by Max hospital pharmacy -

- 1) Pharmacist License
- 2) Narcotics License

INVENTORY MANAGEMENT PARAMETERS

I. ABC Class

A Items: 7 days

B Items: 10 days

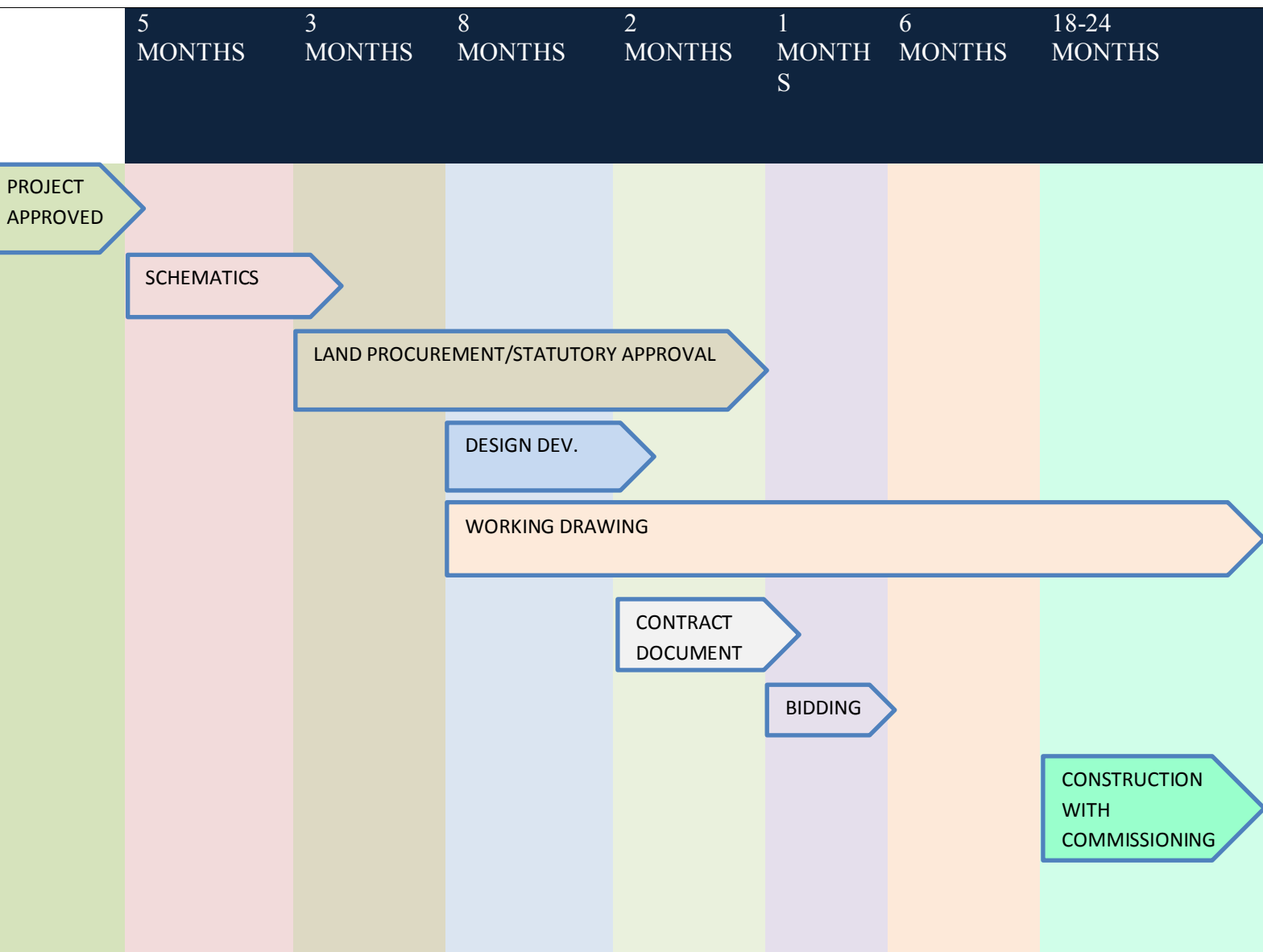
C Items: 15 days

II. EOQ - (economic order quantity)

III. LEAD TIME – Time from ordering to delivery of drugs

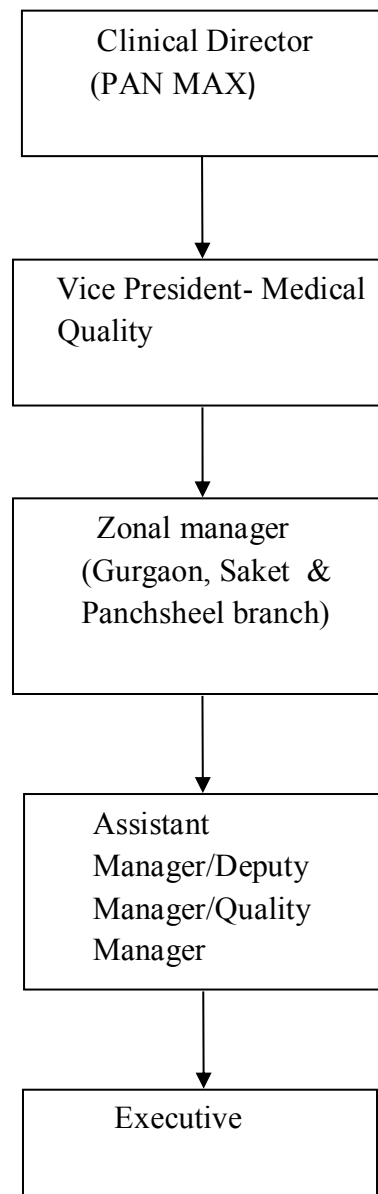
IV. VED – Vital Essential Desirable (According To move of drugs)

V. BULK MEDICINE.

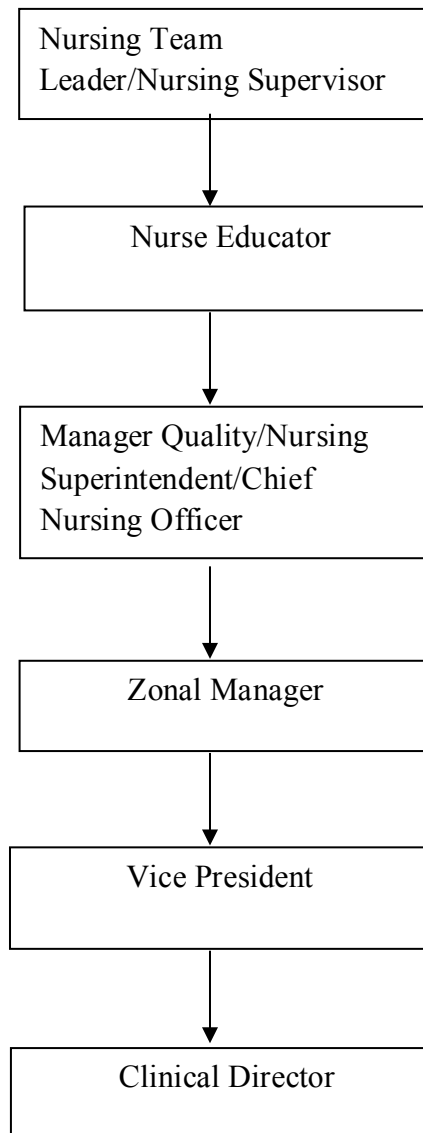


MEDICAL QUALITY DEPARTMENT

Organogram of the department



Flow of reporting in the Quality Team:-



The different **indicators of medical quality** are:-

1. Falls
2. Nosocomial infections
3. Phlebitis
4. Medication errors
5. Near miss(incident might have occurred)
6. Needle stick injury
7. Pressure sores
8. Hypoglycemia
9. Adverse drug reactions
10. Blood transfusion related errors

11. Infection outbreak
12. Notifiable diseases
13. Sentinel events-wrong patient, wrong surgery, wrong side, foreign body left inside cavity.
14. Code blue-Rapid Response Team(RRT)
15. Mortality- data categorized by area, speciality,age
16. Other adverse events
17. Readmission within 14 days of discharge/Return to Emergency within 7 days
18. Return to OT within 7 days
19. Return to ICU within 7 days.

NURSING QUALITY DEPARTMENT

Purpose- To know where nursing quality is lacking.

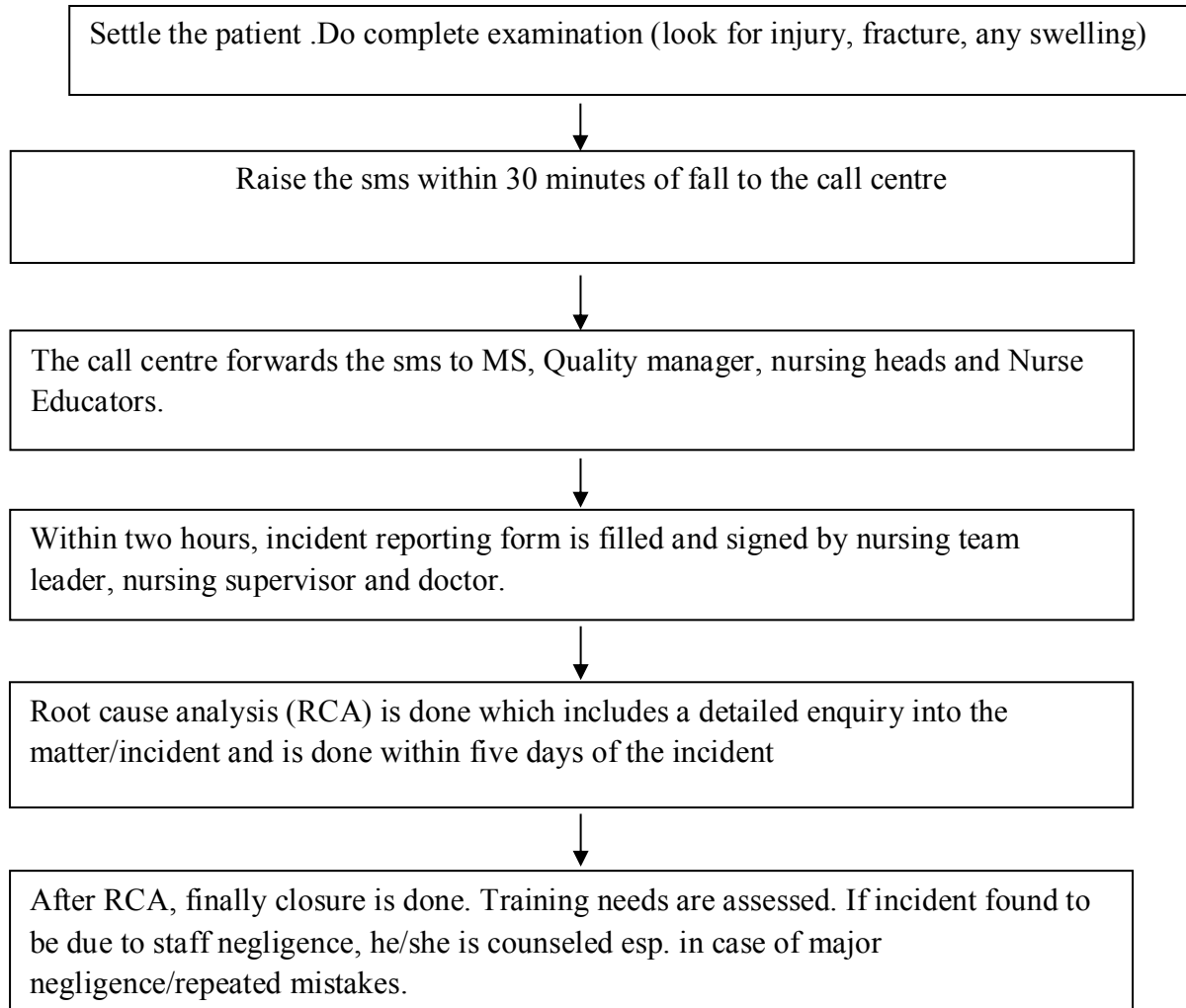
There are a total of **seven indicators** of nursing quality:-

1. Patient falls
2. Medication errors:-is of four types:-
 - Prescription error-mistake of doctors
 - Dispensing error-mistake of pharmacist
 - Administration error-mistake of nurses
 - Documentation error-mistake of nurses where they fail to document after administration of medicines.
3. Pressure sores: - outside/inside pressure sores

Outside pressure sores means those acquired before admission while inside pressure sores means those acquired post admission. There are special wound care nurses who look after pressure sore dressings and work jointly with plastic surgeon's team.
4. Hypoglycemia-Random blood sugar level falling below 60mg/dl has to be informed. It is called negligence if nurse doesn't inform doctor or fails to recheck the blood sugar.
5. Needle stick injury
6. Health care associated infection is of four types:-
 - CAUTI-Catheter Associated Urinary Tract Infection
 - CLABSI-Central Line Associated Blood Stream Infection
 - VAP-Ventilator Associated Pneumonia
 - SSI-Surgical Site Infection

7. Phlebitis-It is defined as inflammation of vein which has different signs and symptoms like redness, swelling, pain and inflammation. A phlebitis checklist is maintained.

Flow of reporting an adverse event (e.g. falls)



SERVICE QUALITY DEPARTMENT

This department deals with the quality of the services provided by the hospital.

Feedback forms that are kept in the feedback box in every department are collected daily and then divide it into positive and negative forms. Suggestions are also considered as negative feedback

After going through all the complains lodged by the patient or their attendants, service quality departments informed the respective department head within 24 hrs about these responses from their department and tell them to rectify or improve the quality of their services.

Department head who look after these services then try to know the root cause of the problem and within 72 hrs solve and close the case by providing proper training or counseling

Various ways to collect the feedback:-

- 1) Through feedback forms
- 2) Through blogs
- 3) Directly to the quality manager

Everyday quality manager takes a round to every ward to know their problems or feedback about the services provides to them.

This will help to know the various issues related to the quality of the services provided by the hospital and to help them to understand the various areas which need to be improved.

Issues can be related to:-

- 1) Behavior of the staff,nurses,doctors
- 2) Cleanliness
- 3) Quality of food
- 4) Getting medications on time or not
- 5) Delay in any of the services etc.

Therefore, this department plays a very important role to understand the needs of the patient or their attendant and to improve the quality of the services provided by the hospital.

BLOOD BANK

Max super specialty hospital has its own blood bank. All blood groups are available. But it is preferred that patient arranges blood through his relatives or any friend and should give replacement.

Blood bank consist of

1. Sample collection area / reception area: In reception area a form is given to the attendant of the patient regarding their details before he/ she donates the blood.
2. Apheresis area: blood have several components including red blood cells platelets and plasma. Donor aphaeresis is a special type of blood donation in which a specific component platelet, plasma is withdrawn from donor
3. Component room: In component room the whole blood is separated into packed cells FFP and platelets.
4. TTI room: it is to diagnose transfusion transmitted infections. If donor is detected positive for TTI status it means donor have the potential to transmit the infection to their partner and children.
5. Issue room: This room is to issue the screened blood bags.

Staff of blood bank consists of 1 HOD, 2 blood bank officer, 1 technician supervisor, 16 technicians, 2 staff nurse, 2 computer executives, 4 GDA.

BIOMEDICAL ENGINEERING

- The department of biomedical engineering deals with the purchase, installation & commissioning, training on operating, handling and maintenance of all the medical equipments in all the areas and departments of the hospital.
- Also deals with the in-house calibration of equipments.
- Gas manifolds are also handled by the biomedical department.

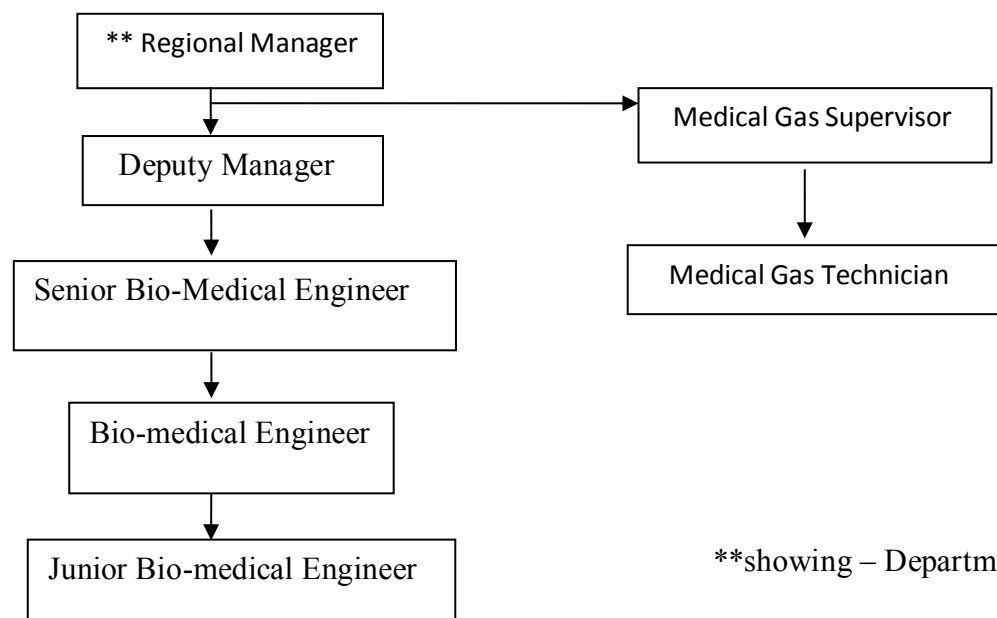
The areas included are:

- All wards
- All operation theatres
- All ICUs
- Patient rooms
- Radiology
- Triage
- Blood Bank
- Nuclear medicine
- Cardiac non invasive diagnostics
- Medical Gases
- Medical Furniture
- LINAC

Objectives:

- To maintain assets list
- To conduct preventive maintenance for biomedical equipments.
- To ensure timely repair of biomedical equipments medical furniture.
- To conduct calibration/validation of biomedical equipments.
- Preventive maintenance for Medical Gas equipments.

