

**Summer Training at
Max Super Specialty Hospital, Saket, New Delhi
(April 3 to June 2, 2017)**

- **Study on Analysis of Door to Balloon Time and Reasons for Delay in Stemi Patients**
- **Study on Linen Per Bed Per Day on the Floor**

**By
Priyanka**

**Under the guidance of
Dr. Anoop Khanna**

**MBA Hospital & Health Management
2016-2018**


**Institute of Health Management Research
The IIHMR University, Jaipur
2017**

CERTIFICATE

This is to certify that **Dr. Priyanka** has undergone summer training in **Max super speciality hospital, Saket, New Delhi** from **3rd April to 2nd June 2017**.

The candidate herself completed the project assign to her during summer training. Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish her success in all her future endeavors.



Col. (Dr.) Ashok Kaushik
Dean (Academic & Student Affair)
The IIHMR University, Jaipur



Mentor
Dr. Anoop Khanna
Professor
The IIHMR University, Jaipur

CERTIFICATE OF COMPLETION

This is to certify that

Dr. Priyanka

has been associated as an

INTERN

with the department of

MEDICAL ADMINISTRATION

for a period of

3rd April 2017 to 2nd June 2017

at

Max Super Specialty Hospital,
Saket

"The Internship/Observership course is a Max certified course not affiliated to any National/International society".


Head of the Department


Dr. Shubnum Singh

Dean - Nursing, Allied Health, & Wellness Programs
Max Healthcare, New Delhi


Ms. Brigitte Wuethrich
General Manager
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Max Healthcare

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ACKNOWLEDGMENT

The internship opportunity with Max Super Specialty Hospital, Saket was a great chance for learning and professional development. I am also grateful for having a chance to meet so many wonderful people and professionals who led me through this internship period.

I am highly grateful and would like to express my deepest gratitude and special thanks to my mentor, Dr. Sandeep Mor, Deputy Medical Superintendent at Max Super Specialty Hospital, Saket, who in spite of being extraordinarily busy with his duties, took time out to hear, guide and keep me on the correct path and arranging all facilities to make life easier and allowing me to carry out my project at their esteemed organization during my summer internship. I choose this moment to acknowledge his contribution gratefully.

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude to Dr. Nitin Kumar Sharma, (Programme Manager- Medical Administration), Dr. Yashi Kapoor (Deputy Manager- Medical Administration), Dr. Surbhit Sharma (Manager – Medical Quality), Dr. Devesh Tiwari (Senior Manager- Medical Quality) , Mr. Naresh Chaudhary (Manager-Emergency Department), Mrs. Seema Vishvanath (Manager-Housekeeping), Mr. Devesh Parmar (Assistant Manager-Housekeeping) and Mr. Rajesh (Supervisor-Housekeeping) and all of the support staff at Max Hospital, Saket, for their careful and precious guidance which were extremely valuable for my study both theoretically and practically throughout my internship.

I perceive as this opportunity as a big milestone in my career development. I will strive to use gained skills and knowledge in the best possible way.

Sincerely,

Ms. priyanka

Dr. Sandeep Mor

DMS (Deputy Medical Superintendent)

Max Super Specialty Hospital, Saket

Place: New Delhi

Date: 1st June, 2017

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ABBREVIATIONS

ABBREVIATIONS	Meaning
ALOS	Average Length of Stay
CMO	Chief Medical Officer
COW	Computer on Wheels
CPRS	Computerised Patient Record System
CTVS	Cardiac Thoracic Vascular Surgery
EMR	Electronic Medical Record
ERCC	Emergency Response Coordination & Communication
ERT	Emergency Response Team
ICS	Incident Command System
IRT	Initial Response Team
ERT	Emergency Response Team
MAMBS	Minimal Access, Metabolic & Bariatric Surgery
MD	Doctor Of Medicine
MDDF	Max Devki Devi Foundation
MLC	Medico-Legal Case
MPH	Masters In Public Health
MSSH	Max Super Specialty Hospital
NABH	National Accreditation Board Of Hospitals
NABL	National Accreditation Board Of Laboratories
PAC	Pre Anaesthetic Clearance
PAHO	Pan American Health Organization
PCP's	Primary Care Physicians
PPE	Personal Protection Equipment
RRT	Rapid Response Team
SCR	Security Control Room
TAT	Turn Around Time
TSSU	Thermal Sterile Supply Unit
TTI	Transfusion Transmitted Infections
WHO	World Health Organisation

OBSERVATIONAL LEARNING

INTRODUCTION

Max Healthcare is committed to the highest standards of medical & service excellence, 'Patient Centered Care', scientific knowledge and medical education. The country's leading comprehensive provider of standardized, seamless and international class healthcare services. 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.

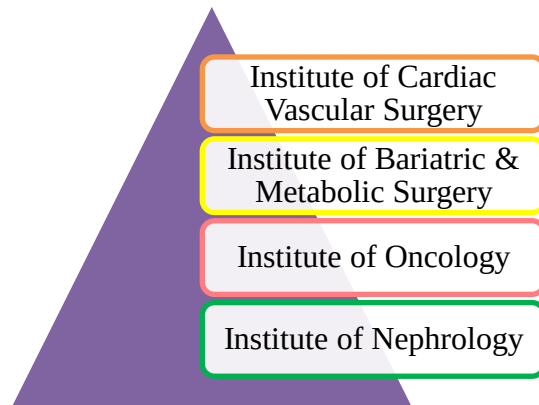


The pillars of this model include:

- 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

Every department of the hospital was observed carefully for its working, staff, hierarchy, physical set up and major challenges faced by them and suggestions were made to overcome those challenges.

The hospital has four key areas of specialties:



MODE OF DATA COLLECTION

Data collection involved discussions with the Administrative staff, the HODs on the managerial issues, communicating with the other staff and going through the records.

Sources of Data

➤ Primary

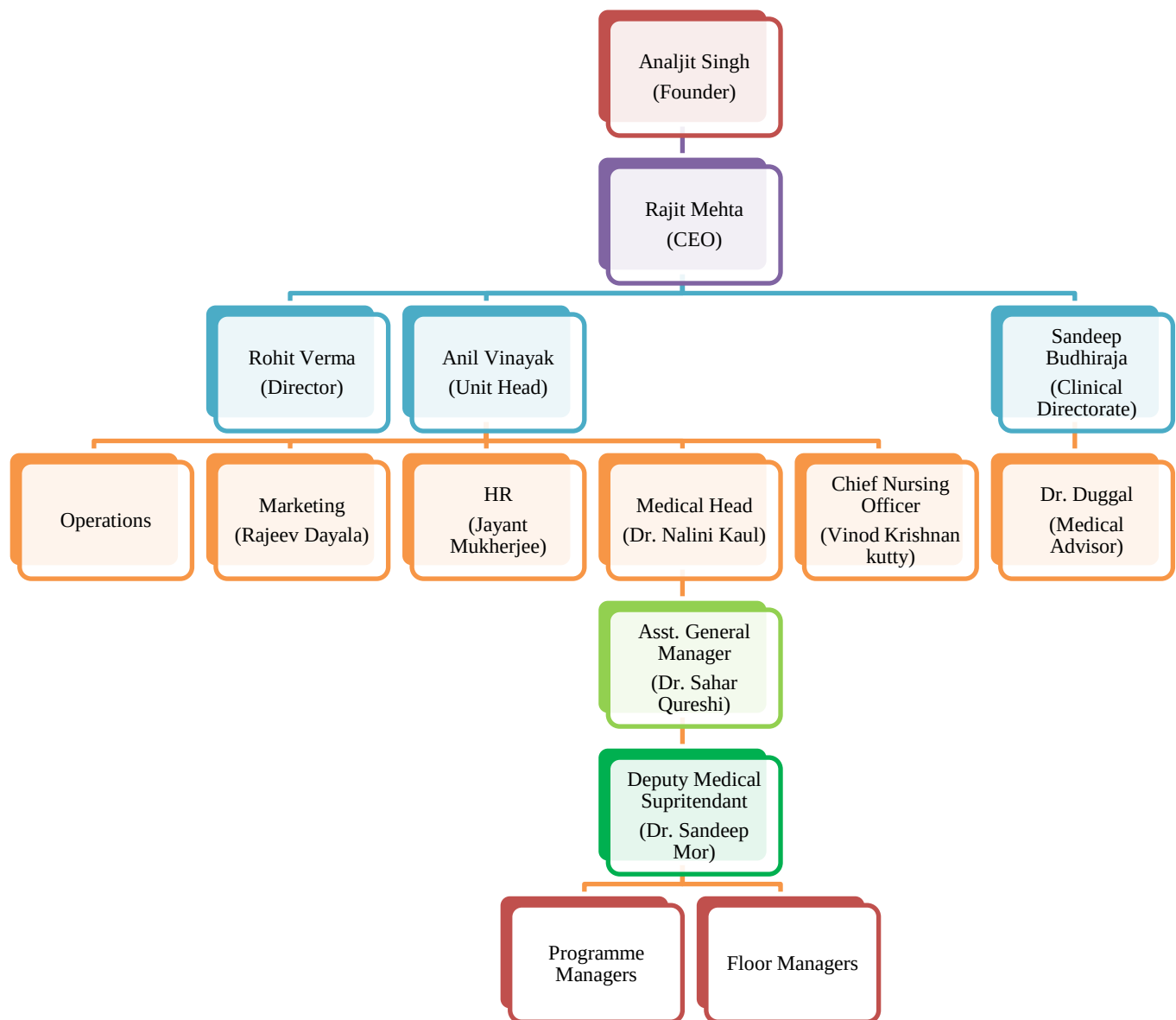
- By interacting with the HODs, executives, Doctors, Nursing staff and other valuable employees of the hospital.
- Through direct observations.

➤ Secondary

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

GENERAL FINDINGS

ORGANIZATIONAL CHART



FRONT OFFICE

- **First contact point** between the patients / their attendants coming to the facility.
- Gives directions to them about the locations of various departments.
- Performs in patient and out- patient registration.
- Does appointment scheduling of the patients.
- Makes doctors' available summary.
- Insurance management.
- Does registration and scheduling of preventive health check-ups.
- Helps in planning timely discharge a day before by inquiring about the same from the concerned consultants.

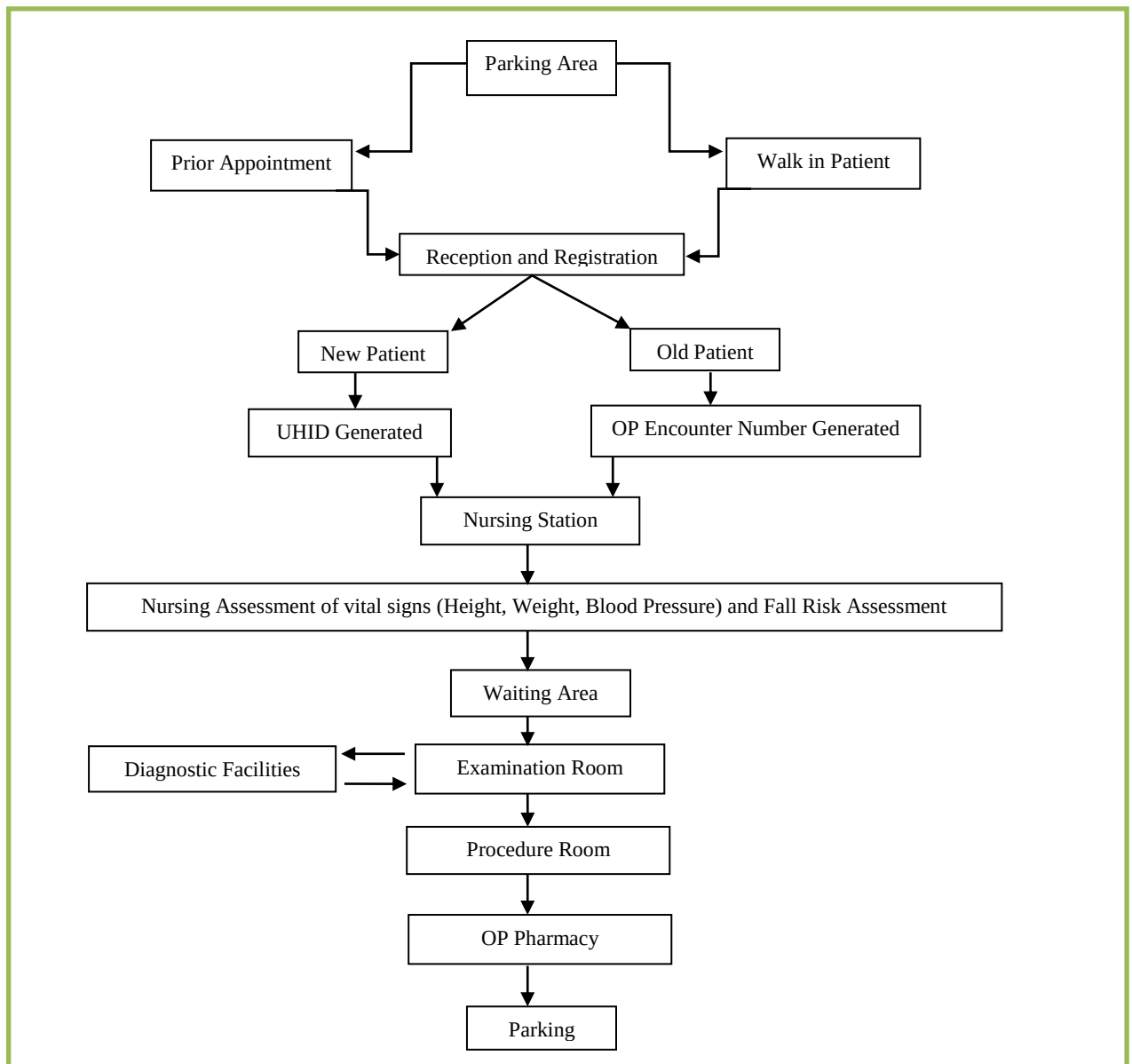
Challenges

- Shortage of staff
- Huge rush during peak hours, 9:00 am-12:00 pm.

OUT-PATIENT DEPARTMENT

- Each INSTITUTE of Max hospital, Saket has its own OPD area as well as IPD area / day-care area wherever applicable with doctor's chambers and procedure rooms.
- 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.
- In case of a new patient, registration is done which is valid pan-Max and for life time of the patient and a UHID is created which becomes a unique identification for all his health-related information.
- 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.