Organizational chart



**showing – Department head

SECURITY DEPARTMENT

The security department is an eye and ear of every organization acting as a liaison between management and staff. The control room of Security Department is located on B1 (basement) of East Wing, Max Saket.

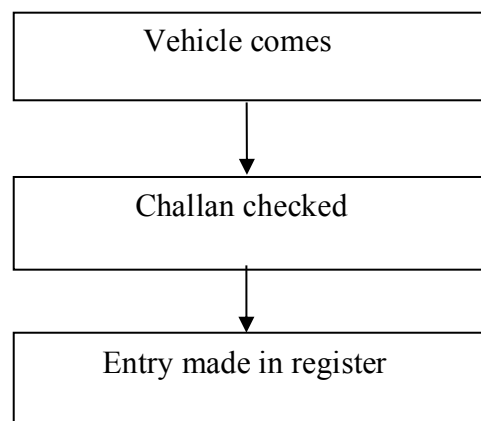
Functions of Security Department:-

1. Security management:-

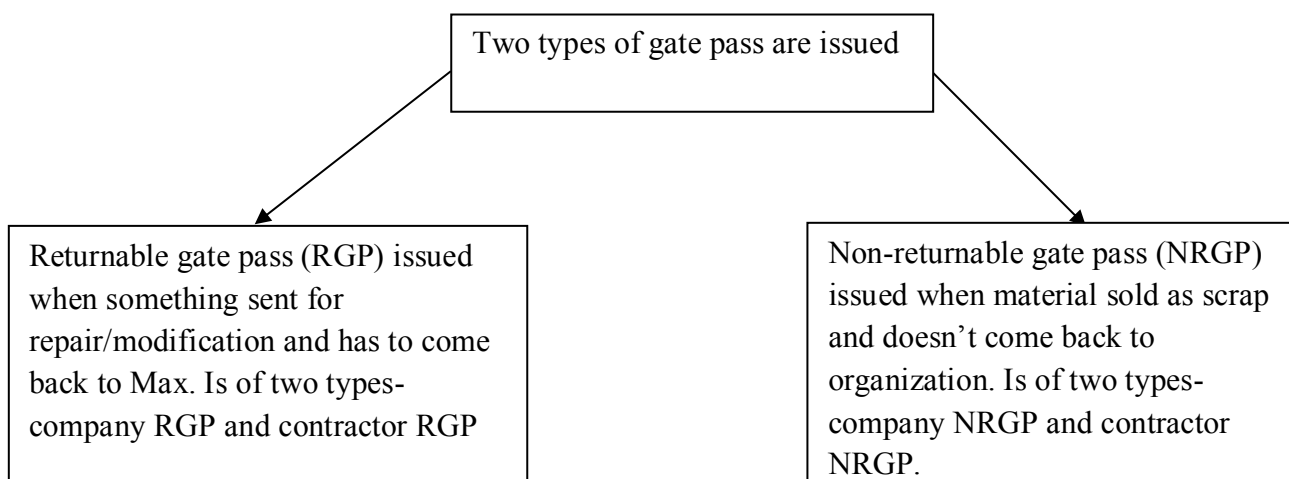
- Selection of people(guards and supervisors)
- Deploying of security staff to different floors and departments
- Checking of people entering hospital
- Turnout and grooming of security staff
- Training of security staff
- MLC handling
- Dispute handling

2. Material management:-It includes management of both incoming and outgoing materials.

a. Flow for incoming materials:-The incoming materials are received either from a company or a contractor to Max.The process flow is as under:-



b. Flow for outgoing materials



3. Disaster management:-

There are six emergency codes:-

1. Red- Fire
2. Black- Bomb threat
3. Blue-Cardiac arrest
4. Yellow- External disaster like earthquake
5. Violet-Violent patient
6. Pink- Missing patient

The SOP's and disaster management plans are prepared by the Security Department. Fire management system includes smoke detectors, sprinklers fitted on ceiling and fire shafts in all corridors.

Walkie talkies are an important source of communication.

Other disasters include floods, water logging, terrorist attacks.

4. Valet management:-

- Helps to optimally utilize the parking space.
- Within a time frame of maximum 7 minutes, vehicle is handed over to customer when asked for in porch.

CALL CENTRE

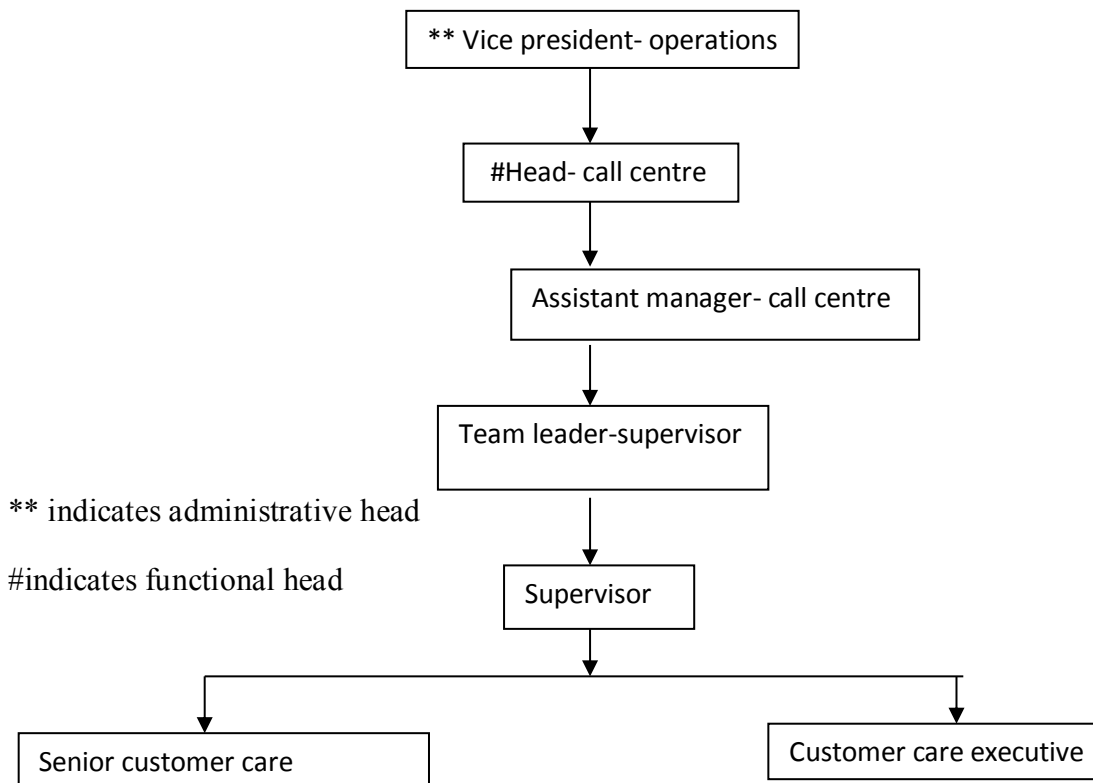
Call centre of Max hospital, saket operates at 24*7. It is centralized patient contact centre for saket. It can be used as an information centre for all customers.

Call centre deals with:

- Doctor's appointment
- Health check ups
- Radiology and diagnostic appointments
- Patient's information
- Doctor's information
- Employee's information
- Speciality information
- Other department information
- It handles internal emergency e.g. Blue code

Main board line number is: 26515050

Organization chart:



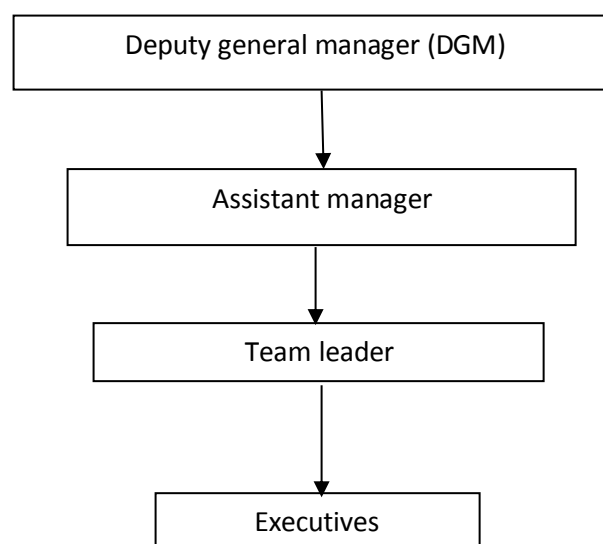
FOOD AND BEVERAGES

Introduction

Food and beverages department deals with supply of food to the patients sometimes to the patients attendant and during the various conferences and meeting in the organization.

Although food and beverages dept at the max healthcare centre is outsourced to the sodexo food services but controlling power is with **max employee**.

Organization chart

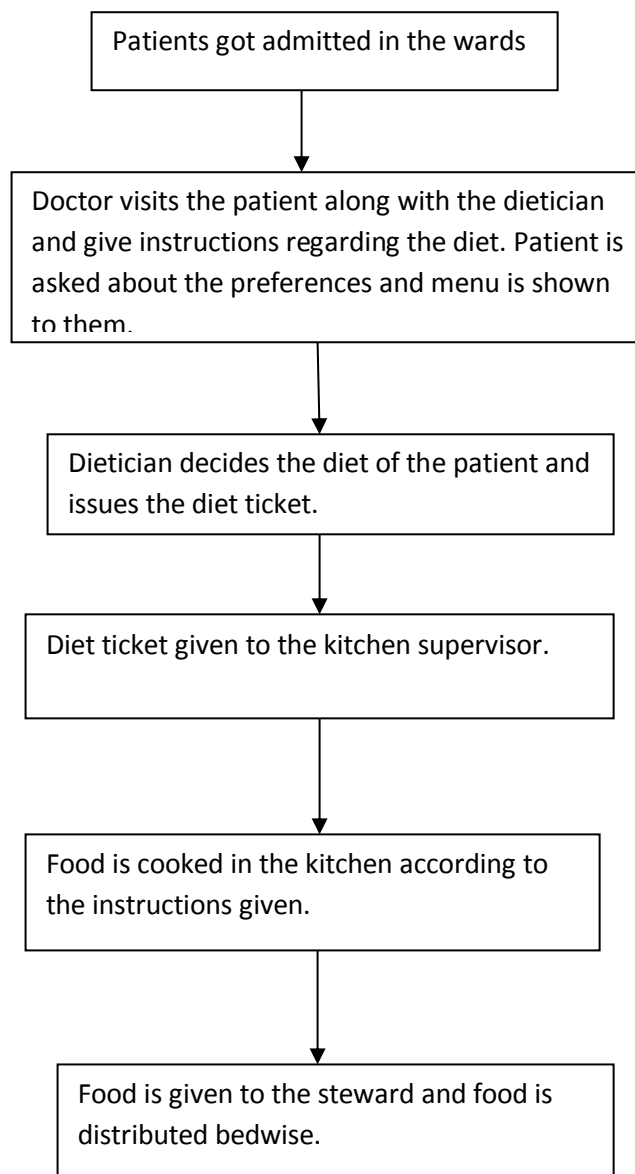


- The department consist of one head chef from Max , 26 chefs are from sodexo,72 stewards from sodexo.
- Dietician -25 of Max.
- Max chef keeps check on quality of food provided to the patients.
- The task of the sodexo is to provide food to ipd patients , max staff and visitors.
- Other then sodexo there are various food outlets which are as follows
 - Sagar ratna
 - Café coffee day
 - Subway
 - Quality express

Royalties are being charged from these outlets.

Process flow

Supply of food to the patients



Time table for the diet of the patient

7-8AM	Breakfast
10:30-11:30AM	Soup/Beverages
1-2PM	Lunch
4-5PM	Evening tea
6-7PM	Soup
8-9PM	Dinner

- Dinner of the same day, breakfast and lunch of the next day are decided prior in the evening and diet tickets are issued by the dietician and given to the chef.
- Apart from these if patients wants to have something extra ,those can be provided to the patient after consulting dietician ,but for an extra charges.

Different menu offered are –

- Indian menu
- Afgani menu for middle east patients.
- Continental menu
- No onion and no garlic menu for jain patients



A STUDY ON

EFFECTIVENESS OF TIME MANAGEMENT FOR

INTERNATIONAL PATIENTS UNDERGOING

RENAL TRANSPLANTS AT MAX HOSPITAL, SAKET

TITLE

A Study on Effectiveness of Time Management for International patients undergoing Renal Transplants at Max Hospital, Saket, Delhi

EXECUTIVE SUMMARY

Max Healthcare was launched in 2001 with a vision to deliver international class healthcare with a total service focus. The renal transplant unit was introduced at Max, Saket six months ago and has been carving a niche for itself amongst other departments ever since. About 14-15 renal transplants take place every month which involve providing consultation, diagnostic, pharmaceutical, out-patient and in-patient facilities to the patient under different packages chosen by the patient according to his/her convenience. Being an NABH accredited hospital, Max serves among the top preferences by international patients, accounting for 33% of the total renal transplants taking place every month. A delay in services provided by either of the departments mentioned above leads to a huge setback to the transplant process thereby, involving a greater risk to the hospital's stature as a whole.

A descriptive cross-sectional study carried out for duration of 4 weeks with a sample size of 10 patients aims to provide an insight on the "Effectiveness of time management for international patients undergoing renal transplants". As these patients need a visa and a considerable time off from work (1 month and 1 week minimum) to come to India to avail treatment, they must be offered the cure and care within a specific time frame, taking their return dates into account. This duration is extended to (3-4 months) leading to increased levels of dissatisfaction to the patients. The issues mainly faced by them are communication gaps due to inefficient information given to them by the staff, thorough medical examination and investigations that are not carried out in an orderly manner, extensive in-depth legal formalities, and gaps in transition from one step of the transplant process to the other. The study highlights the problems faced by the patient and provider during the transplant process and suggests areas for improvement such as maintaining transparency of the process, modifying the legal proceedings, etc.

INTRODUCTION

Renal Science Department in Max hospital, Saket is a recent addition to the various multi- and super specialties available at the hospital. It is a 6 month old entity which is growing fast in terms of patient inflow as well as generating revenue.

The department includes the following sub-departments:

- Nephrology
- Urology
- Renal Transplant
- Dialysis unit
- Renal Operation Theatre

The Renal Transplant procedure is a treatment that integrates all the three units, Nephrology, Urology and Dialysis. Till the time a patient receives a renal transplant, he/she has to undergo regular dialysis. Also, before a patient is declared fit to receive a kidney, he/she has to undergo various nephrology and urology tests, along with other routine medical investigations. Both, the urology and nephrology team, in conjugation, perform the transplant surgery.