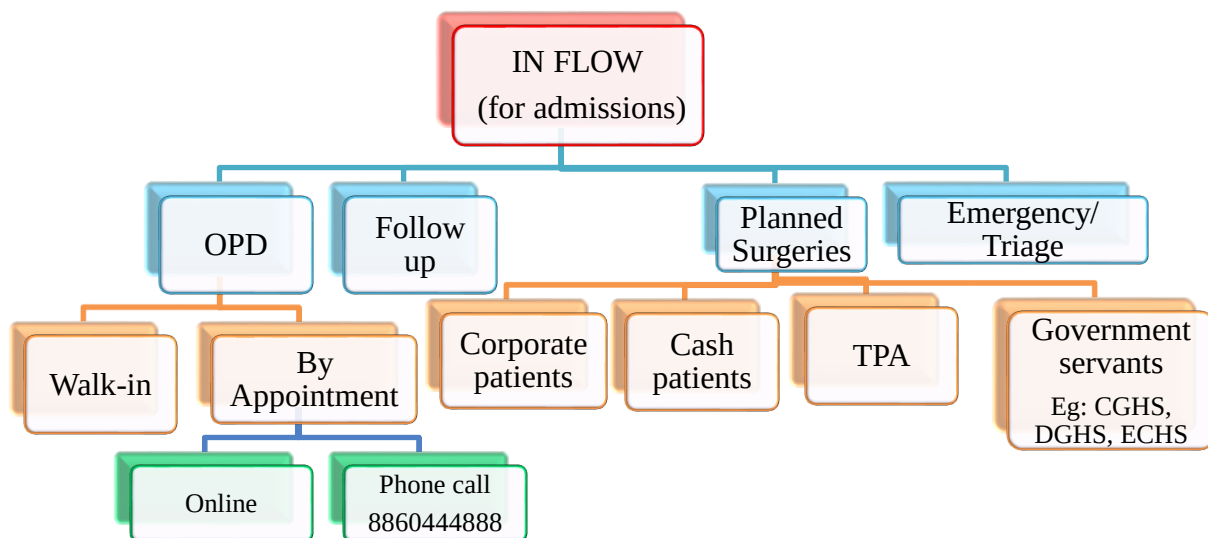
The general process flow that is followed in all the OPDs is as follows:



ADMISSIONS DESK

- If the patient has to be admitted to the hospital, he/she first reports to the admissions desk wherein all the paperwork is completed, do's and don'ts as well as patient's rights and duties are explained to him. An initial token amount is deposited here by the patient which is according to his preference of the room (be it economy, single, double, classic deluxe or suite)
- In case of TPA patients, the admission has to be reported to the insurance company within 24 hours.
- STAFF – 70-80; work in shifts with TPA staff working only from 5-5.

ISSUES- Huge departmentalisation which causes co-ordination problems



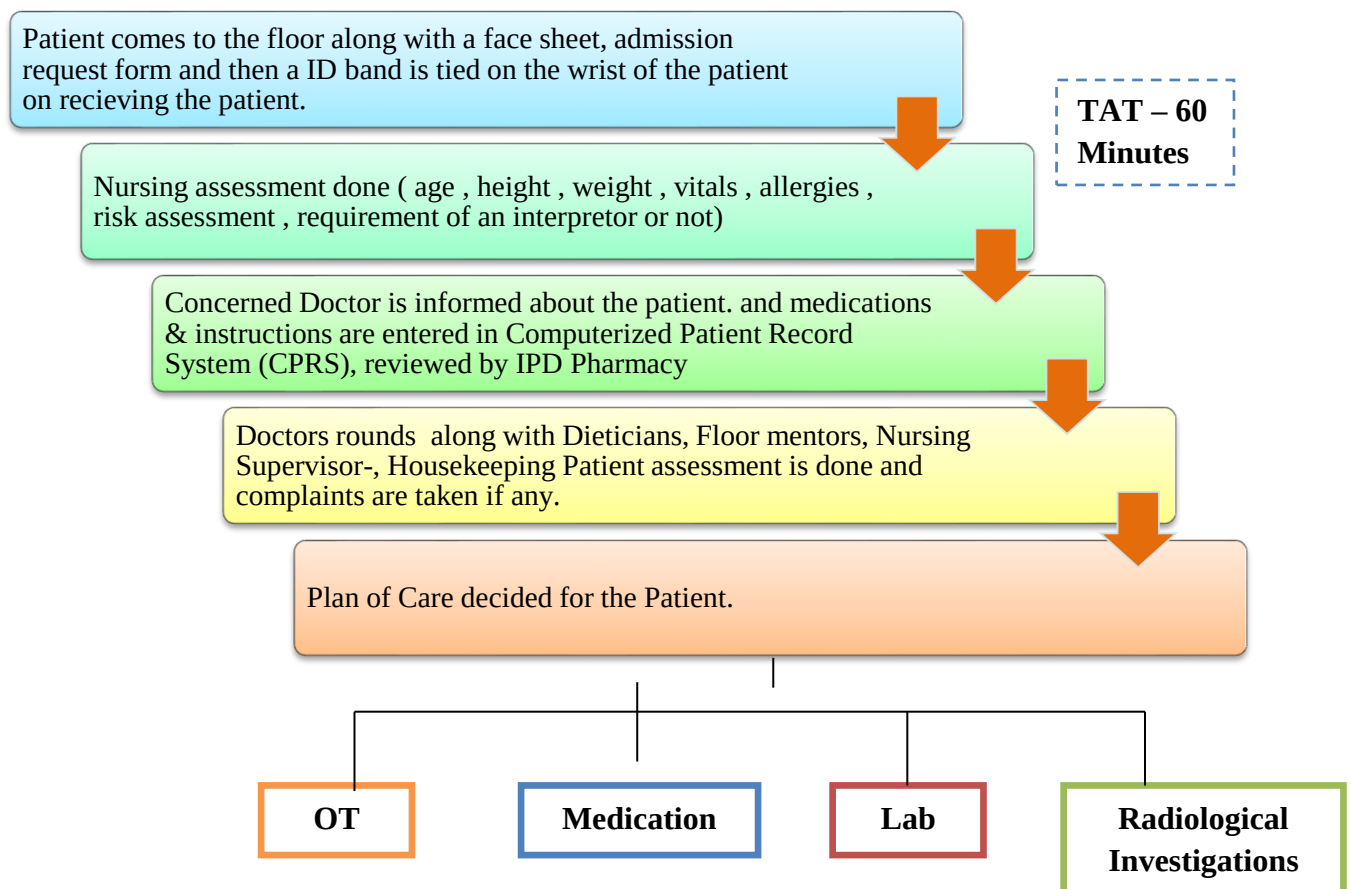
Hierarchy



IN-PATIENT DEPARTMENT (IPD)

- IPD is distributed over Six floors (G.F., 2nd-6th) in the east and Five Floors (2nd-6th) in the west wing of Max hospital including a total number of 314 beds in East & 211 beds in West.
- Every bedside has:
 - Details of Consultant, Nurse and Mentor written at the top of every bed
 - Room equipment checklist – Side rails, Oxygen, Suction, “**Safety First Bell**”
 - Important Instructions
- The rooms available in IPD have the following structure of beds per room:
 - Economy room – 4 beds per room.
 - Double – 2 beds per room
 - Single Deluxe
 - VIP suite
- Every floor has a central nursing station with
 - Information Board covering:
 - Designation & Contact numbers of
 - Duty doctor

- Administration Staff
- Floor Mentor
- Support Staff
- Ward Secretary
- Bed Manager
- Nurses' names with shift timing and designation (8-10 nurses per shift) and allotted Room Numbers.
- 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
- Nurse to bed ratio = 1:5 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, Hypoglycemia, Needle stick Injury
- Process of admission of new patient to IPD