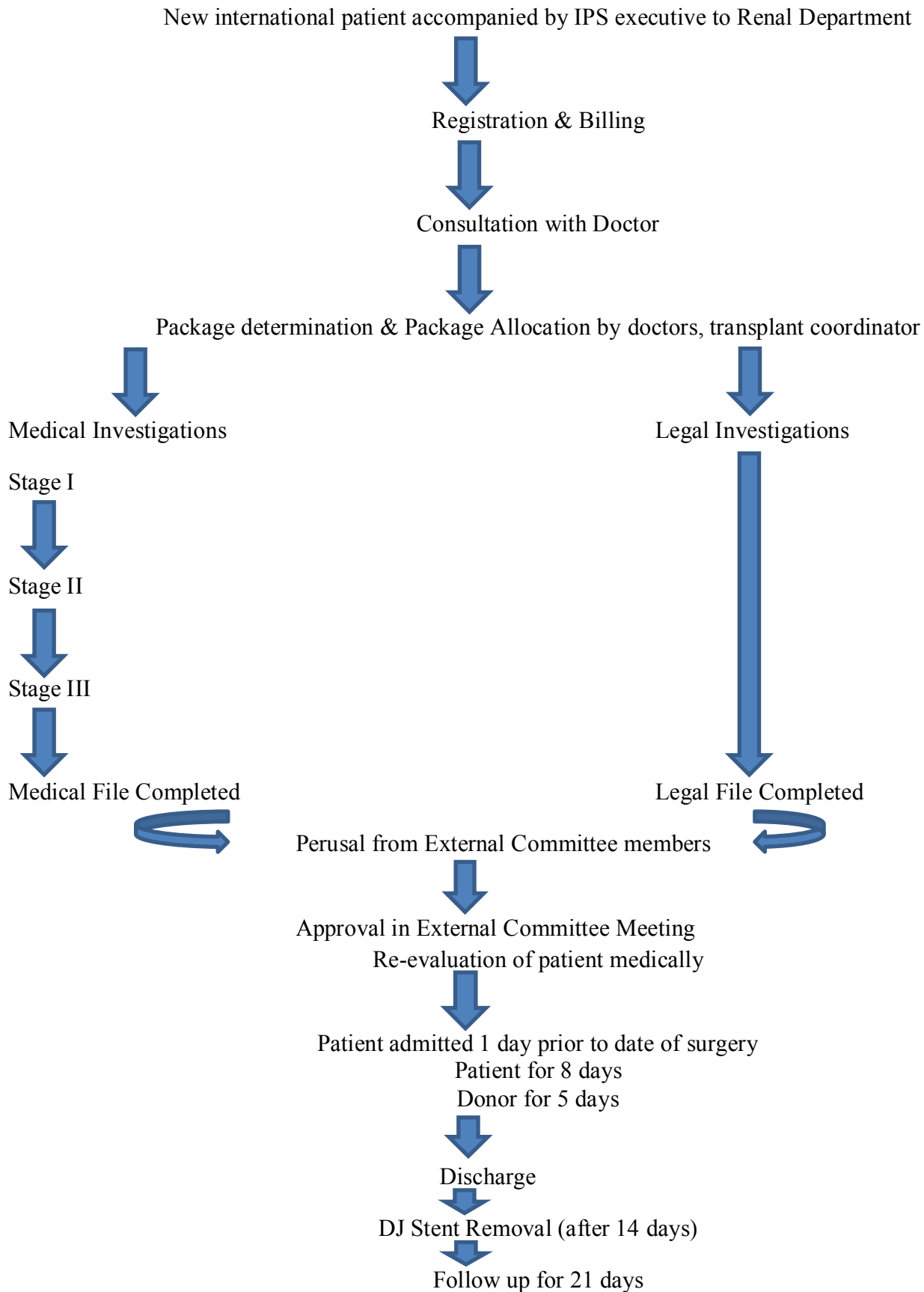
The transplant procedure involves rigorous medical evaluation of both, the donor and the recipient along with extensive legal documentation. This makes the process prolonged and tiresome for the patients to follow through.

A separate department known as International Patient Services (IPS) is dedicated for proper facilitation and treatment of international patients, and to promote medical tourism. From the time a patient sends a query via phone or mail from his/her home country, to the time the patient is declared fit to go back home after post-transplant follow ups, IPS coordinates and takes care of every patient including pick-up from the airport to departure. IPS also provides translators or interpreters and coordinators for foreign nationals who are unable to comprehend and converse in English language. He/she guides the patient throughout the process at every step.

On an average, 5-6 international patients come for renal transplant every month. Nigeria, Bangladesh and Uzbekistan are among the leading countries from where patients come for treatment. Other countries are Afghanistan, Zambia, Iraq, Nepal, Myanmar and Oman.

To simplify the process, these patients are offered a range of Kidney Transplant Packages (KTP), from which the patients choose the desired package on the basis of their concerns such as monetary, etc. The legalities are even stricter involving a meeting held by the external committee to scrutinize and interview both, the patient and donor. Therefore, an efficient system is required to accelerate the existing transplant process.

Transplant process at Max hospital, Saket



BACKGROUND

Transplant process at Max

Step 1:

A new patient gets registered at Max hospital in the Renal Department for the first time and a unique Max ID is generated for that patient. In case, the patient has previously been registered at any of the Max branches, the same Max ID can be used for registration.

Step 2:

The patient visits the Nephrology or Urology consultant and transplant procedure and details of surgeries are explained to him/her. The desired package including the list of facilities available to the patient within the package, are assigned to the patient by the IPS team. The patient is asked to proceed with the medical and legal investigations.

Step 3:

The medical investigations include a series of routine and serological tests of both the donor and the patient (Annex) These tests are divided into 3 stages and need to be followed in the given order i.e. only after completion and appropriate results of Stage I, the patient and donor can proceed to medical investigations of Stage II and so on.

In case any report of the donor is contrary or levels obtained are greater or lesser than the prescribed values, the donor is rejected and is declared unfit for donation on medical grounds. The patient can then start the proceedings afresh with a new donor.

Also blood group compatibility is a pre-requisite between the patient and donor. This can be appreciated as follows.

	Transplant Procedure			
Blood group of Donor	A	B	AB	O
Blood group of Patient				
A	Approved	Rejected	Rejected	Need to go for Plasmapheresis pre-transplant
B	Rejected	Approved	Rejected	Need to go for Plasmapheresis pre-transplant
AB	Approved	Approved	Approved	Approved
O	Rejected	Rejected	Rejected	Approved

Plasmapheresis (PP), as a preconditioning protocol for ABO incompatible transplants, may take form of plasma exchange, where a patient's plasma is removed and replaced with human albumin and fresh frozen plasma or another substitute. This was one of the first methods to show success in alloantibody reduction. It has been widely used to reduce pre-transplant antibody levels.

Recently ABO incompatible renal transplants have been performed using plasmapheresis (PP) as a part of the preconditioning protocol at Max, Saket. The objective of PP along with immunosuppression, followed at Max, Saket was to bring down the antibody titer of the patient to ≤ 2 during the transplant and keep it low, around ≤ 4 , until post-operative 4-14 weeks.

Step 4:

The legal formalities are commenced simultaneously as soon as the patient and donor clear Stage I of medical investigations. They include affidavits from the patient and donor and one close relative of the donor (Annex) along with legal documents that serve as relationship proof, identity cards (ID cards), income and residence proofs. The checklist for legal file (Annex) is attached and counter-checked while proceeding the legalities.

Documents that can be used for international patients

- As ID proofs : Passport, Birth certificate, Death certificate, National ID
- As relationship proofs :
 - For near-related living donor – Birth certificate, Death certificate, Passport
 - For spousal living donor – Marriage certificate
 - For unrelated-living donor – Birth certificate, Death certificate, Passport, National ID
 - The above documents along with old photographs of donor and recipient together

Forms (Annex) required for:

- For near-related living donor – Forms 1, 4, 11, 18, 21
- For spousal living donor – Forms 2, 4, 6, 11, 21
- For unrelated living donor – Forms 3, 4, 11, 18, 21

All the photocopies of the original documents must be attested by the country's embassy and are then only considered valid and as a legal proof.

Step 5:

Once all the medical investigations reports are up to the mark and legal file is completed with all the documents and proofs, a copy of the file is sent to the External Committee for perusal.

Once the file is pre-approved, a date is decided mutually among the members of the committee for approval and the meeting is held to personally interview the donor and recipient regarding the transplant formalities. The meeting is video-recorded for proof and records. On the basis of authenticity of the documents submitted and interview of the donor and recipient, the committee approves or rejects the patient-donor case.

In case a patient-donor case is rejected by the committee, they cannot appear in front of the authorization committee of the same state again. This information is also conveyed to other hospitals of the same state when the patient tries for a transplant at other hospitals.

External Committee members include:

- Chairman, Max Super Specialty Hospital
- DHS or Nominee
- Health Secretary or Nominee
- Two members of high social standing
- Two members of Max Super Specialty Hospital

Step 6:

Date of the transplant surgery is then decided by the Nephrology or Urology HODs and conveyed to the patient.

Step 7:

A medical re-evaluation is done prior to the surgery by the doctors of the Urology or Nephrology teams and in case any report shows levels that aren't appropriate, the case is kept on hold.

Only after the medical re-evaluation is approved by both teams, the patient and donor are declared fit for surgery.

Step 8:

Donor and recipient are admitted one day prior to the date of surgery in the wards of transplant unit.

Step 9:

Surgery is performed on the given date.

Step 10:

Donor is discharged after 5 days from the date of admission.

Recipient is discharged after 8 days from the date of admission.

The doctor prescribes discharge medications and gives the date for first follow-up visit. The patient has to follow strict diet change and precautions to prevent failure of the surgery which are explained to the patient at the time of discharge.

Step 11:

After 14 days from the discharge of the patient, a DJ stent removal procedure is performed in the patient.

The patient is required to come twice a week for regular follow-up visits for 21 days from the date of discharge. Doctor's consultation during the first week only is included in the package availed by the patient.

The donor is needed to come for follow up visit for one week only.

Every time the patient comes for follow up, he/she is required to go through medical tests and get the reports of Complete Blood Count and Renal Profile for assessment of recovery by the doctor.

REVIEW OF LITERATURE

- Medical Tourism

Medical tourism is a growing sector in India. India's medical tourism sector is expected to experience an annual growth rate of 30%, making it a \$2 billion industry by 2015.[1][2]As medical treatment costs in the developed world balloon - with the United States leading the way - more and more Westerners are finding the prospect of international travel for medical care increasingly appealing. An estimated 150,000 of these travel to India for low-priced healthcare procedures every year.[3]

Advantages for medical treatment in India include reduced costs, the availability of latest medical technologies,[4] and a growing compliance on international quality standards, as well as the fact that foreigners are less likely to face a language barrier in India. The Indian government is taking steps to address infrastructure issues that hinder the country's growth in medical tourism. The government has removed visa restrictions on tourist visas that required a two-month gap between consecutive visits for people from Gulf countries which is likely to boost medical tourism.[5] A visa-on-arrival scheme for tourists from select countries has been instituted which allows foreign nationals to stay in India for 30 days for medical reasons.[6]

Confederation of Indian Industry reported that 150,000 medical tourists came to India in 2005, based on feedback from the organization's member hospitals. The number grew to 200,000 by 2008. A separate study by ASSOCHAM reported that the year 2011 saw 850,000 medical tourists in India and projected that by 2015 this number would rise to 3,200,000.[7]

- Max Hospital, Saket

Lower treatment cost does not necessarily mean lower healthcare standards. This is where Max Hospital, Saket steps in. With a vision “to deliver international class healthcare with a total service focus, by creating an institution committed to the highest standards of medical & service excellence, patient care, scientific knowledge, research and medical education”, and a passion to “build trust”, Max truly focusses on obtaining maximum patient satisfaction without compromising on quality of healthcare provided.

On an average, 14-15 renal transplants are carried out at Max, Saket every month out of which 33% is accountable by international patients.

- Renal Transplantation

In humans, the kidneys are two small organs located near the vertebral column at the small of the back. The left kidney lies a little higher than the right kidney. They are bean-shaped, about 4 in. (10 cm) long and about 2 1/2 in. (6.4 cm) wide.[8]

The kidneys have a couple of different functions. The main purpose of the kidney is to separate urea, mineral salts, toxins, and other waste products from the blood. The kidneys also conserve water, salts, and electrolytes.[8]

Although humans are born with two kidneys, it is possible for a person to survive with only one. This is because each kidney is packed with renal tissue, which is more than enough for daily use and is quite capable of carrying out the necessary functions all on its own.[8]

Kidney transplantation or renal transplantation is the organ transplant of a kidney into a patient with end-stage renal disease. Here, the surgeon places a healthy kidney from another person's body (donor) into patient's body. The surgeon places the new kidney inside your lower abdomen and connects the artery and vein of the new kidney to your artery and vein. Your blood flows through the donated kidney, which makes urine, just like your own kidneys did when they were healthy. The new kidney may start working right away or may take up to a few weeks to make urine.[9]

When a person has 'RENAL FAILURE', the kidneys do not properly filter harmful waste products; as a result, excess wastes and chemicals start to accumulate in the blood. When this happens, a dangerous accumulation of waste products can occur, causing a condition known as uremia. Patients with irreversible renal failure have two options of treatment:

1. Dialysis, where the waste products from the blood are removed artificially
2. Kidney transplantation

Candidate for Kidney Transplant:

Any patient whose own kidneys have failed permanently is a potential candidate for a kidney transplant. There are several factors in each individual case, which determine whether a kidney transplant or lifelong dialysis is the better form of treatment for that patient. These factors include age, availability of family donors and the presence of antibodies in the patients (this increases the risk of kidney failure after transplantation).[10]

Not a Candidate for Kidney Transplant:

For some people, a kidney transplant may not be an option due to other medical problems. Some of the most common reasons you would not be eligible for kidney transplant include the following:[10]

- Significant cardiovascular disease
- Active malignancy or history of cancer within the last five years
- Alcohol and drug dependency or abuse
- Psychiatric (Mental) disorders that are not controlled by treatment
- Non-compliance with medication and physician treatment recommendations
- Obesity (Overweight patients will be evaluated by the Transplant Surgeon and weight reduction programs may be recommended before the medical evaluation can be initiated or completed.)
- Severe liver disease
- Severe lung disease
- Active infection

Sources of Kidney:

- **Cadaver donors:** A cadaver kidney is removed from an individual who has been declared as brain-dead from non-kidney related causes, such as an accident or a stroke. Since a cadaver kidney is from a person not related to the patient, the kidney has less possibility of close antigen matching and thus less chances of success.
- **Living related donors** (genetically related): Very close relatives-parents, siblings (brothers & sisters), children, grandparents may donate a kidney to a near relative. This is because a normal individual has two kidneys and can live safely in good health with one kidney. Kidney donation does not alter the physical capacity or life-style or longevity of life of such a donor.
- **Spousal donors:** Husband-wife relations are taken into consideration for Spousal Donors. The relationship is proved through marriage certificate, identity cards involving spouse's name, wedding cards or photographs.
- **Unrelated kidney donors** (genetically non-related): When cadaver donors, living related donors, emotionally related donors are not available or are found unfit, then unrelated donor kidney transplantation can be considered, depending on whether a biological relationship exists between the donor and recipient. Patients should understand that the chances of rejection are higher. Exchanges and chains are a novel approach to expand the living donor pool.[10]

Kidney Transplant Evaluation:

During a kidney transplant evaluation, a transplant coordinator will arrange a series of tests to assess your treatment options. Tests and procedures performed during the evaluation include:

- Blood tests
- Tissue-typing tests (done on blood)
- General lab screening for evidence of hepatitis or other viral disease
- PSA (Prostate specific antigen) for men over the age of 50
- EKG (Electrocardiogram)
- Chest x-ray

Depending on a patient's age and gender, additional tests may be required. After evaluation, members of the transplant team will meet to review the case. They will decide as a group if further testing is necessary before any decision regarding transplantation can be reached.

Legal Status of Kidney Transplant in India:

As per the rules of Transplantation of Human Organs Act 2014 (THOA), only a relative who is compatible can donate a kidney to the patient. Among the relatives, there is a category called the near relatives which is parents, siblings, children and spouse. People in this category can donate the kidney if they are medically compatible without the permission of the Government. Any other relative not belonging to this category in addition to being medically suitable, the permission from the Government needs to be taken.

Cost of Kidney Transplantation in India:

Among the various healthcare facility, dialysis and kidney transplant is one of the major area that attracts international patients to India. The important reason behind people's preference to India is the availability of low cost dialysis and kidney transplant. Kidney transplantation in India costs a meagre amount as compared to the Western, European and other Asian countries. The success rates match international standards. Indian doctors have a wealth of experience in kidney transplants owing to the large number of procedures done.

Comparison of costs of kidney transplantation among various countries (with donor)

Countries	Average price
U.S.A	\$65,000
U.K.	\$76,500
India	\$15,000
Canada	\$50,000
Guatemala	\$31,500
Turkey	\$25,000

As health care costs are skyrocketing, people are looking for a medical treatment which is a delight to both, their health and their wallet. The cost of kidney transplant in India is still shrinking. The costs have dropped so significantly that it is now cheaper to have a kidney transplant done rather than being on dialysis for more

than two and a half years. India is capitalizing on its low cost medical care and highly trained doctors to appeal to the medical tourists. To have a hassle free and quick kidney transplant, India is the best option.[11]

- Legal Guidelines followed under THOA

- Authorisation Committee—

- (1) The medical practitioner who will be part of the organ transplantation team for carrying out transplantation operation shall not be a member of the Authorisation Committee constituted under the provisions of clauses (a) and (b) of sub-section(4) of section 9 of the Act.
- (2) When the proposed donor or recipient or both are not Indian nationals or citizens whether near relatives or otherwise, the Authorisation Committee shall consider all such requests and the transplantation shall not be permitted if the recipient is a foreign national and donor is an Indian national unless they are near relatives.
- (3) When the proposed donor and the recipient are not near relatives, the Authorisation Committee shall, -
 - (i) Evaluate that there is no commercial transaction between the recipient and the donor and that no payment has been made to the donor or promised to be made to the donor or any other person;
 - (ii) Prepare an explanation of the link between them and the circumstances which led to the offer being made;
 - (iii) Examine the reasons why the donor wishes to donate;
 - (iv) Examine the documentary evidence of the link, e.g. proof that they have lived together, etc.
 - (v) Examine old photographs showing the donor and the recipient together;
 - (vi) Evaluate that there is no middleman or tout involved;
 - (vii) Evaluate that financial status of the donor and the recipient by asking them to give appropriate evidence of their vocation and income for the previous three financial years and any gross disparity between the status of the two must be evaluated in the backdrop of the objective of preventing commercial dealing;
 - (viii) ensure that the donor is not a drug addict;
 - (ix) ensure that the near relative or if near relative is not available, any adult person related to donor by blood or marriage of the proposed unrelated donor is interviewed regarding awareness about his or her intention to donate an organ or tissue, the authenticity of the link between the donor and the recipient, and the reasons for donation, and any strong views or disagreement or objection of such kin shall also be recorded and taken note of.
- (4) Cases of swap donation referred to under subsection (3A) of section 9 of the Act shall be approved by Authorisation Committee of hospital or district or State in which transplantation is proposed to be done and the donation of organs shall be permissible only from near relatives of the swap recipients.
- (5) When the recipient is in a critical condition in need of life saving organ transplantation within a week, the donor or recipient may approach hospital in-charge to expedite evaluation by the Authorisation Committee.

- Application for living donor transplantation—

- (1) The donor and the recipient shall make jointly an application to grant approval for removal and transplantation of a human organ, to the competent authority or Authorisation Committee as specified in Form 11 and the papers for approval of transplantation would be processed by the registered medical practitioner and administrative division of the Institution for transplantation.
- (2) The competent authority or Authorisation Committee shall take a decision on such application in accordance with the rule 18.
- (3) If some State wants to merge Form 11 with Form 1, Form 2 or Form 3, they may do so, provided the content of the recommended Forms are covered in the merged Form and the same is approved by the State Government concerned.

- Composition of Authorisation Committees—

- (1) There shall be one State level Authorisation Committee.
- (2) Additional Authorisation Committees in the districts or Institutions or hospitals may be set up as per norms given below, which may be revised from time to time by the concerned State Government or Union territory Administration by notification.
- (3) No member from transplant team of the institution should be a member of the respective Authorisation Committee.
- (4) Authorisation Committee should be hospital based if the number of transplants is twenty five or more in a year at the respective transplantation centres, and if the number of organ transplants in an institution or hospital are less than twenty-five in a year, then the State or District level Authorisation Committee would grant approval(s).

- Composition of hospital based Authorisation Committees.— The hospital based Authorisation Committee shall, as notified by the State Government in case of State and by the Union territory Administration in case of Union territory, consist of, —

- (a) The Medical Director or Medical Superintendent or Head of the institution or hospital or a senior medical person officiating as Head - Chairperson;
- (b) Two senior medical practitioners from the same hospital who are not part of the transplant team – Member;
- (c) two persons (preferably one woman) of high integrity, social standing and credibility, who have served in high ranking Government positions, such as in higher judiciary, senior cadre of police service or who have served as a reader or professor in University Grants Commission approved University or are self-employed professionals of repute such as lawyers, chartered accountants, doctors of Indian Medical Association, reputed non-Government organisation or renowned social worker - Member;
- (d) Secretary (Health) or nominee and Director Health Services or nominee from State Government or Union territory Administration - Member.

- Composition of State or District Level Authorisation Committees—

The State or District Level Authorisation Committee shall, as notified by the State Government in case of State and by the Union territory Administration in case of Union territory, consist of, —

- (a) a Medical Practitioner officiating as Chief Medical Officer or any other equivalent post in the main or major Government hospital of the District – Chairperson;
- (b) two senior registered medical practitioners to be chosen from the pool of such medical practitioners who are residing in the concerned District and who are not part of any transplant team– Member;
- (c) two persons (preferably one woman) of high integrity, social standing and credibility, who have served in high ranking Government positions, such as in higher judiciary, senior cadre of police service or who have served as a reader or professor in University Grants Commission approved University or are self-employed professionals of repute such as lawyers, chartered accountants, doctors of Indian Medical Association, reputed non-Government organisation or renowned social worker - Member;
- (d) Secretary (Health) or nominee and Director Health Services or nominee from State Government or Union territory Administration–Member: Provided that effort shall be made by the State Government concerned to have most of the members’ ex-officio so that the need to change the composition of Committee is less frequent.

- Scrutiny of applications by Authorisation Committee—

- (1) Secretariat of the Authorisation Committee shall circulate copies of all applications received from the proposed donors and recipients to all members of the Committee along with all annexures, which may have been filed along with the applications.
- (2) At the time of the meeting, the Authorisation Committee should take note of all relevant contents and documents in the course of its decision making process and in the event any document or information is found to be inadequate or doubtful, explanation should be sought from the applicant and if it is considered necessary that any fact or information requires to be verified in order to confirm its veracity or correctness, the same be ascertained through the concerned officer(s) of the State Government or Union territory Administration.

- Procedure in case of foreigners—When the proposed donor or the recipient are foreigners;

- (a) a senior Embassy official of the country of origin has to certify the relationship between the donor and the recipient as per Form 21 and in case a country does not have an Embassy in India, the certificate of relationship, in the same format, shall be issued by the Government of that country;
- (b) the Authorisation Committee shall examine the cases of all Indian donors consenting to donate organs to a foreign national (who is a near relative), including a foreign national of Indian origin, with greater caution and such cases should be considered rarely on case to case basis: Provided that the Indian living donors wanting to donate to a foreigner other than near relative shall not be considered.

- Eligibility of applicant to donate— In the course, of determining eligibility of the applicant to donate, the applicant should be personally interviewed by the Authorisation Committee which shall be videographed and minutes of the interview shall be recorded.

- Precautions in case of woman donor—In case where the donor is a woman, greater precautions ought to be taken and her identity and independent consent should be confirmed by a person other than the recipient.
- Decision of Authorisation Committee—The Authorisation Committee (which is applicable only for living organ or tissue donor) should state in writing its reason for rejecting or approving the application of the proposed living donor in the prescribed Form 18 and all such approvals should be subject to the following conditions, namely:-
 - (i) the approved proposed donor would be subjected to all such medical tests as required at the relevant stages to determine his or her biological capacity and compatibility to donate the organ in question;
 - (ii) the physical and mental evaluation of the donor has been done to know whether he or she is in proper state of health and it has been certified by the registered medical practitioner in Form 4 that he or she is not mentally challenged and is fit to donate the organ or tissue:
Provided that in case of doubt for mentally challenged status of the donor the registered medical practitioner or Authorisation Committee may get the donor examined by psychiatrist;
 - (iii) All prescribed forms have been and would be filled up by all relevant persons involved in the process of transplantation;
 - (iv) All interviews to be video recorded.
- The Authorisation Committee shall expedite its decision making process and use its discretion judiciously and pragmatically in all such cases where, the patient requires transplantation on urgent basis.
- Every authorised transplantation centre must have its own website and the Authorisation Committee is required to take final decision within twenty four hours of holding the meeting for grant of permission or rejection for transplant.
- The decision of the Authorisation Committee should be displayed on the notice board of the hospital or Institution immediately and should reflect on the website of the hospital or Institution within twenty four hours of taking the decision, while keeping the identity of the recipient and donor hidden.[10]

RATIONALE

- Renal Transplant is one of the major treatments contributing towards promotion of medical tourism at Max Hospital, Saket, Delhi amongst Oncology, Neurology and Joint replacement surgeries.
- Reducing the turnaround time of a renal transplant process can lead to increase in the number of transplants being carried out thereby, increasing patient inflow and significantly enhancing the hospital's image.
- Establishing a standard time for a procedure helps to promote efficiency amongst the employees and helps in establishing a significant position of the hospital amongst competitors.
- Very few studies have been carried out in this context, especially in the Indian scenario
- A smooth flow of the process will lead to lesser time utilization of the patient thereby leading to achievement of higher levels of patient satisfaction.

OBJECTIVES

General-

To evaluate the average time required for a renal transplant procedure, for international patients, including both, medical and legal aspects of the procedure, and perform gap analysis.

Specific-

1. To determine and compare the minimum time (or Standard Time) and average time required for a renal transplant, for international patients, including both medical and legal aspects of the procedure.
2. To identify the causes for delay in availing the treatment.
3. To suggest ways to minimize the transplant process time.
4. To suggest areas for improvement.

METHODOLOGY

- *Type of study* : Descriptive cross-sectional
- *Study population* : All international patients (non-citizens of India) undergoing renal transplant procedure at Max Hospital, Saket, Delhi
- *Study area*- Max Hospital, East wing, Saket, Delhi
- *Duration of Study*- 4 weeks
- *Type of Data*- Quantitative & Qualitative
- *Technique* – Direct Observation of Operations & Unstructured Interviews
- *Tool*- Written Descriptions
- *Variables*-
 - Independent variables:
 - Number of patients undergoing renal transplant procedure
 - Date of medical investigation
 - Dependent variables:
 - Number of visits by patient
 - Date of Report collection
 - Legal proceedings
 - Date of admission
 - Date of surgery
- *Operational Definition*:
Patient Days – The number of days invested by the patient actively i.e. by maintaining contact with the hospital staff during the transplant process excluding Sundays.
- *Sample size*- 10
- *Sampling technique*- Non probability sampling
- *Inclusion criteria*-
 - International patients
 - Undergoing renal transplant treatment at Max Hospital, East wing, Saket
 - suffering from End Stage Renal Disease (ESRD) or Chronic Kidney Disease Stage-V (CKD-V) with renal transplant being the lifesaving treatment modality
 - Donor and Recipient, both are present in Max hospital, Saket
 - Live related or un-related donors only
- *Exclusion criteria*-

- Indian nationalities suffering from ESRD or CKD-V
- International patients
 - Suffering from other Nephrology or Urology diseases.
 - Who have been declared unfit as donors on the basis of medical tests by doctors at Max Hospital, Saket
 - Cadaver donors
- *Data collection*- Primary and Quantitative (3 weeks)
- *Data entry*- Manually
- *Data Analysis*- Using bar charts, pie charts

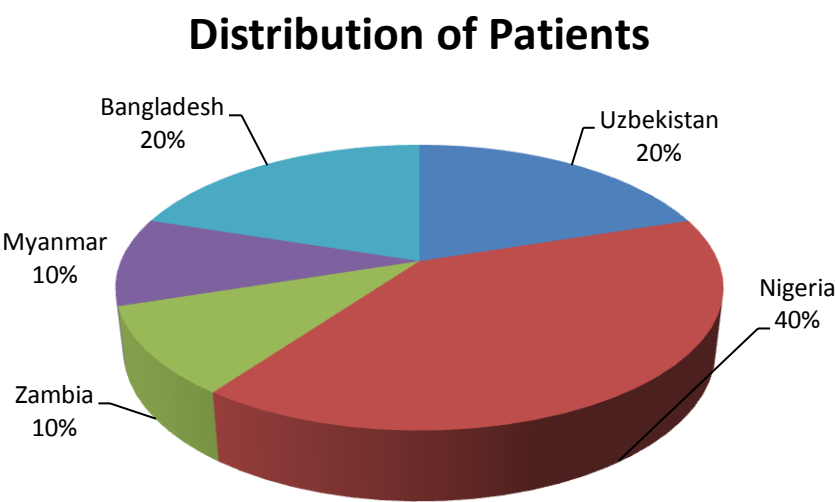
DATA COLLECTION AND ENTRY

Patie nt no.	Count ry	Transplant Process												Remarks
		First visit	Medical Tests		Report Collection		Legal Formalitie s		Exte rnal Com mitt ee	Patie nt admit ted	Surg ery	Disc harg e	Fir st Fol lo w up	
1	Uzbek istan	29-Apr	29- Apr	30- Apr	01- May	02- May	03- May	07- Ma y	09- May	13- May	14- May	21- May	24- Ma y	
2	Nigeri a	05- May	05- May	06- May	06- May	07- May	06- May							Radical Cystectomy on 15-May
3	Zambi a	02- May	03- May	07- May	05- May	08- May	05- May	09- Ma y						
4	Nigeri a	24-Apr	28- Apr	05- May	03- May	06- May	28- Apr	09- Ma y						
5	Uzbek istan	18-Apr	21- Apr	23- Apr	22- Apr	25- Apr	23- Apr	30- Ap r	05- May	07- May	08- May	15- May	19- Ma y	
6	Nigeri a	27-Mar	27- Mar	02- Apr	01- Apr	04- Apr	09- Apr	30- Ap r	05- May 09- May	11- May	12- May	18- May	22- Ma y	Incomplete documents on 05- May.
7	Nigeri a	21-Apr	26- Apr	01- May	28- Apr	03- May	30- Apr	05- Ma y	09- May	12- May	13- May	22- May	24- Ma y	Extra medical tests administered.
8	Bangl adesh	18-Apr	21- Apr	22- Apr	23- Apr	24- Apr	19- Apr	06- Ma y	09- May					Incomplete documents. Meeting pending.
9	Bangl adesh	08- May	12- May	13- May	14- May	-	14- May	20- Ma y						

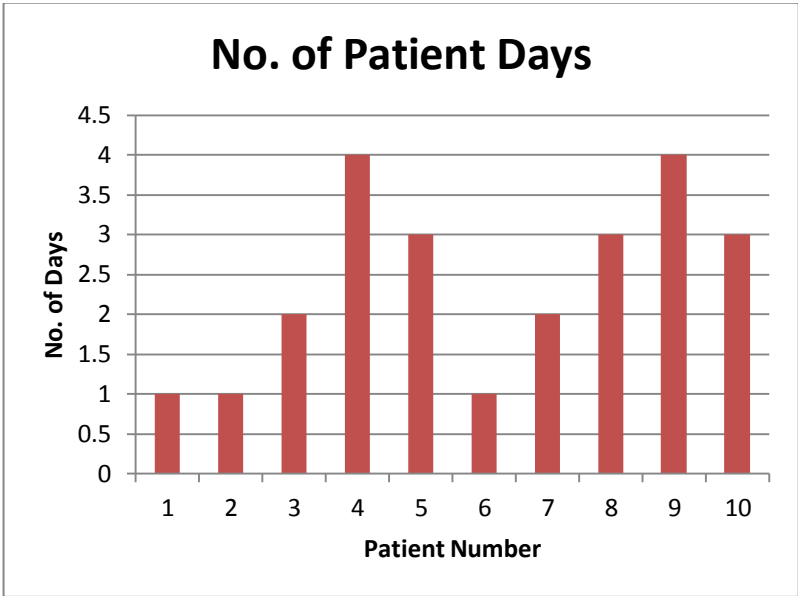
10	Myanmar	17-May	19-May	21-May	20-May	22-May	20-May							
----	---------	--------	--------	--------	--------	--------	--------	--	--	--	--	--	--	--

DATA ANALYSIS

- The maximum number of patients out of the sample population was from Nigeria followed by Uzbekistan and Bangladesh.



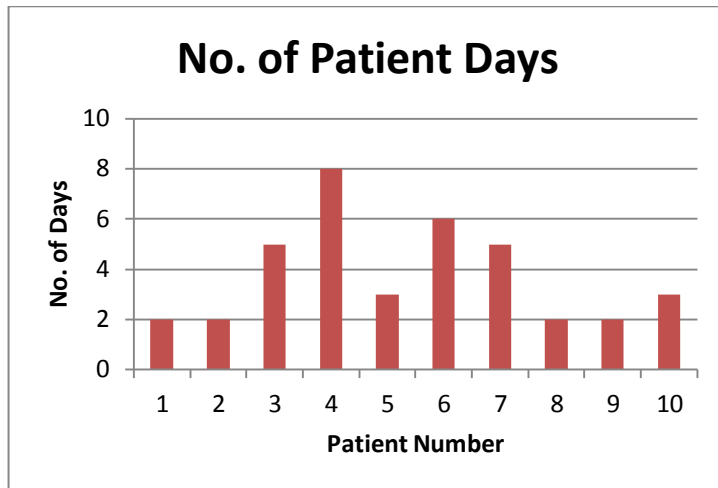
- The average time required by a patient to start with the Medical Tests is 1-4 days. 50% of the patients proceed with the Medical Tests within a day of their first visit to the Renal Transplant department.



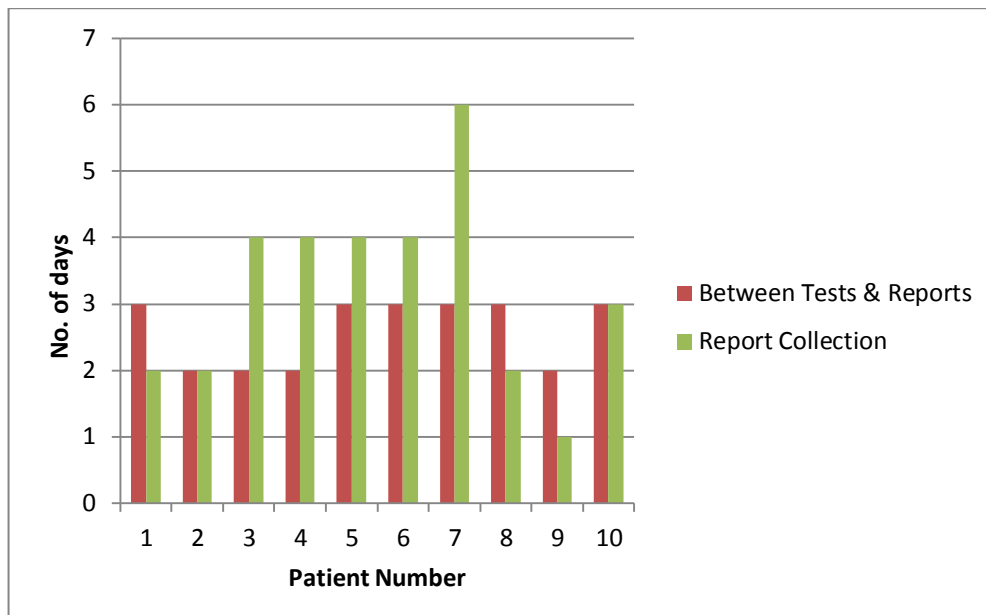
- The duration for these tests varies from 1 day to 7 days.