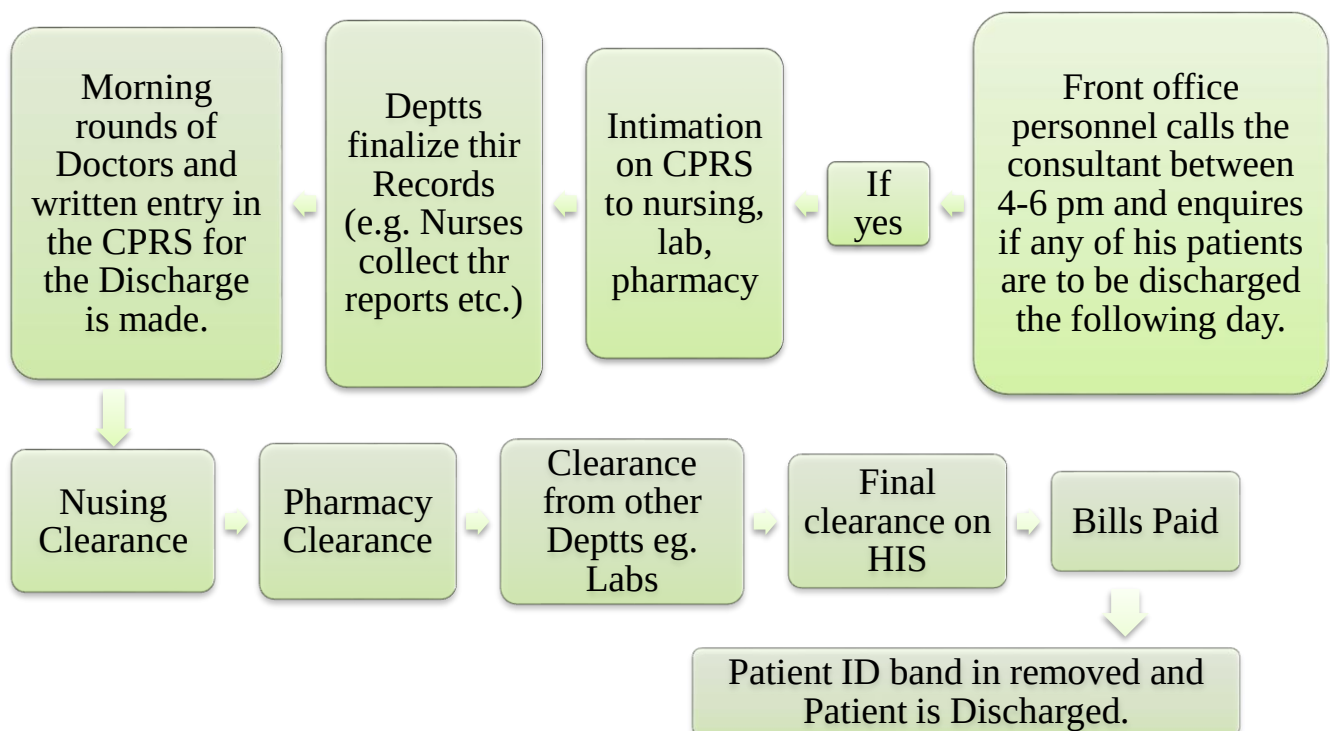
- **BARRIER NURSING-**

Isolation of the patient in case the blood or urine culture of the patient has been tested positive for any infection so that the infection doesn't spread to others.

- **REVERSE BARRIER NURSING-**

Done in cases where patient is immuno-compromised so that infection doesn't travel to him from others.

- **Discharge** Process flow of patient from IPD



- Documents included in Discharge of a patient- Discharge Slip, In-patient Bill (Summary + Detailed), Discharge Summary, Pre-authentication approval letter (in case of TPA), Doctor's Clarification and reports of the patient.
- Delay in Discharge is seen due to Final Bill clearance, TPA approval, finalizing discharge summary.

EMERGENCY DEPARTMENT

Due to the unplanned nature of patient attendance, this department provides 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 from outside and to inside of the hospital and operates for 24 hours a day.

Ambulance - 2 ACLS (with CCTV camera for telemedicine, Suction Cardiac Monitor, Defibrillator, Oxygen Pump) and 2 BCLS (Ferno Stretcher, Oxygen Pump)

Patients are either transferred to other departments or are discharged within 4 hours. Max Super Specialty Hospital, Saket has 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:

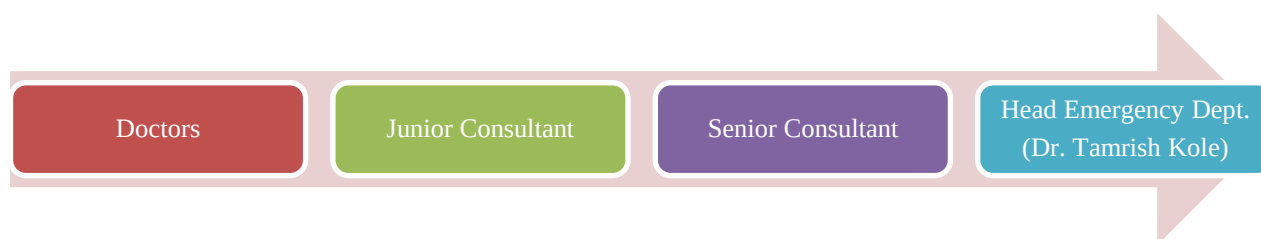
Total 25 bedded

- Resuscitation suite -2 bed
- Urgent care area – 9 beds
- Observation area – 12 beds
- Triage – 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 double lock and key system.
- Hospital information system and CPRS
- COWS(computer on wheels)
- Waiting area for patient's attendants is outside the department.

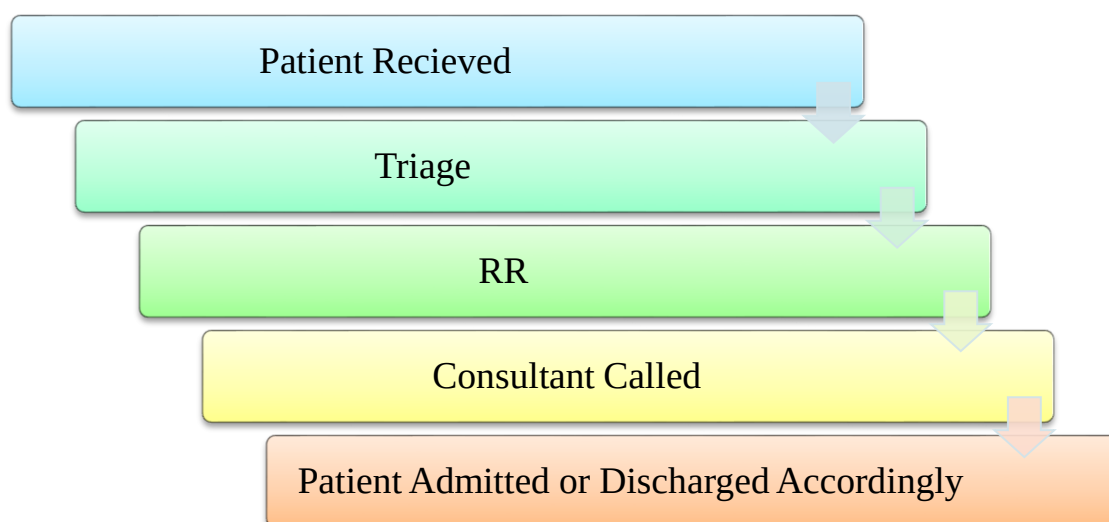
Staffing:

1. Senior consultant (Emergency medical officer)
2. 4 doctors
3. Team leader
4. Emergency physicians - 3
5. Nurses : 32 (8 nurses per shift)
6. 2 personnel at reception
7. Paramedical staff for ambulance
8. 4 GDA per shift
9. Outsourced staff: security personnel.

Hierarchy



Process Flow



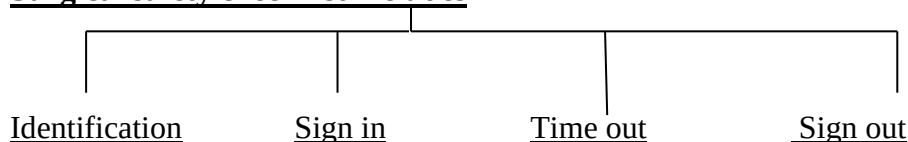
OPERATION THEATER COMPLEX

Operation theatre complex of East wing is located on first and second floor. Operation theatre complex has 11 operation theatre assigned to various departments. Cardiac, oncology, bariatric laparoscopic, ENT and plastic surgeries are performed in these operation theatres. Operation theatre complex of west wing is located on first floor. It has 7 operation theatres for various departments. Orthopaedic, neurology, gynaecology, Brain Suite intervention, general and robotic surgeries are performed here. 8th OT was under-construction.

Organization of staff: The staffs of Operation Theatre are organized into four groups: Anaesthetist- Surgeon, Nursing staff, Technician and Supportive staff.

- Nursing Station – 1
- Pre-Op Beds and Recovery Beds – 4 each
- Scrub Station - 2
- Average number of cases done per day – 20-25 in each wing, 15-16 Robotic Surgeries per month
- Temperature - 21 approx
- Humidity – 50-55
- Light – 2000 lux in the centre of OT table and decreases on moving farther

- OT booking is done through online. 2 types of surgeries are performed – *Elective*: surgeon gets PAC done and gives an appointment; *Add on*: manual booking of OT in case there is cancellation of the scheduled cases due to any reason.
- Each OT complex has a separate material store and a TSSU_(Theatrical Sterile Supply Unit, TAT-45mins).
- Staffing ratio- Nurses : patients – 4:1(pre-op) ; 2:1(post-op)
Technicians: patients- 1:1
- OT Utilization – average is 70%
- Max super specialty hospital recently got a GREEN OT certificate which signifies minimal amount of pollution caused by OT gases and acceptable standards of practices being followed here.
- Sterilization is done by ETO (12 hrs); autoclave. Fumigation is done twice a day in the morning and evening.
- Bio medical waste disposal is done every 2 hours.
- Surgical safety check list includes



- Quality indicators: wrong patient, wrong surgeon, wrong surgery , return to OT(within 7 days) , waiting time for OT

INTENSIVE CARE UNIT (ICU)

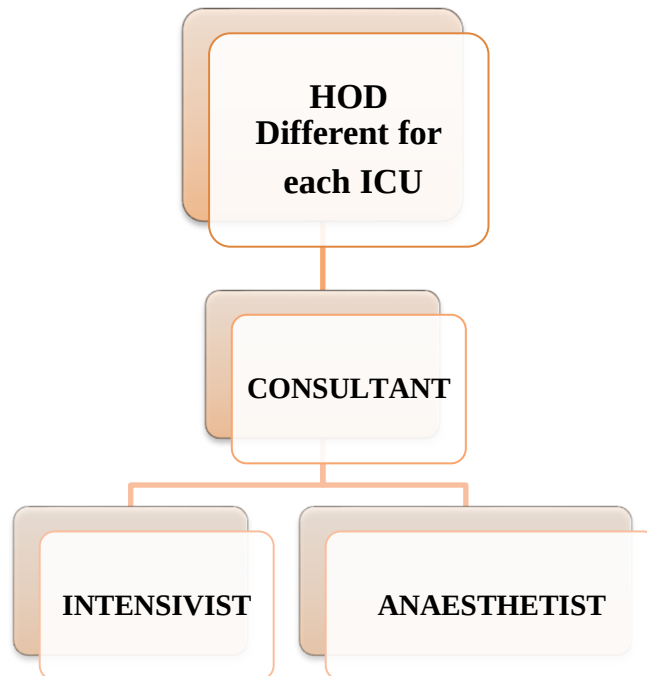
Max Saket has a total of 13 Intensive Care Units and 5 High Dependency Units in the Hospital:

Floor	East	No. of Beds	West	No. of Beds
G.F.	Apex Coronary Care	16		
1 st Floor	CTVS	17	Surgical	11
	Cath Recovery	14	Neuro-Surgical	9
	Paediatric CTVS	11	Neuro-HDU	9
2 nd Floor			ISCU	4
	Onco-Surgical	9	Stroke and Neuro	8
	Onco-Medical	12		
	CTVS- HDU	4		
3 rd Floor	Cardiac HDU	4		
	Medical	8	Neonatal (a)	8
4 th Floor			Neonatal (b)	6
5 th Floor			PICU	8
6 th Floor			Ortho HDU	8
		95	Medical	8
				79

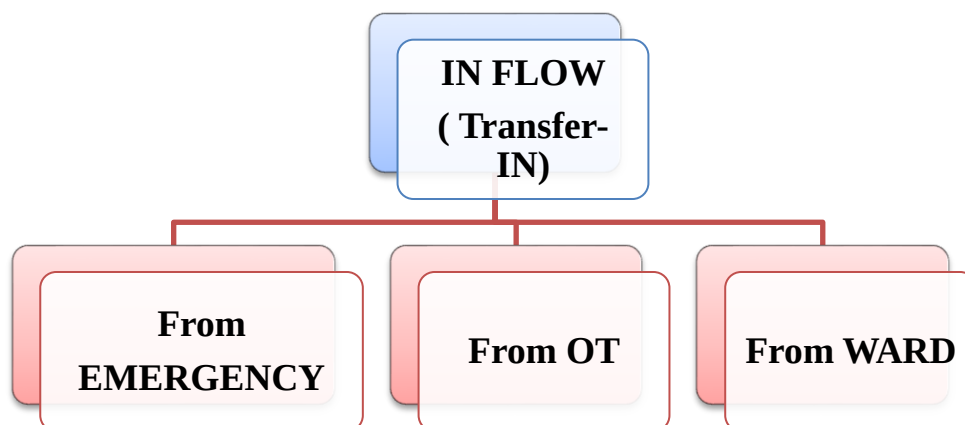
All Intensive Care Units have a 24 hour service of Intensivist and an Anesthetist.