The various factors affecting this duration is

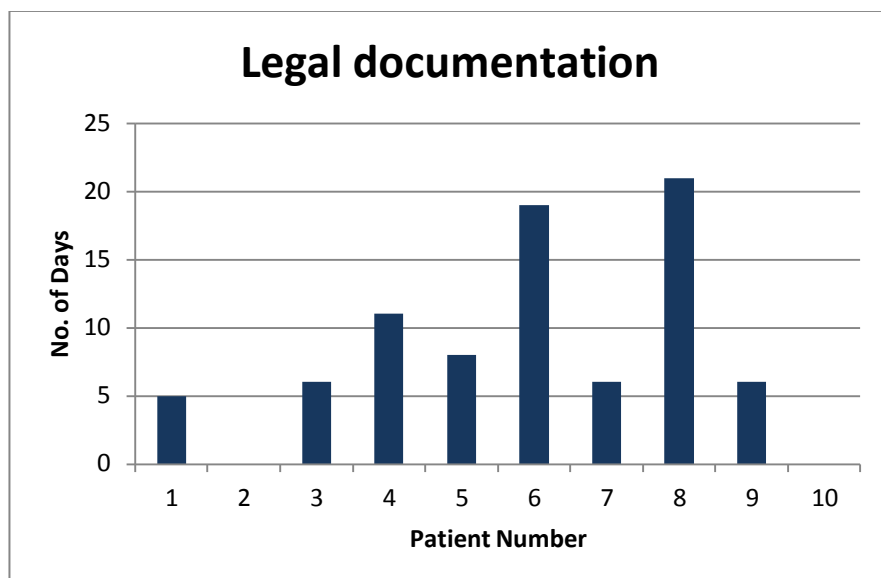
- The availability of the patient,
- His/her approach towards the treatment, and
- Scheduling of the required medical test. For example, the following tests are scheduled every 4 days:
 - HCV RNA PCR
 - Varicella Zoster – IgG, IgM
 - EBV – IgG, IgM



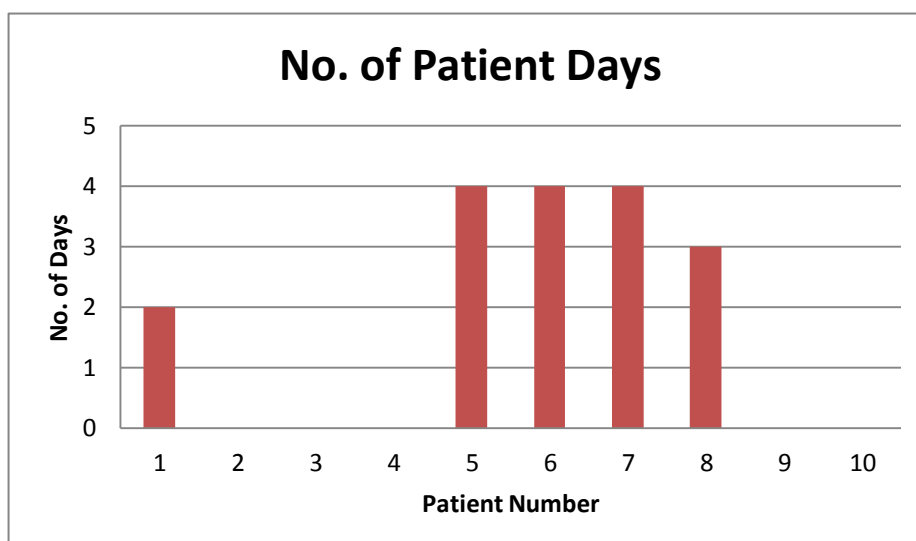
- The time elapsed between completion of tests till completion of report collection does not exceed 2 days in 100% of cases.
In 90% of the cases, the report collection takes 3 days.



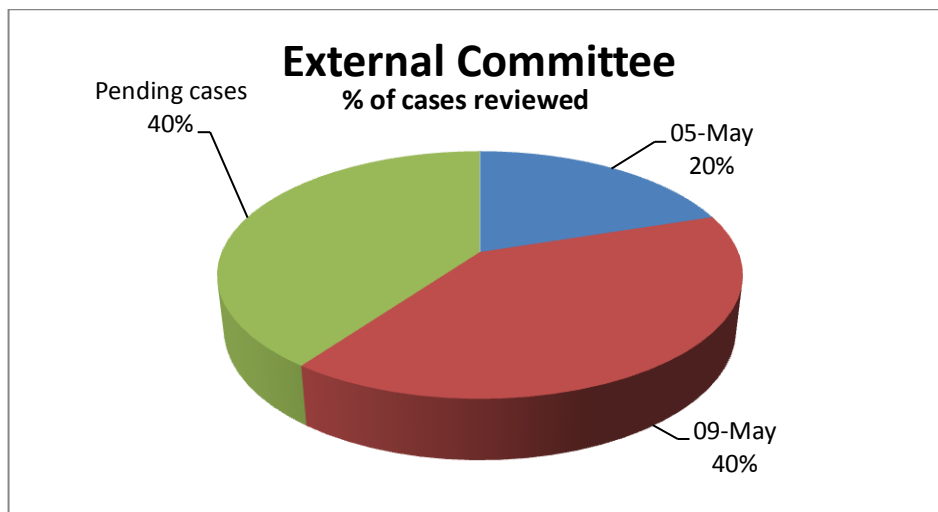
- The legal formalities are usually initiated once the patient proceeds with the medical tests or clears the Stage I of medical tests. It is one of the time consuming stages of the process with its completion varying from within 5 days, to extending up to 21 days.



- External Committee meeting is held once all the legal formalities have been completed and documentation is complete. The time after completion of legal formalities and before approval meeting is held, for 5 cases here, is between 2-4 days. The remaining cases are pending for review by the committee.



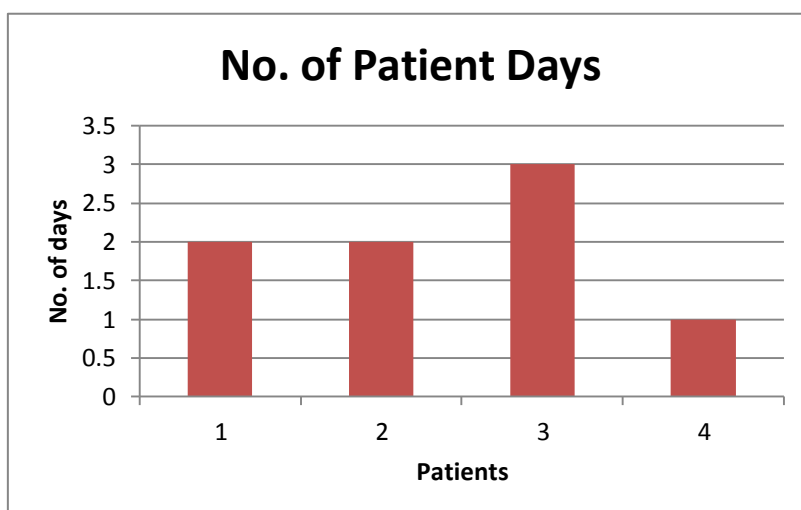
- 2 cases need a review again by the committee because of incomplete documentation. Thus, 40% of the cases are pending for approval by the committee.



- Once the case has been approved for transplantation by the external committee, a date for the surgery is assigned by the doctors depending upon their schedule.
In case any discrepancy from the normal results is observed during the medical re-evaluation of the patient, the case is put on hold till the patient recovers.
Patient and donor, both are admitted one day prior to the surgery. On an average, the time elapsed between the external meeting and admission of patient is 2-3 days.

- From the date of admission, patient is discharged on the 8th day.

- The date of first follow up varies from patient to patient. It ranges from within 1 day of discharge to 3 days.



- The minimum no. of patient days are 23 days for Patient 1
- The maximum no. of patient days are 52 days for Patient 6

RESULTS

S.No.	Steps	No. of days for each step		No. of days for transition to next step	Reasons for delay
		Minimum	Maximum		
1.	First visit	1	1	1-4	▪ Patient unavailable ▪ Communication gap/ incomplete information to the patient
2.	Medical tests	2	8	2-3	▪ Stage wise medical investigation is not followed ▪ Scheduling of certain medical tests differently ▪ After completion of all tests, reports collected
3.	Report Collection	2	6	--	▪ Patient unavailable ▪ Communication gap
4.	Legal Formalities	5	21	2-4	▪ Incomplete information regarding required legal documents ▪ Inefficient legal documentation and review ▪ Legal paperwork not duly submitted as per instructions
5.	External Committee	1	3	1-3	
6.	Date of admission	1	1	1	
7.	Surgery	1	1	8	
8.	Discharge	8	8	1-3	
9.	First Follow up	1	1		
	TOTAL	22	50	16-26	



Shaded area represents area of concern

DISCUSSION

- The main issues causing delay can be grouped into two categories, namely Patient-centric and Healthcare provider-centric.

S.No.	Patient-centric Issues	Healthcare provider-centric Issues
1.	Patient unavailable or patient doesn't show up on time for the medical investigations. Due to this reason, the appointment is given to other patients on priority basis.	Communication gap or incomplete information is given to the patient regarding the medical investigations by doctor's secretaries or IPS executives
2.	Stage wise medical investigation is not followed by the patients. This is viewed as a patient as well as provider centric issue. On one hand, the patients are uninformed regarding the 3 stages of medical tests because of which they get all the investigations done at once and thus incur heavy waiting time and monetary losses, in case the donor is rejected on the basis of results obtained post stage I investigations. On the other hand, there is lack of communication by healthcare providers regarding the need for staging of tests and proceeding in the order from stage I-stage II-stage III.	
3.	After completion of all the tests, reports are collected by the patient. Instead of collecting reports in the same serial order in which tests were administered, patients wait for all the investigations to get over and then collect all the reports at once leading to prolonged delays.	Certain medical tests are scheduled differently or are outsourced and cannot be administered every day. For this reason, the patient has to wait.
4.	Legal paperwork is not duly submitted as per instructions due to miscomprehension by the patient. Thus, he/she has to go through the legal proceedings again.	Incomplete information regarding required legal documents is given by the doctor's secretaries or IPS executives which prolongs the legal filing time.
5.		Inefficient legal documentation and review leads to incomplete file submission for the external committee and thus file is kept on hold till the documents are completed and submitted. This increases patient dissatisfaction levels and further delays the approval of the case by external committee members.

- The cases that have successfully undergone transplantation are reviewed as follows:

Patient No.	Patient Days	Remarks
1	23 days (minimum)	• Living Near related donor – mother-son relationship • Easy to prove, less legal complications.
5	27 days	• Living Near related donor – real brother-sister relationship • Easy to prove, less legal complications.
6	52 days (maximum)	• Living Unrelated Donor – brother-in-law—brother relationship • Complicated case as distant relationship • More legal complications and documentation • Committee meeting held twice: Case kept on hold because of incomplete documentation. Approved in the next meeting.
7	30 days	• Living Near related donor – mother-daughter relationship • One medical test showed positive results. Case referred to other hospital for further investigation (DNA Fingerprinting) • After confirming results, approved for external committee • Earlier case was processed for brother-sister relationship. At the time of re-evaluation (one day prior to surgery), incomplete medical investigations were observed. • Donor examined and remaining tests performed. Donor rejected on the basis of inappropriate stage I results.

- This highlights the importance of complete and correct documentation of legal files along with stage wise progression of the medical tests in order to save money and time of both, the patients and the healthcare providers.

- The following cases are withheld due to the following reasons:

Patient No.	Step awaited	Reason for delay
2	Legal formalities completion	Radical Cystectomy was performed on the patient on 15-May. Patient is not declared fit to undergo transplant surgery yet.
10	Legal Formalities Completion	Medical reports awaited for complete documentation
8	External Committee Approval	External committee held on 09-May. Due to incomplete documentation, case kept on hold. Date awaited for the next committee meeting for reviewing the required document.

- Also, there are certain cases that have not yet proceeded to the stage of External Committee. The reasons are as follows:

Patient No.	Legal Formality completion date	Reasons for delay
3	09-May	External Committee date has not been decided by the members till date. Once all the members narrow down a date, then only these cases will be considered for approval
4	09-May	
9	20-May	

Ethical Considerations:

- Patient's confidentiality and privacy should be maintained throughout the study.
- Prior to collection of data, an informed consent should be taken.
- Special care should be taken so that the identity of patients who are Hepatitis B or C positive is not revealed.
- Unstructured interview should involve questions that minimize the risks associated with the study including psychological and social risks and maximizing the benefits of the study.
- Contact numbers of the transplant coordinator, and secretary of the consultants are given to the patient after interacting with them regarding the entire transplant process.

Work Plan: Gantt Chart

Time	Week 1					Week 2					Week 3					Week 4				
Initial Discussion with mentor regarding the study																				
Collection of Background Material																				
Review of Literature																				
Setting Rationale & Objectives																				
Determining sample size and inclusion & exclusion criteria																				
Data Collection																				
Data Entry																				
Data Analysis																				
Report Writing																				
Submission of Draft Report																				
Submission of Final Report																				

AREAS FOR IMPROVEMENT:

- **Patient tracker system** – A patient tracker system should be developed for the patients registered under Renal Transplant process in order to keep an eye on their proceedings since their first visit. This would help to segregate patients who are actively involved in the process and, the people who are less interested or who are not responding for treatment anymore. This database should be shared by the IPS executives, doctor's secretaries and the Renal Transplant Coordinator.
It would help to have a consolidated data about all the transplant patients as well as their daily status. It should be updated on a daily basis. Similar to Hospital Information System (HIS), this database would be of great help to both healthcare providers for the benefit of the patients.
- **Transparency** of the transplant process should be maintained by explaining the entire process to the patient and donor in detail and asking for feedback. A copy of the **flowchart of the process** (shown earlier) can be used as a guiding tool for the description and maybe provided to the patient and donor along with the details of the medical tests, when the patients come for consultation.

- Medical investigation stages sheet – A copy of the **patient and donor check list** should be given to patient for clear assessment of grouping of various medical tests into stages so that it enables the patients to proceed in an orderly fashion. This would also help in reducing errors such as incomplete tests performed, which leads to rejection of donor in the end after a heavy investment of time and money.
- Legalities sheet – A copy of the **legal document checklist** can be shared with the patient in order for better comprehension of the required documents and minimum wastage of time in this step. A copy of the required format for affidavits should be readily available in sets and should be given to the patient when he/she starts with the legal proceedings.
- An **urgent modification** is required in the **review system by external committee** for approving a required document that is missing from the documentation at the time of external meeting. Because of one or a few missing documents, the patient and donor are made to wait the entire time until the next external meeting date is announced. This leads to a lot of patient dissatisfaction with the transplant process and the administration. Instead, a system to scan and mail the required documents(s) to the members of the committee for review and approval of the case, should be incorporated in the process

REFERENCES

1. Indian Medical Tourism To Touch Rs 9,500 Crore By 2015, The Economic Times, posted on IndianHealthCare.in
2. Hamid, Zubeda (20 August 2012). "The medical capital's place in history". The Hindu (Chennai: The Hindu). Retrieved 15 Sep 2012.
3. Jump up^ "Swamis to Surgeries", medicaltourismmag.com, January 19, 2011
4. "Reason to smile". The Hindu. 2011-10-24.
5. "Easing of visa norms to boost medical tourism". The Times of India. 2012-12-05.
6. "Visa-on-arrival". Bureau of Immigration. 2012-12-05.
7. "Medical translators to aid foreign patients". The Times of India. 2013-01-24
8. Walter F., PhD. Boron (2004). Medical Physiology: A Cellular And Molecular Approach. Elsevier/Saunders. ISBN 1-4160-2328-3.
9. David Petechuk (2006). Organ transplantation. Greenwood Publishing Group. p. 11. ISBN 0-313-33542-7
10. Ministry of Health and Family Welfare Notification, New Delhi, March 24, 2014. Transplantation of Human Organs Act, Part II Section 3(i)
11. "Kidney Transplant in India." , *Low Cost , Kidney Transplant Benefits India*. N.p., n.d. Web. 30 July 2014



A STUDY ON

INFECTION CONTROL IN DIALYSIS UNIT



INTRODUCTION

Good quality of life and survival on maintenance dialysis depends on following major factors namely;

- i) The dose of dialysis delivered or solute removal achieved,
- ii) Time on dialysis,
- iii) Adequacy of nutrition,
- iv) Family and socio-economic support,
- v) Management of co-morbid illnesses, and
- vi) **Prevention & management of infections.**

Unfortunately in our country the quality of dialysis delivered to patients can vary from center to center. The quality could range from very poor to as good as any center in world. This is because there are **no minimum defined standards of care of maintenance dialysis.**

The **Indian Society of Nephrology** therefore set up core group to write these minimum standards that should be followed in our country. It was realized by this group very early that if we make these standards very stringent comparable to best centers in the world then it would be practically impossible to follow by majority of dialysis units. However, for the practicality if we compromise on the principles of good dialysis our patients will suffer. The general aim of these standards is therefore to improve the general quality of dialysis delivered to our patients.[1]

Dialysis Unit at Max Hospital:

Dialysis unit was established 6 months ago and included under the Renal Science Department. It is a fully functioning unit with a bed capacity of 17 and a total number of 22 machines including 3 portable machines. On an average, 50 dialysis procedures are performed every day in the unit which is inclusive of out-patient and in-patient department.