- Each ICU has 1 medication room, 1 Nursing Station, 1 Dr. room

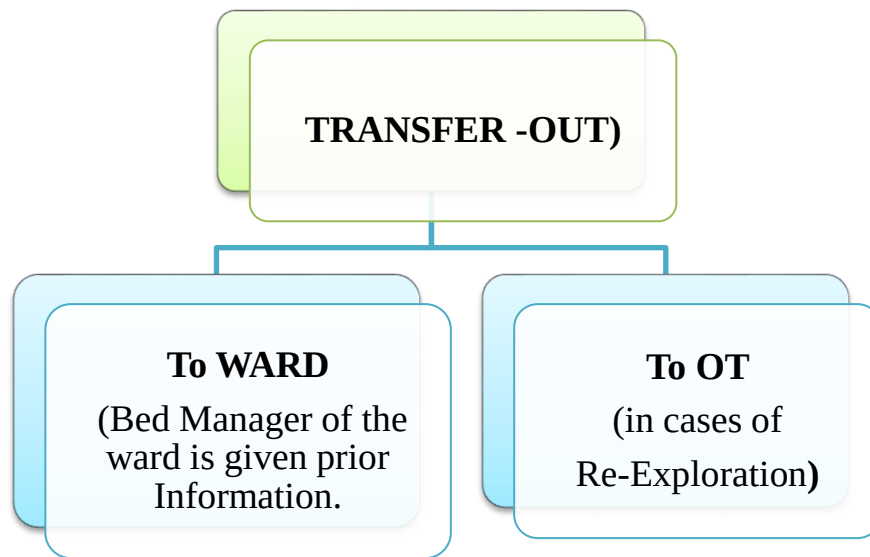
Hierarchy



Patient Flow



Before hand information is given on call to the ICU for *transfer-in* of the patient.



- Patient: nurse – 1:1(for all patients)
- Patient counselling – done throughout the day; Family Meeting – done twice a day by the Intensivist .
- Protocol for infected patients –
 - Isolation
 - Visitor's policy- no visitor allowed inside the isolation room
 - Aseptic policy
 - Full PPA
 - Separate linen disposal in separate bags
 - Separate dressing trolley
 - Separate housekeeping material- dusters, mops etc
- Quality indicators-
 - Patient falls
 - Bed sores
 - Medication error
 - Nosocomial infections

All the Quality indicators are duly noted in “Quality Flash” and it is audited time to time and measures are taken to reduce the number of incidents.

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 (EPS)
 - Cath study

Out of these 3 angiography, angioplasty 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](#)

Slots are booked for everyday as per the doctors' and patients' convenience. About 70% of the slots booked are treated everyday

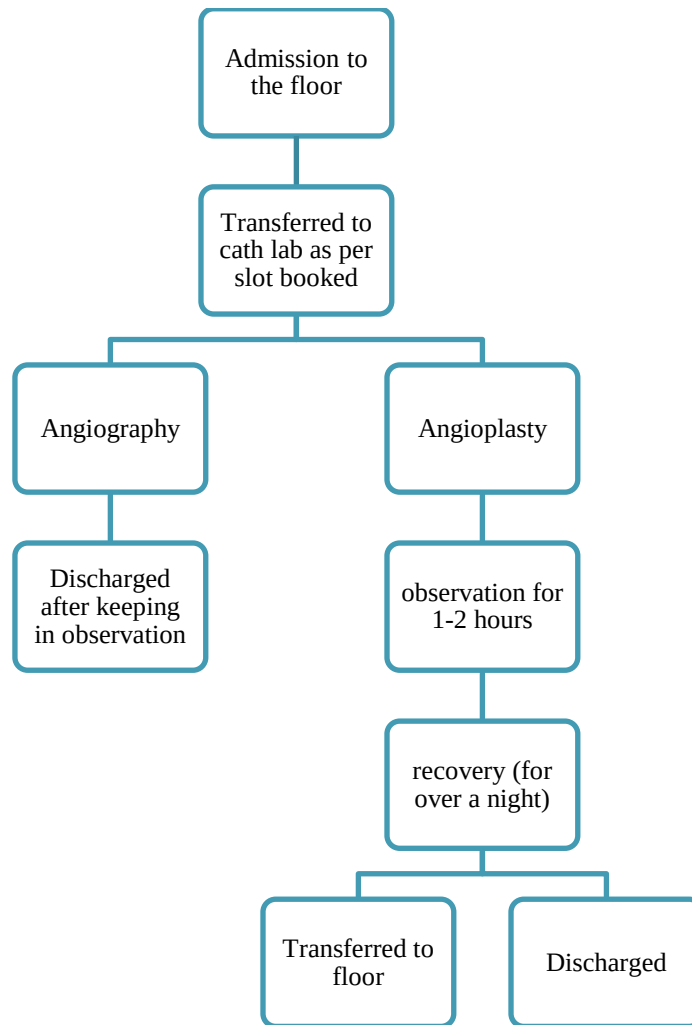
Units of cath lab:

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-3 Beds
8. Instrument washroom

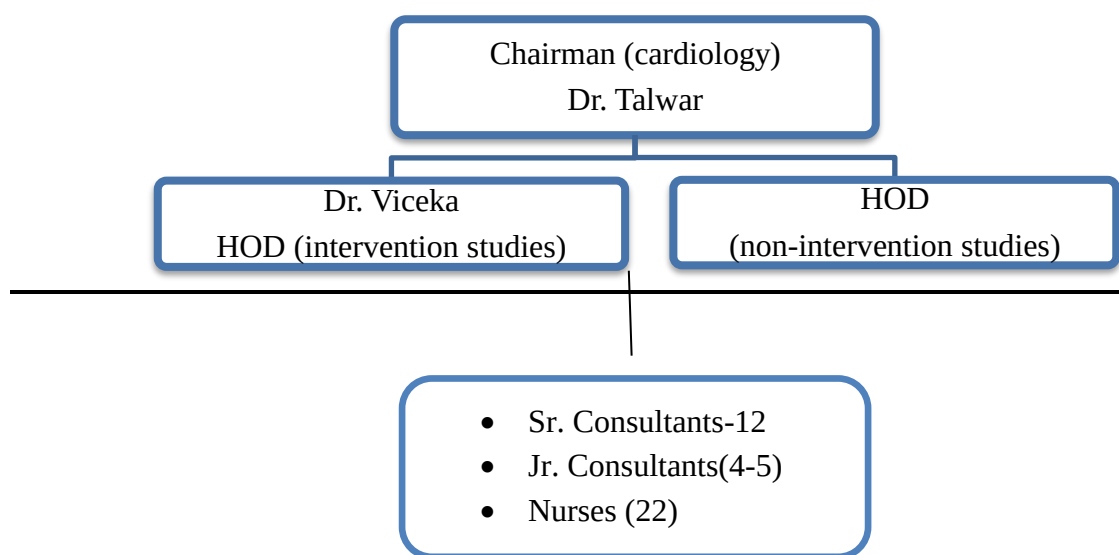
Location: Cath lab is located on the first floor with the vicinity areas as

- Emergency department
- Operation theatre
- Cath recovery-12 Beds
- Coronary care
- CTVS
- SICU
- PICU
- MICU