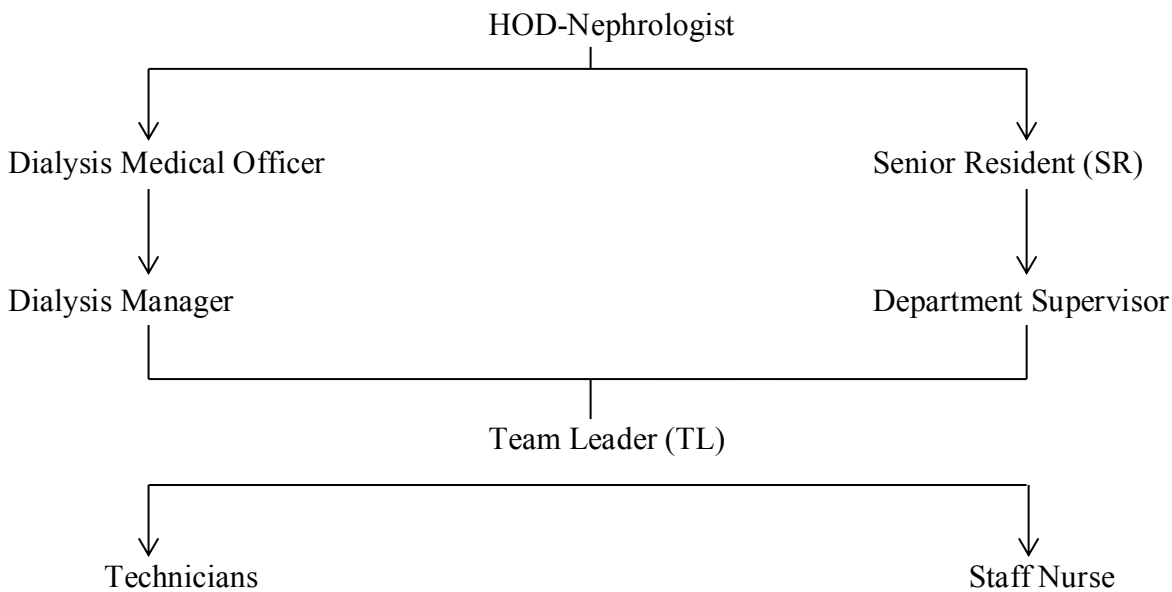
The procedures carried out at the unit are Hemodialysis (HD), Hemodiafiltration (HDF), Plasmapheresis (for ABO incompatible renal transplant), Peritoneal Dialysis (PD), and continuous ambulatory peritoneal dialysis (CAPD). About 1400 dialysis are performed per month.

- The Staffing is as follows:

1. Nephrologist	3
2. Senior Residents	4
3. Junior Resident	1
4. Medical Officers (JR)-Dialysis	2
5. Technicians	13
6. Staff Nurses	14
7. General Duty Assistant (GDA)	3
8. Housekeeping	1

- Patient : Nurse Ratio = 1:3 to 1:4
- Patient : Technician Ratio = 1:4 to 1:5

Organization Chart – Dialysis Unit



- Machines used:
 - 4000-8-S : 17 (for maintenance hemodialysis)
 - 5000-8-S : 2 (for hemodiafiltration)
 - Portable : 3

REVIEW OF LITERATURE

Dialysis:

In medicine, dialysis (from Greek dialysis, meaning dissolution, dia, meaning through, and lysis, meaning loosening or splitting) is a process for removing waste and excess water from the blood, and is used primarily as an artificial replacement for lost kidney function in people with renal failure. Dialysis may be used for those with an acute disturbance in kidney function (acute kidney injury, previously acute renal failure), or progressive but chronically worsening kidney function—a state known as chronic kidney disease stage 5 (previously chronic renal failure or end-stage renal disease). The latter form may develop over months or years, but in contrast to acute kidney injury is not usually reversible, and dialysis is regarded as a "holding measure" until a renal transplant can be performed, or sometimes as the only supportive measure in those for whom a transplant would be inappropriate.[1]

Principle:

Dialysis works on the principles of the diffusion of solutes and ultrafiltration of fluid across a semi-permeable membrane. Diffusion is a property of substances in water; substances in water tend to move from an area of high concentration to an area of low concentration.[2] Blood flows by one side of a semi-permeable membrane, and a dialysate, or special dialysis fluid, flows by the opposite side. A semipermeable membrane is a thin layer of material that contains holes of various sizes, or pores. Smaller solutes and fluid pass through the membrane, but the membrane blocks the passage of larger substances (for example, red blood cells, large proteins). This replicates the filtering process that takes place in the kidneys, when the blood enters the kidneys and the larger substances are separated from the smaller ones in the glomerulus.[2]

Types:

The two main types of dialysis, hemodialysis and peritoneal dialysis, remove wastes and excess water from the blood in different ways[3].

Hemodialysis removes wastes and water by circulating blood outside the body through an external filter, called a dialyzer, that contains a semipermeable membrane. The blood flows in one direction and the dialysate flows in the opposite. The counter-current flow of the blood and dialysate maximizes the concentration gradient of solutes between the blood and dialysate, which helps to remove more urea and creatinine from the blood. The concentrations of solutes (for example potassium, phosphorus, and urea) are undesirably high in the blood, but low or absent in the dialysis solution, and constant replacement of the dialysate ensures that the concentration of undesired solutes is kept low on this side of the membrane. The dialysis solution has levels of minerals like potassium and calcium that are similar to their natural concentration in healthy blood. For another solute, bicarbonate, dialysis solution level is set at a slightly higher level than in normal blood, to encourage diffusion of bicarbonate into the blood, to act as a pH buffer to neutralize the metabolic acidosis that is often present in these patients. The levels of the components of dialysate are typically prescribed by a nephrologist according to the needs of the individual patient.

In peritoneal dialysis, wastes and water are removed from the blood inside the body using the peritoneal membrane of the peritoneum as a natural semipermeable membrane. Wastes and excess water move from the blood, across the peritoneal membrane, and into a special dialysis solution, called dialysate, in the abdominal cavity which has a composition similar to the fluid portion of blood.

There are three primary and two secondary types of dialysis: hemodialysis (primary), peritoneal dialysis (primary), hemofiltration (primary), hemodiafiltration (secondary), and intestinal dialysis (secondary).

- Hemodialysis

In hemodialysis, the patient's blood is pumped through the blood compartment of a dialyzer, exposing it to a partially permeable membrane. The dialyzer is composed of thousands of tiny synthetic hollow fibers. The fiber wall acts as the semipermeable membrane. Blood flows through the fibers, dialysis solution flows around the outside of the fibers, and water and wastes move between these two solutions.[4] The cleansed blood is then returned via the circuit back to the body. Ultrafiltration occurs by increasing the hydrostatic pressure across the dialyzer membrane. This usually is done by applying a negative pressure to the dialysate compartment of the dialyzer. This pressure gradient causes water and dissolved solutes to move from blood to dialysate, and allows the removal of several litres of excess fluid during a typical 4-hour treatment. In the US, hemodialysis treatments are typically given in a dialysis center three times per week (due in the US to Medicare reimbursement rules); however, as of 2007 over 2,500 people in the US are dialyzing at home more frequently for various treatment lengths.[5] Studies have demonstrated the clinical benefits of dialyzing 5 to 7 times a week, for 6 to 8 hours. This type of hemodialysis is usually called "nocturnal daily hemodialysis", which a study has shown a significant improvement in both small and large molecular weight clearance and decrease the requirement of taking phosphate binders.[6] These frequent long treatments are often done at home while sleeping, but home dialysis is a flexible modality and schedules can be changed day to day, week to week. In general, studies have shown that both increased treatment length and frequency are clinically beneficial.[7]

Hemo-dialysis was one of the most common procedures performed in U.S. hospitals in 2011, occurring in 909,000 stays (a rate of 29 stays per 10,000 population).[8]

- Peritoneal dialysis

In peritoneal dialysis, a sterile solution containing glucose (called dialysate) is run through a tube into the peritoneal cavity, the abdominal body cavity around the intestine, where the peritoneal membrane acts as a partially permeable membrane. The peritoneal membrane or peritoneum is a layer of tissue containing blood vessels that lines and surrounds the peritoneal, or abdominal, cavity and the internal abdominal organs (stomach, spleen, liver, and intestines).[9] Diffusion and osmosis drive waste products and excess fluid through the peritoneum into the dialysate until the dialysate approaches equilibrium with the body's fluids. Then the dialysate is drained, discarded, and replaced with fresh dialysate.[10]

This exchange is repeated 4-5 times per day; automatic systems can run more frequent exchange cycles overnight. Peritoneal dialysis is less efficient than hemodialysis, but because it is carried out for a longer period of time the net effect in terms of removal of waste products and of salt and water are similar to hemodialysis. Peritoneal dialysis is carried out at home by the patient, often without help. This frees patients from the routine of having to go to a dialysis clinic on a fixed schedule multiple times per week. Peritoneal dialysis can be performed with little to no specialized equipment (other than bags of fresh dialysate).

- Hemofiltration

Hemofiltration is a similar treatment to hemodialysis, but it makes use of a different principle. The blood is pumped through a dialyzer or "hemofilter" as in dialysis, but no dialysate is used. A pressure gradient is applied; as a result, water moves across the very permeable membrane rapidly, "dragging" along with it many dissolved substances, including ones with large molecular weights, which are not cleared as well by hemodialysis. Salts and water lost from the blood during this process are replaced with a "substitution fluid" that is infused into the extracorporeal circuit during the treatment. Hemodiafiltration is the combining of hemodialysis and hemofiltration in one process.

- Hemodiafiltration

Hemodiafiltration is a combination of hemodialysis and hemofiltration.

- Intestinal dialysis

In intestinal dialysis, the diet is supplemented with soluble fibres such as acacia fibre, which is digested by bacteria in the colon. This bacterial growth increases the amount of nitrogen that is eliminated in fecal waste. An alternative approach utilizes the ingestion of 1 to 1.5 liters of non-absorbable solutions of polyethylene glycol or mannitol every fourth hour.[11]

RATIONALE:

The hemodialysis patient is particularly susceptible to several infections both bacterial occasioned by the decreased immunity and blood borne viral infections. Studies have shown that bacterial infections in addition to carrying higher short term mortality also increase the risk of long term cardiovascular complications. Viral infections like Hepatitis B and C progress to liver cirrhosis and increase the morbidity and mortality on hemodialysis.

In addition the staff of a dialysis unit is uniquely at risk of contracting these viral infections from contaminated blood and dialysate. Preventing the transmission of infections involves several links in the chain involving the patients, the dialysis procedure and ancillary care, the staff of the unit and various administrative and waste disposal protocols.

A comprehensive infection preventive protocol includes hygiene measures, vaccination, dialyzer reprocessing and disposal of biohazardous materials as set out in the following guideline. [12]

Description:

The number of patients on maintenance hemodialysis is increasing rapidly in India.

Chronic hemodialysis patients have an increased infection risk. HD facility is very conducive for transmission of infection since multiple patients receive dialysis concurrently. Transmission can occur directly or indirectly via contaminated devices, equipment and supplies, environmental surfaces, or hands of personnel.

Even in the developed world, there are substantial deficiencies in infection control practices. These suggested reasons include lack of awareness of the practices and their importance, and lack of clarity of difference between universal precautions (recommended for all health-care settings) and the additional precautions necessary in the hemodialysis setting.

The important infections that develop in these patients include viral infections such as hepatitis B and C, HIV and bacterial infections, especially those involving vascular access. The prevalence of antimicrobial-resistant bacteria has increased rapidly in health-care settings, including hemodialysis units in recent years. Multi-resistant organisms (MRO) are defined as bacteria that are resistant to one or more classes of antimicrobial agents. These include Methicillin Resistant *Staphylococcus aureus* (MRSA), Vancomycin Resistant Enterococci (VRE), Extended Spectrum β -lactamase (ESBL)-producing *Klebsiella pneumoniae*, Carbapenem-resistant *Acinetobacter baumannii* (CRAB) and *Clostridium difficile* (antibiotic associated diarrhoea). Antimicrobial use and direct contact transmission of resistant strains are the two main factors that have contributed to this significant increase.

Infection control guidelines and surveillance system for infections in hemodialysis centers has been implemented in most advanced countries to cut down infection risk and to determine the frequency and risk factors for these complications. The suggested guidelines have been prepared by combining essential features from several documents, and are meant to guide infection control implementation and surveillance in HD units. Units should establish written protocols for all procedures including cleaning and disinfecting surfaces and equipment in the dialysis unit.[12]

KEY OBSERVATIONS:

In comparison with the ISN guidelines, the Dialysis Unit at Max Hospital was evaluated for infection control standards.[12]

S.No.	Areas for Assessment	Guideline standards	Max Dialysis Unit		Remarks
			Yes	No	
A.	Setting up of Hemodialysis Unit				
i)	Hemodialysis Area				
1.	Each machine area should be easily observed from the nursing station which should be included in this area			✓	Bed numbers 11,12,14 & 16 not visible
2.	Air Conditioning temperature	70-72° F	✓		
	Humidity	55-60%	✓		
3.	HBV/HCV patients separate from other patients having independent:		✓		
	• drainage		✓		
	• water supply			✓	Common
	• air handling		✓		
	• personal facilities		✓		
4.	Facilities for Sterilium/alcohol based handrub/sterilient dispensers should be available in each patient area		✓		
ii)	Preparation, work & storage area				
1.	Independent area for reprocessing dialyzers – with work bench, sink				
2.	Storage areas				
	• one for new supplies		✓		
	• one for reprocessed dialyzers		✓		
3.	Clean room for preparation of sterile trays for dialysis start-up kit & preparation of injection & storage of emergency equipment			✓	Dialysis startup kit stored in a trolley near nursing station. Preparation done at bed-side of patient.
4.	Area for dirty utility This area should be located in such a way that personnel and material need not come from dirty utility to clean area of dialysis			✓ ✓	
5.	Space for water treatment unit		✓		

6.	Procedure room/operating room			✓	
7.	Adequate toilets for consultation, technicians, patients and patients' relatives		✓		2 washrooms
	Separate for men & women			✓	
	General Conditions:				
	Electricity – stable voltage & online UPS/generator		✓		
	Plumbing & Drainage – all treated pipelines should be stainless steel grade 316 or medical grade PVC with minimum bends & loops			✓	PEX* pipelines are used.
	Oxygen & vacuum outlets at head of every dialysis machine		✓		
B.	Personnel for HD				
1.	Nephrologist				
	Review the water quality, infection control measures and day to day functioning at regular intervals		✓		
2.	Dialysis Technicians				
	Should be trained in- - Water quality, water treatment & water distribution - Infection control & safety, disinfection - Reuse of dialyzers		✓ ✓ ✓		
3.	Staff training in - Proper hand hygiene technique - Appropriate use of Personal Protective Equipment (PPE) - Modes of transmission of Blood Borne Viruses (BBV), pathogenic bacteria & other microorganisms - Infection control precautions for Dialysis units - Rationale for segregating patients - Correct technique for initiation, care & maintenance of dialysis access sites		✓ ✓ ✓ ✓ ✓ ✓		
C.	Selection of machine & Dialyzer unit for Maintenance HD				
1.	HD machine specifications				
	- The blood leak monitor allows the detection of blood leaks & prevention of dialysate contamination by blood downstream of dialyser - Various alarms of the machine should be working		✓ ✓		

2.	Recommendations for disinfection of the HD machine				
	• After an episode of blood leak in to the dialysate • If surveillance cultures show high cfu (colony forming units) or endotoxin levels • Regular disinfection at least once a week • After each dialysis session or once a day (optional) • Bleach or Citrosteril or heat or a combination maybe used • Performed by the designated personnel • Gloves to be worn • Protective glasses to be worn		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		After each dialysis session Bleach – every Sunday
3.	Recommendations for once monthly evaluation & monitoring				
	• Microbiological monitoring – water for production of dialysate proportioned & exiting the dialyser should be monitored for bacterial levels on no less than a monthly basis • Sampling should be done at termination of dialysis at the point where dialysate exits the dialyzer • Total microbial counts	Should not exceed more than 2000 cfu/unit	✓ ✓ ✓		A range of 0-200 cfu/units is maintained
D.	Water Treatment for Hemodialysis				
1.	Water Quality Standards to be followed - Association for the Advancement of Medical Instrumentation (AAMI) or European Standards		✓		AAMI Standards followed
2.	Three aspects of water quality should be achieved				
	• Chemical purity	Chemical analysis once in 3 months		✓	Every 6 months
	• Microbiological purity	Culture taken every 15 days	✓		
	• Endotoxin purity	Every 15 days		✓	Every 6 months

3.	Water treatment components				
	• Pre-treatment of source water • Water treatment equipments – reverse osmosis • Storage facilities • Distribution of treated water		✓ ✓ ✓ ✓		
	• Storage tank – de-aeration valve, drain facility & air tight lid		✓		
	• All pipelines	SS-316 or medical grade PVC		✓	PEX pipelines used
4.	Sterilization – cleaning & plumbing	Every 15 days	✓		
5.	Test for microelements in water		✓		
6.	Dialyzer re-use – policy & guidelines			✓	Currently being drafted.
F.	Infection Prevention in HD unit				
	Standard precautions to be followed:				
1.	Hand Hygiene		✓		
2.	Personal Protective Equipment (PPE)		✓		
3.	Immunization of Healthcare workers • Routine Serological Testing • Hepatitis B vaccination		✓ ✓		
4.	Surveillance for infection		✓		
5.	Aseptic Technique		✓		
6.	Management of sharps, blood spills		✓		
7.	Additional cleaning procedures		✓		
8.	Management of waste to maintain a safe environment		✓		
9.	Management of equipment, medication & consumables		✓		
10.	Routine Environmental Cleaning		✓		

STANDARD PRECAUTIONS

The Standard Precautions followed in HD unit are centralized precautions followed throughout the hospital. They are prepared & issued by Member CICC and approved by Clinical Director & Chair CICC.[13]

1. INTRODUCTION:

- Purpose: To ensure that staff follows proper evidence based practices for the Cleaning Disinfection and Sterilization, to minimize the risk of Infection to Max Staff and patients.
- Responsibility: Nurses, Doctors and Housekeeping staff

❖ Certain standard precautions are needed to be followed in all health care settings. They are:

- Wash hands before and after all patients or specimen contact.
- Handle the blood of all patients as potentially infectious.
- Wear gloves for potential contact with blood and body fluids.
- Place used syringes immediately in nearby impermeable container. DO NOT recap or manipulate needle in any way.
- Wear protective eyewear and mask if splatter with blood or body fluids is possible (e.g. bronchoscopy, oral surgery etc.)
- Wear gowns when splash with blood or body fluids is anticipated.
- Handle all linen soiled with blood and / or body secretion as potentially infectious.
- Process all laboratory specimens as potentially infectious.
- Wear mask for TB and other respiratory organisms (HIV is not airborne).

2. SELECTION OF PROTECTIVE BARRIERS:

Type of exposure	Protective barriers	Examples
Low risk: Contact skin, no visible blood.	• Gloves helpful but not essential	Injections, minor wound dressing
Medium risk: Probable contact with blood splashing unlikely	• Gloves • Gowns and apron may be necessary	Vaginal examination, insertion or removal of intravenous cannula, handling of laboratory specimens, large open wounds dressing, venepuncture spill of blood.
High Risk: Probable contact with blood in splashing uncontrolled bleeding.	• Gloves • Waterproof gown or apron • Eye wear • Mask	Major surgical procedures particularly orthopaedic surgery and oral surgery, vaginal delivery.

3. GUIDELINES FOR COLLECTION OF BLOOD SAMPLES:

- I. Use gloves and take special care if there are cuts or scratches on the hands.
- II. Take care to avoid contamination of hands and surrounding area with the blood.
- III. Use disposable / autoclaved syringes and needles.
- IV. Use 70% ethanol or isopropyl alcohol swabs / sponges for cleaning the site of needle puncture.
- V. Use thick dressing pad or adsorbent cotton below the forearm when drawing blood and tourniquet above

- VI. Tourniquet must be removed before the needle is withdrawn.
- VII. Place dry cotton –swab and flex the elbow to keep this in place till bleeding stops.
- VIII. Place used needles and syringes in a puncture resistant container containing disinfectant.
- IX. Do not recap used needles.

Handling Syringes and Needles	
Do's	Don'ts
☐ Pass syringes and needles in a tray.	☐ Never pass syringe and needle on directly to next person.
Preferably cut it with needle Cutters.	☐ Do not bent/or break used needle with hands.
☐ Put needle and syringes in 2% hypochlorite solution if needs clutter is not available.	☐ Never test the fineness of the needle's tip before use with bare or gloved hand.
☐ Remove cap of needle near the site of use.	☐ Never pick up open needle by hand.
☐ Pick up open needle from tray / drum with forceps.	☐ Never dispose it off by breaking it with hammer / stone.

Good Practice for the Safe Handling and Disposal of Sharps

- ☐ ALWAYS dispose of your own sharps.
- ☐ NEVER pass used sharps directly from one person to another.
- ☐ During exposure –prone procedures, the risk of injury should be minimized by ensuring that the operator has the best possible visibility e.g. by positioning the patient, adjusting light source and controlling bleeding.
- ☐ Protect fingers from injury by using forceps instead of fingers for guiding suturing.
- ☐ NEVER recap, bend or break disposable needles.
- ☐ Directly after use, place needles and syringes in a rigid container until ready for disposal.
- ☐ Locate sharps disposal containers close to the point of use, e.g. in patient's room, on the medicine trolley and in treatment room etc.

THE INFECTION CONTROL COMMITTEE

A competent and active infection control committee is a most important part of the program for prevention and control of Nosocomial infections among patients and personnel. The committee meets at least every two months. There is a planned agenda for each meeting and minutes are kept. The committee reviews data concerning infections and infection risks and recommends policies to appropriate medical staff committees, hospital administration, and hospital personnel. The committee may develop, recommend, and set policies. Hospital department managers have line responsibility for implementation of these policies.[13]

A. Membership and department representation:

The Infection Control Committee is a medical staff committee. Membership includes representation from the Medical Staff, Administration, Department of Nursing, and the Infection Control Department. Representation from supporting services is used on a consultative basis. The committee members are representatives of the following departments:**Active**

- Ø Clinical Laboratory/Microbiology
- Ø Department of Anesthesiology

- Ø Department of Medicine
- Ø Department of Nursing
- Ø Department of Pediatrics
- Ø Department of Surgery & Operating Room
- Ø Infection Control Department
- Ø Medical Administration
- Ø Housekeeping
- Ø Maintenance Engineering
- Ø Quality Improvement

Consultative

- Ø CSSD, Biomedical Engineering

B. Lines of communication

The Infection Control Committee reports to the Chairman & Director, Operations MSSH.

C. Authority

The Infection Control Committee Chairman has the authority to institute appropriate control measures or studies when there is considered to be a danger to patients or personnel.

INFECTION CONTROL SURVEILLANCE

Surveillance of endemic and epidemic nosocomial infections and risk factors related to those infections in patients and health care workers is an ongoing process. The Infection Control Team will develop annually, and submit for Infection Control Committee approval, a "**Surveillance Plan.**"

A. Definitions

Identification of nosocomial versus community acquired infection is based upon the definitions developed by the Centers for Disease Control and Prevention (CDC) for use in the National Nosocomial Infection Surveillance (NNIS) program (see appendix). In addition, nosocomial infection and case definitions not addressed by CDC will be developed as needed by the Infection Control Department. These definitions will be approved by the Infection Control Committee when formulated or changed.

B. Rationale

Surveillance provides a process for monitoring specific outcomes of patient care delivery related to infection risk factors and infection prevention/control activities. It provides baseline and trend data for use in problem identification and monitoring and for assessment of outcomes related to interventions. It assists in targeting intervention and identifying educational needs.

C. Patient Populations

Inpatient
 Outpatient
 Health care workers and volunteers

D. Methods for Reporting and Follow-up

1. The goal of reporting and follow-up is to focus interventions that will improve patient outcomes.

2. "Surveillance" reporting will be an ongoing component of the Infection Control Committee Agenda.
3. Reports will be made to the appropriate unit, department, service, or committee in a timely manner by Infection Control.
4. When possible, rates will be used when reporting data. Denominators will vary based on appropriateness and availability (e.g. admissions, discharges, patient days, procedures, device days, at-risk days).

E. Responsibilities

1. Data collection: Infection Control Practitioners (ICPs), Employee Health, Quality Assurance personnel
2. Data evaluation: Infection Control Team
3. Follow-up: Infection Control Team, the Infection Control Committee and appropriate unit(s), department(s), service(s), or committee(s).
4. Health care worker issues will be the primary responsibility of Employee Health. Infection Control

Department will provide consultation and support.

F. Data Collection Methods and Intensity

1. Microbiology Laboratory reports - comprehensive
2. Patient records - focused
3. Pathology reports - focused and periodic
4. Pharmacy - limited and disease/condition specific
5. Unit specific data e.g. patient days, device days - focused and periodic
6. Verbal or written reports - limited and disease/condition specific

G. Quality Control Procedures

1. Single occurrences of unusual diseases/organisms will trigger investigation.
2. Clusters/outbreak in any patient or health care worker population will trigger investigation
3. Routine microbiology sampling on either patients, staff or environmental surfaces will not be performed unless used as part of an outbreak or cluster investigation.
4. Thresholds will be established, when appropriate, and deviation from a threshold will trigger investigation.

HAND HYGIENE POLICY

How to handrub?

Rub hands for hand hygiene! wash hands when visibly soiled

1a Duration of the entire procedure: 20-30 seconds

1b Apply a palmful of the product in a cupped hand, covering all surfaces;

2 Rub hands palm to palm

3 Right palm over left dorsum with interlaced fingers and vice versa;

4 Palm to palm with fingers interlaced;

5 Backs of fingers to opposing palms with fingers interlocked;

6 Rotational rubbing of left thumb clasped in right palm and vice versa;

7 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8 Once dry, your hands are safe.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this document. However, the published material is being distributed without warranty of any kind, either expressed or implied.

The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material

IMMUIZATION POLICY

Immunization policy would include prescribed vaccinations as per employee's area and nature of work. Immunization would be done for all, at the time of:

- Joining
- Annual Health check-up

AREAS OF IMPROVEMENT

- All those areas where the guidelines aren't followed should be taken into consideration. Immediate action for abiding by the guidelines should be made applicable.
- Fumigation of the Dialysis unit should be done and a schedule should be prepared regarding the same.
- Disinfection of the patient zone and non-critical areas should be carried out strictly.
- Policy guidelines for re-use of Filters should be established as early as possible.
- Regular monitoring of the infection control parameters should take place.
- Standard precautions should be followed in every case.
- Proper reporting and maintenance of records regarding microbial culture, incidences related to needle-prick injury, etc should be done for dialysis unit apart from centralized records of the hospital.

REFERENCES

1. Pendse S, Singh A, Zawada E. Initiation of Dialysis. In: *Handbook of Dialysis*. 4th ed. New York, NY; 2008:14–21
2. Mosby's Dictionary of Medicine, Nursing, & Health Professions. 7th ed. St. Louis, MO; Mosby; 2006
3. Atlas of Diseases of the Kidney, Volume 5, Principles of Dialysis: Diffusion, Convection, and Dialysis Machines" (PDF). Retrieved 2011-09-02
4. Ahmad S, Misra M, Hoenich N, Daugirdas J. Hemodialysis Apparatus. In: *Handbook of Dialysis*. 4th ed. New York, NY; 2008:59-78
5. USRDS Treatment Modalities" (PDF). *United States Renal Data System*. Retrieved 2011-09-02.
6. Rocco, MV (Jul 2007). "More Frequent Hemodialysis: Back to the Future?". *Advances in chronic kidney disease* **14** (3): e1–9.doi:10.1053/j.ackd.2007.04.006. PMID 17603969
7. Daily therapy study results compared
8. Pfunter A., Wier L.M., Stocks C. Most Frequent Procedures Performed in U.S. Hospitals, 2011. HCUP Statistical Brief #165. October 2013. Agency for Healthcare Research and Quality, Rockville, MD.
9. Blake P, Daugirdas J. Physiology of Peritoneal Dialysis. In: *Handbook of Dialysis*. 4th ed. New York, NY; 2008:323-338
10. Kallenbach J.Z. In: *Review of hemodialysis for nurses and dialysis personnel*. 7th ed. St. Louis, Missouri:Elsevier Mosby; 2005.
11. Medscape. Retrieved 2011-09-02.
12. International Society of Nephrology, Standard of Care for Maintenance Hemodialysis in India, Pg.2-143
13. NABH standards, Policy and Procedures – Max Healthcare



A PROPOSAL FOR

IT-ENABLED APPOINTMENT SCHEDULING

IN DIALYSIS UNIT

INTRODUCTION

Dialysis Unit at Max Hospital:

Dialysis unit was established 6 months ago and included under the Renal Science Department. It is a fully functioning unit with a bed capacity of 17 and a total number of 22 machines including 3 portable machines. On an average, 50 dialysis procedures are performed every day in the unit which is inclusive of out-patient and in-patient department.

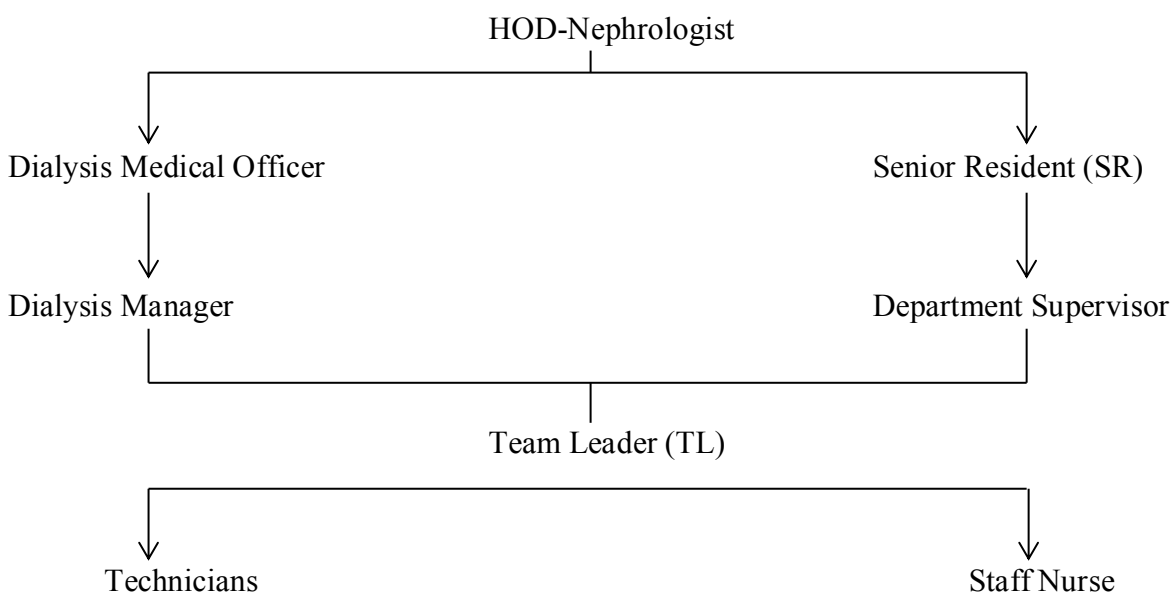
The procedures carried out at the unit are Hemodialysis (HD), Hemodiafiltration (HDF), Plasmapheresis (for ABO incompatible renal transplant), Peritoneal Dialysis (PD), and continuous ambulatory peritoneal dialysis (CAPD). About 1400 dialysis are performed per month.

- The Staffing is as follows:

14. Nephrologist	3
15. Senior Residents	4
16. Junior Resident	1
17. Medical Officers (JR)-Dialysis	2
18. Technicians	13
19. Staff Nurses	14
20. General Duty Assistant (GDA)	3
21. Housekeeping	1

- Patient : Nurse Ratio = 1:3 to 1:4
- Patient : Technician Ratio = 1:4 to 1:5

Organization Chart – Dialysis Unit



- Machines used:
 - 4000-8-S : 17 (for maintenance hemodialysis)
 - 5000-8-S : 2 (for hemodiafiltration)
 - Portable : 3

PROBLEM STATEMENT

High inefficiencies due to manual appointment booking system in Dialysis Unit at Max, Saket.

RATIONALE

- Uncoordinated and mismanaged appointment scheduling leads to chaos and patient dissatisfaction.
- All the appointment bookings are taken care of by the Call Centre unit except for Dialysis as it is not yet in the system in spite of being a 9 month old establishment.
- Desired levels of patient care to be provided are hampered due to the constant diversion of attention.
- It leads to reduction in the dedication of nurses and technicians towards their primary role for patient service and thus becomes an additional burden.
- It is a revenue generating centre and thus needs to be taken care of in terms of both, patient and provider point of views.