Process Flow of Patients



Staff



DEPARTMENT OF LAB SERVICES

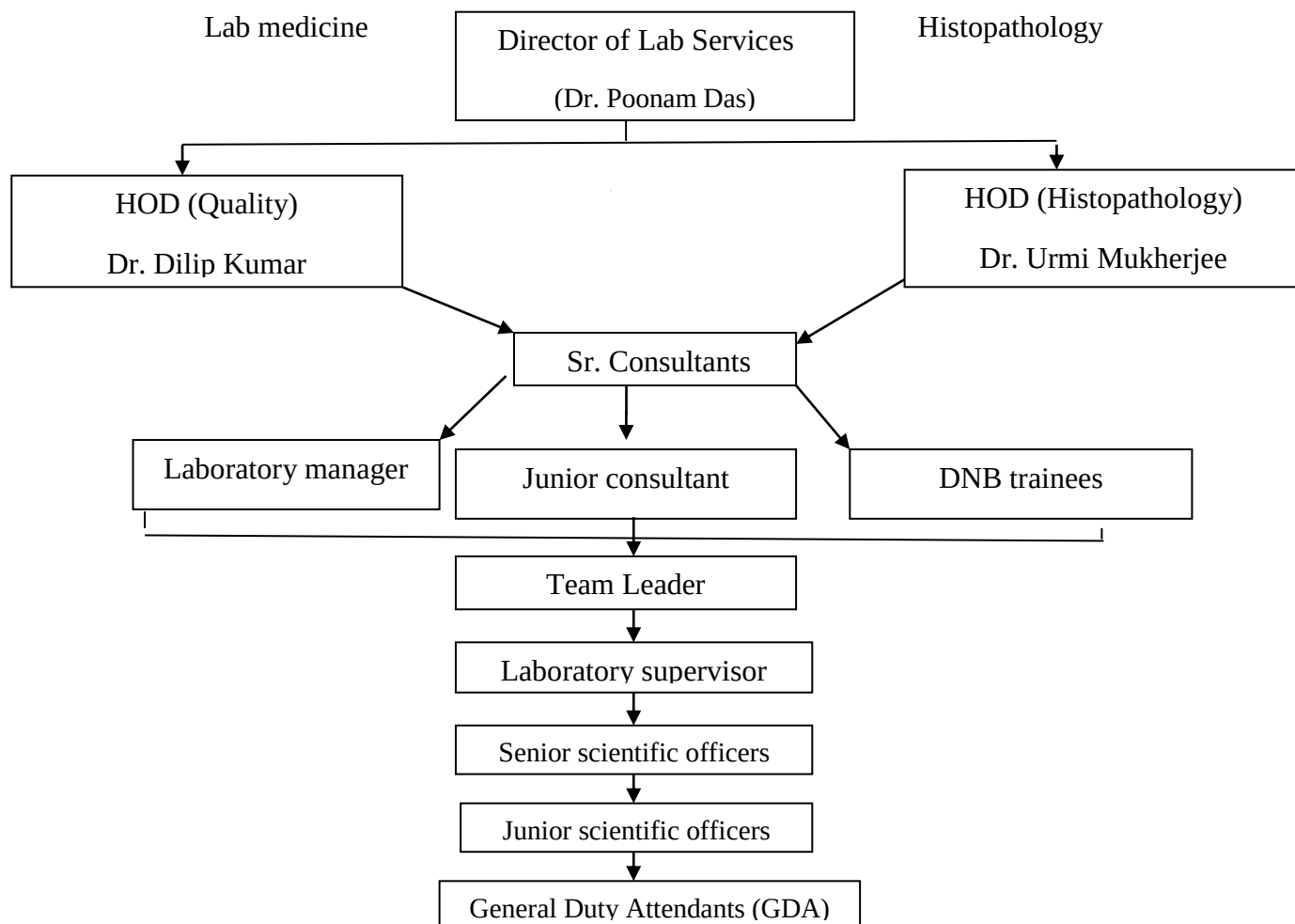
INTRODUCTION-

An ISO: 15189 certified and NABL accredited lab, it is open 24 hrs a day. It's a high-tech lab with fully automated instrument 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.

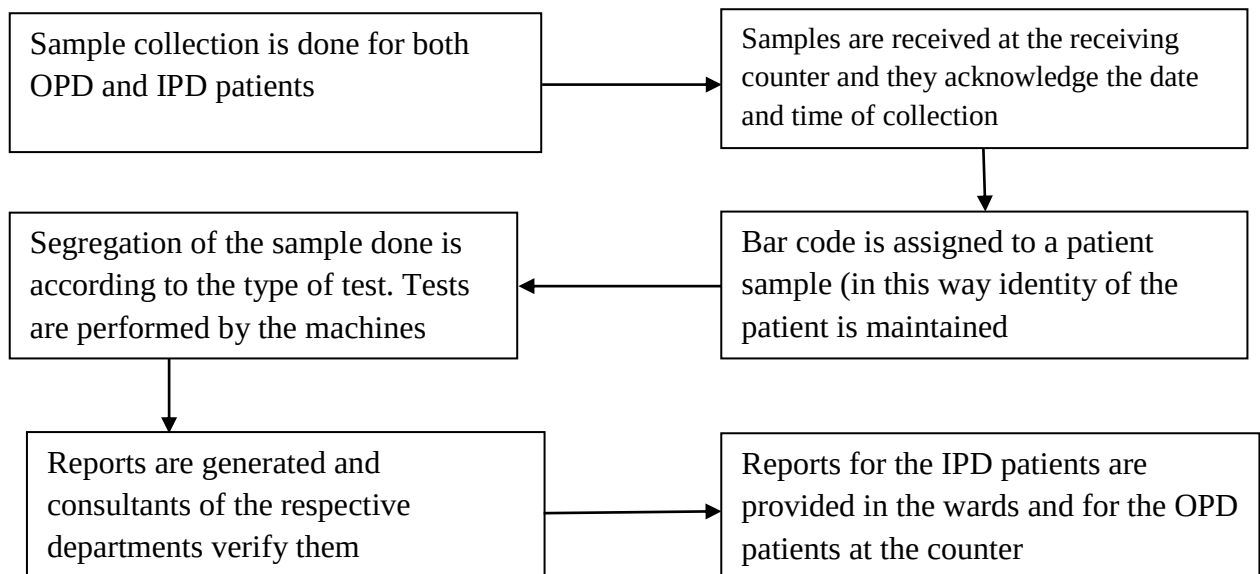
LABORATORY COMPRISES OF THE FOLLOWING DEPARTMENTS-

- Biochemistry
- Hematology
- Immunoassay
- Histopathology
- Clinical pathology
- Serology
- Microbiology
- Cytology

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



PROCESS FLOW-



LABORATORY INFORMATION SYSTEM- It is connected with hospital information system

- Sample received- red color
- Samples acknowledged- yellow color
- Test done- blue color
- Result verified- green color
- Billing done- pink color
- **Indemnity Insurance-** Insurance policy to protect employees when they are found to be at fault for a specific event such as misjudgment.

RADIOLOGY DEPARTMENT: -

- Situated at the ground floor of the west wing of the hospital.
- The Department is headed by Dr. Sonia Dhal
- The total staffs working in the Radiology Department are 60.

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 & color) e.g. 2 D echo, vascular studies, etc

3) Mammography

4) Dexa scan (Bone Densometry)

5) Special imaging techniques

(a) CT Scan (Computerized Axial Tomography)

(b) MRI (Magnetic Resonance Imaging) - 1.5 Tesla, 3 Tesla

Divided into two parts: -

1) For Ultrasonography, mammography, Dexa scan

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)