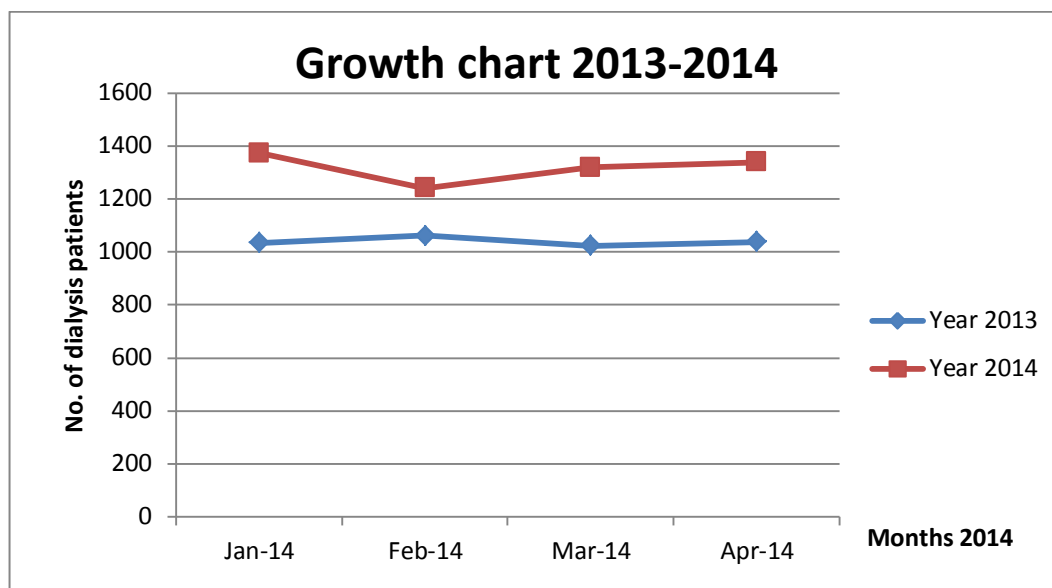
OBJECTIVES

To propose an algorithm for Information Technology (IT) enabled appointment scheduling system for Dialysis Unit, Max, Saket

DATA COLLECTION

Month	Hep.C room HD	Hep.B room HD	Portable cases HD	CRRT cases	Total
Apr-13	153	13	93	29	1034
May-13	162	14	60	48	1061
Jun-13	130	8	110	41	1024
Jul-13	144	0	96	30	1038
Aug-13	104	0	110	36	937
Sep-13	89	4	79	23	846
Oct-13	91	6	111	39	1000
Nov-13	69	12	297	38	1135
Dec-13	74	26	220	35	1202
Jan-14	83	25	259	52	1373
Feb-14	84	12	237	29	1241
Mar-14	96	11	237	34	1318
Apr-14	116	14	171	30	1338

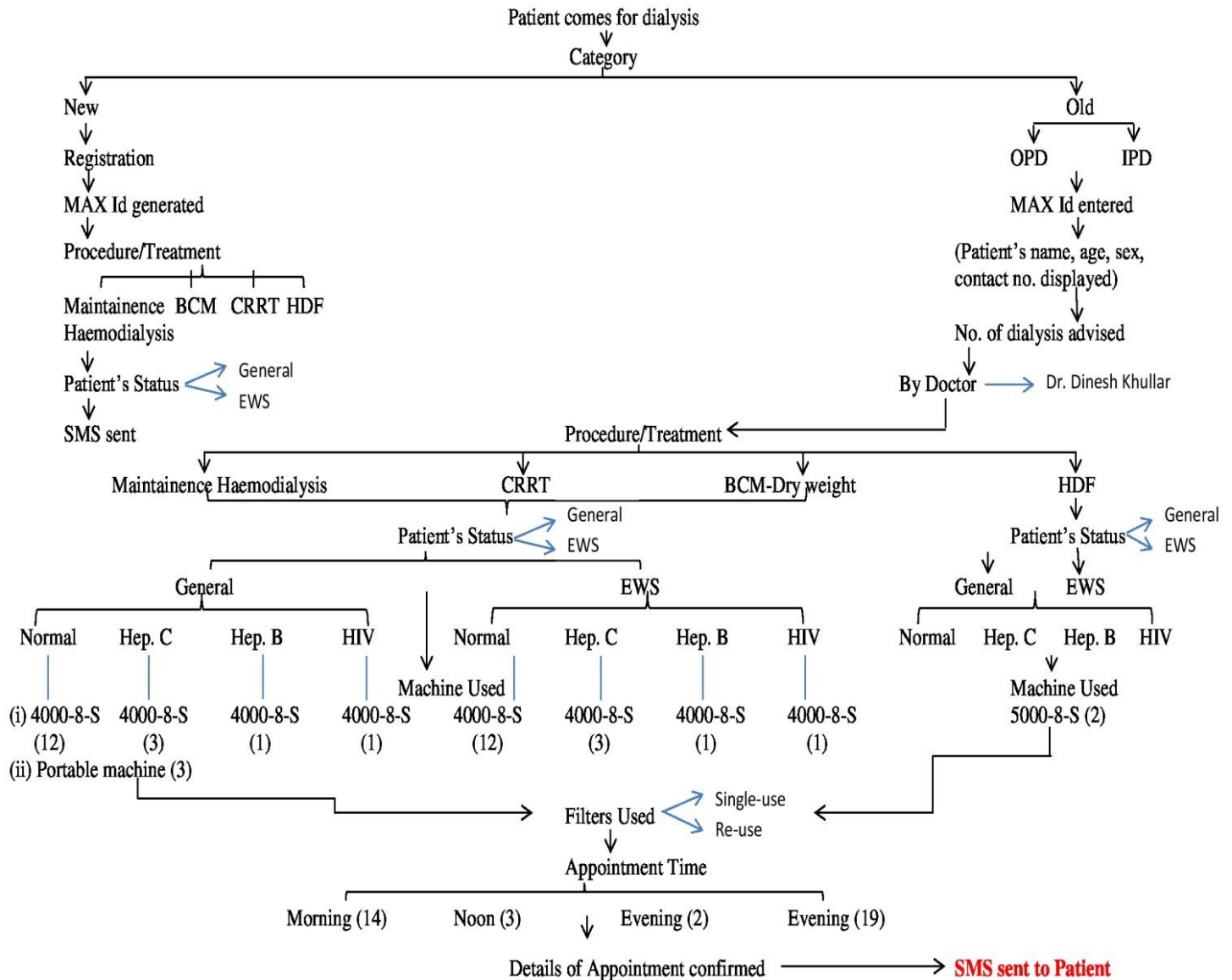
DATA ANALYSIS



It is a retrospective data taking into consideration last one year and the analysis clearly reveals the marked increase in the output of the Dialysis unit in terms of patient numbers and procedures being carried out.

This defines the basis for an efficient system to be developed to cater to the growing outputs of the Unit.

PROPOSED ALGORITHM



REMARKS

- The proposed algorithm should be launched on pilot basis and run for one week.
- The pilot period would basically involve training of the staff to use and handle the algorithm without assistance.
- This algorithm would also allow the new patients to book dialysis appointment through the Max Website.
- It would help in reducing the work load off the staff and help in increasing their efficiency towards patient service and care.

ANNEXURE

DONOR CHECK LIST

Stage – I

1. Blood Group	
2. CBC	
3. BUN	
4. S.Creatinine	
5. S – Na ⁺	
K ⁺	
6. TSH	
7. SGOT, SGPT, S.Bil, Sugar – R+F, HbA1c	
8. Urine – R/E	
9. 24 hrs Urine Protein or Urine spot P/C ratio	
10. PT/INR	
11. APTT	
12. CMV-IgG -IgM	
13. Dialysis Serology Panel	
14. USG abdomen	
15. DTPA scan	
16. ECG	
17. X Ray chest	

Stage – II

1. S.Cholesterol, Urine C/S, S.Prot/Alb, Uric acid, PSA (in males)	
2. Calcium, Phosporus, Alk. phos.	
1. Echo Cardiography	
4. Gynae Clearance	
5. HLA Typing/ Cross Match	

Stage – III

1. CT Renal Angio	
2. Psychiatry Clearance	
3. PAC & Urology Clearance	

RECIPIENT CHECK LIST**Stage – I**

2. Blood Group	
3. CBC,ESR, RFT	
4. USG abdomen	
5. Urine – R/M	
6. Urine C/S	
7. PT/INR	
8. APTT	
8. Dialysis Serology Panel	
9. SGOT, SGPT, S. Bil, S.Prot/Alb	
10. ECG	
11. X Ray Chest	
12. HCV-RNA (Qualitative)	
13. Sugar- F-PP, HbA1c	

Stage – II

1. Echo Cardiography / Stress Echo Cardiologists Clearance	
---	--

Stage – III

1. S.TSH, iPTH, Calcium, Phosphorus, S.iron / ferritin / TIBC /S.Cholesterol, Triglycerides, LDL	
2. CMV – IgG IgM	
3. EBV – IgG (optional) IgM	
4. Varicella Zoster – IgG (optional) IgM	
4. HLA Typing and Cross match	
5. PAC Clearance	
6. Urology Clearance	



Caring for you... for life

INSTITUTE OF LABORATORY SERVICES

**MAX SUPER SPECIALITY HOSPITAL, WEST BLOCK,
1, PRESS ENCLAVE ROAD, SAKET, NEW DELHI-110017**

REQUEST FORM –HLA TYPING () / CROSS MATCHING ()

(Please take prior appointment contact: +911140633645)

Patient Details:

Name: -----

S/O, W/O, H/O:-----

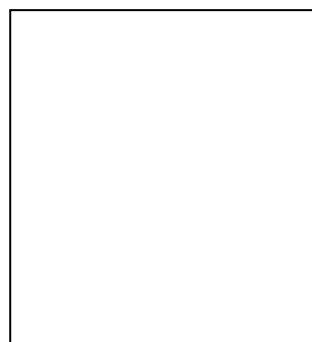
Age/Sex:-----

Max ID:-----

Contact No:-----

Address: -----

Blood Group:-----



Patient's Photograph

(Attested by Doctor)

Donor Details:

Name: -----

S/O,W/O,H/O:-----

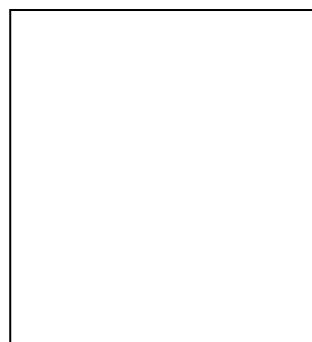
Age/Sex:-----

Max ID:-----

Contact No:-----

Address: -----

Blood Group:-----



Donor's Photograph

(Attested by Doctor)

Relation of Patient with Donor (s):-----

Consent (We confirm above said relationship)

Sign/Right Thumb

Sign/Right Thumb

Impression (Patient)

Impression (Donor)



Caring for you... for life

**INSTITUTE OF LABORATORY SERVICES
MAX SUPER SPECIALITY HOSPITAL, WEST BLOCK,
1, PRESS ENCLAVE ROAD, SAKET, NEW DELHI-110017**

CLINICAL DETAILS OF PATIENT:

No. of Dialysis / Last Dialysis:

Details of Blood Transfusion:

Any Medication (e.g. Immunosuppressant's):

S.No	Condition	Comments (Yes/No)
1.	Hepatitis B	
2.	Hepatitis C	
3.	HIV	
4.	Diabetes	

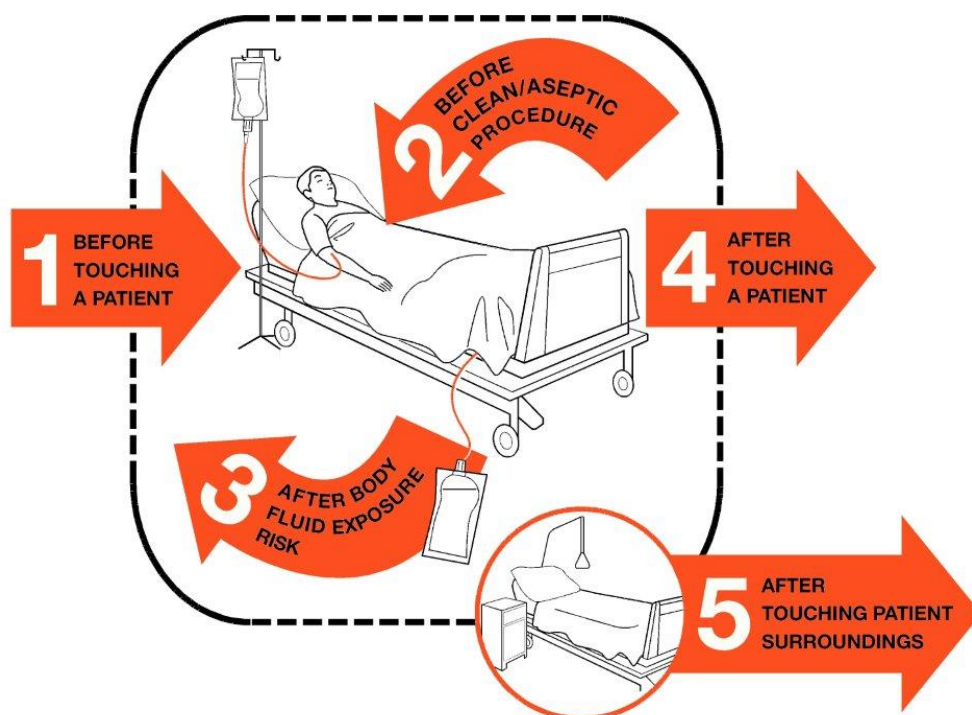
FAMILY TREE (PEDIGREE):

SEAL & SIGNATURE OF REFERRING DOCTOR

Path Lab / Request Form for HLA Typing & Cross Matching/Rev No.00/25th Nov2013

Related/Spousal/Near Related			
S. No	Document	Attachment (Yes/No)	Page No
1	Check List		
2	Forwarding Letter		
3	Brief History of the patient by consultant		
4	ABO typing of recipient and donor		
5	Affidavit/Consent of Donor and Donor close relative		
6	Affidavit/Consent from the recipient		
7	Affidavit from recipient stating appearance for the first time		
8	Documentary evidence of past acquaintance		
	: Proof that they have lived together		
	: Old photograph showing donor and recipient together		
	:Marriage certificate or proof in case of spouse is donating		
9	Documentary evidence of Identity and residence proof of donor and recipient		
	:Voter ID/Passport/Driving License/PAN card/Bank Account/Ration card/Other government issued ID Card		
10	HLA Typing & Form 5		
11	FORM 1		
12	FORM 4 duly signed by consultant		
13	FORM 11		
14	FORM 21		
15	Evidence of vocation and income for last 3 years from donor and recipient		
	:Bank account statement/Income tax returns/ certificate from tehsildar along with affidavit		
16	Psychiatry clearance		
17	NOC from state or embassy		
18	Family tree of both donor and recipient signed by consultant		
19	Age/Blood group/Reason for not donating		
20	Declaration by the doctor.(In case of unrelated donor)		

Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching him/her.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.



World Health Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES

Clean Your Hands

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this document. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use. WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

 Duration of the handwash (steps 2-7): 15-20 seconds

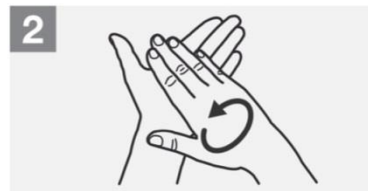
 Duration of the entire procedure: 40-60 seconds



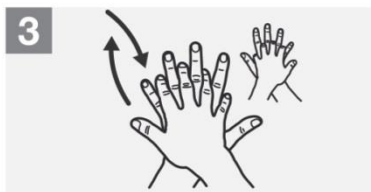
Wet hands with water;



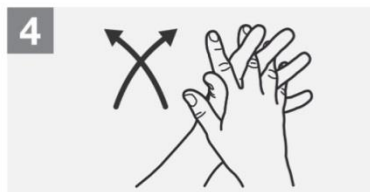
Apply enough soap to cover all hand surfaces;



Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



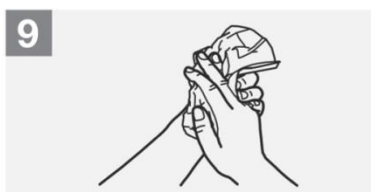
Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



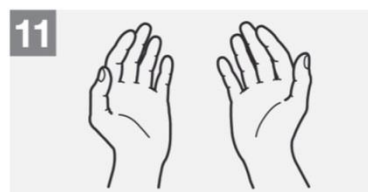
Rinse hands with water;



Dry hands thoroughly with a single use towel;



Use towel to turn off faucet;



Your hands are now safe.



World Health
Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES

Clean Your Hands

Based on the 'How to Handwash', URL: http://www.who.int/gpsc/5may/How_To_HandWash_Poster.pdf © World Health Organization 2009. All rights reserved

May 2009