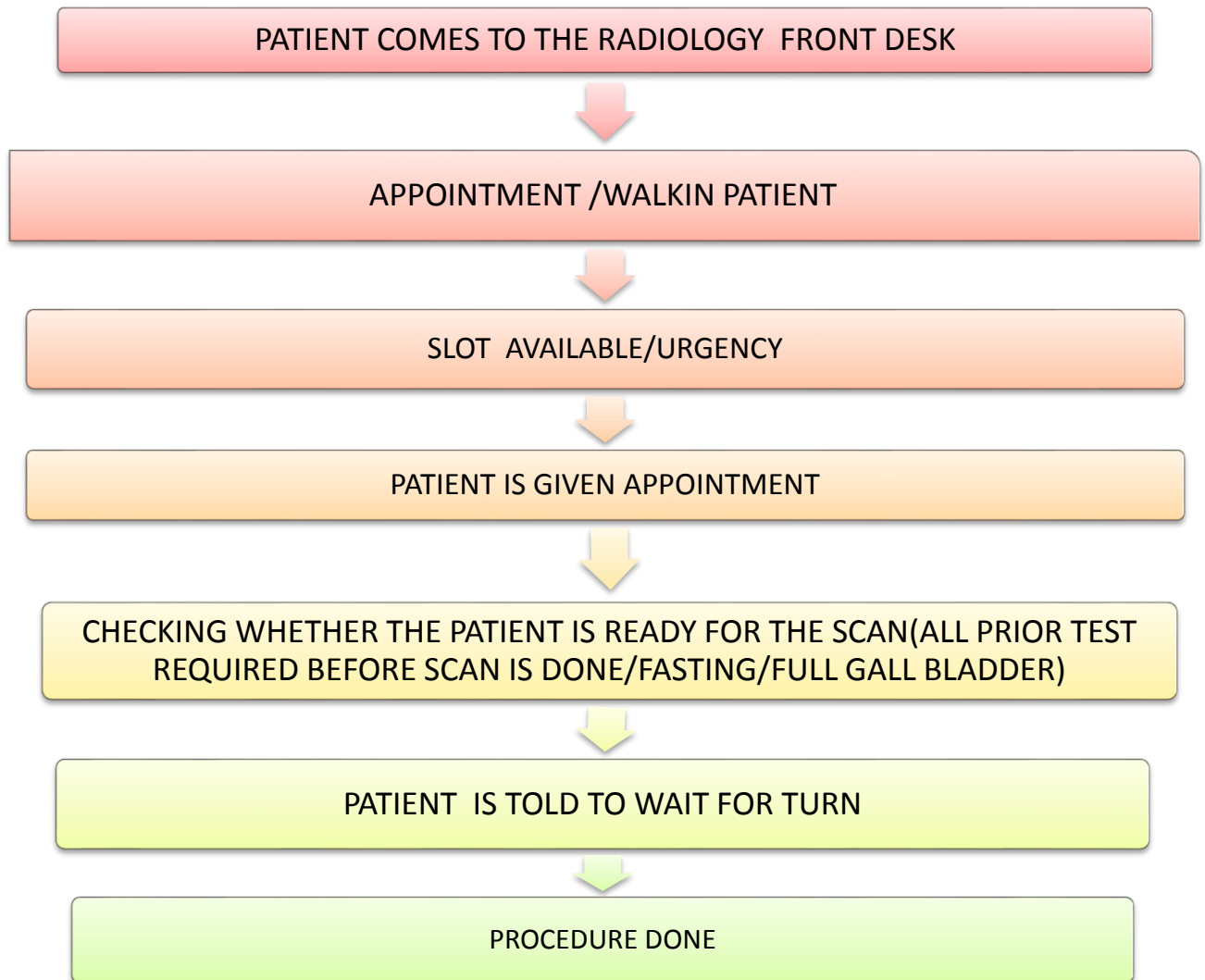


Figure: -Process flow in radiology department for outpatients.

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 Creatinin level for renal patients). After that the patient is given the appointment and told to wait for his turn. Finally, the procedure is performed.

Warning sign with Red light is on when the procedure is going on in the room.

- Emergency patients especially with a critical diagnosis – highlighted in the register and the consultant is immediately informed about the findings.
- Procedures wherein contrast is to be given, for example MRI, consent of the patient is taken prior to the procedure.

BLOOD BANK

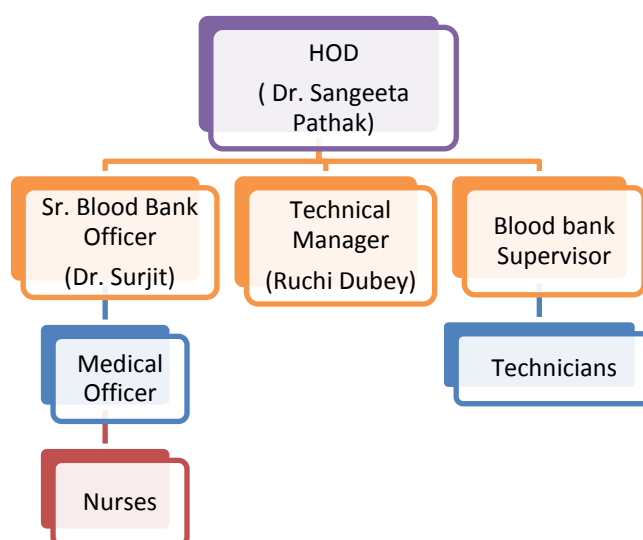
Max super specialty hospital has its own blood bank. All blood groups are available. It is mandatory for the in-patient attendants to donate blood or do replacement of the blood.

Blood bank consists 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. Aphaeresis area: Blood has several components including red blood cells, platelets and Plasma. Donor aphaeresis is a special type of blood donation in which a specific component- platelet is withdrawn from donor.
3. Component room: In component room the whole blood is separated into packed cells (2-6° C), FFP (-80°C) and platelets (22°C). Packed RBC can be stored for 42 days, Platelets for 5 days and FFP for 1 year.
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.
6. Quarantine Area: The untested units are stored in this area for 1 day after component separation. This area is also for nucleic acid testing (NAT)
7. Serology Room- Patient and donor's blood processing is done in this area.
8. Refreshment Area- The donors are provided refreshment after donating blood in this area.

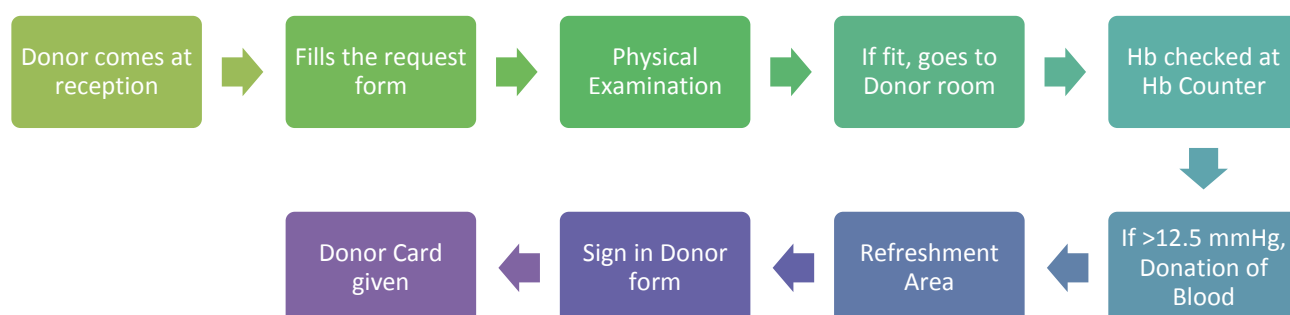
Staff of blood bank consists of 1 HOD, 2 blood bank officer, 1 technician supervisor, 16 technicians, 2 staff nurse, 2 computer executives, 4 GDA.

Hierarchy



- The blood donation timings are from 9am to 5pm. Blood can be donated after every 3 months.

Process Flow



- Voluntary Donor Card is valid for 1 year and Replacement Card is valid for 3 months.
- Record Maintenance – Both manually and digital (Acuren Software)
- Post-Donation Testing is done for and informed to all the donors.
- Report is given only to the patient, if patient cannot come, then the reports are emailed to them.

CENTRAL STERILIZATION SUPPLY DEPARTMENT

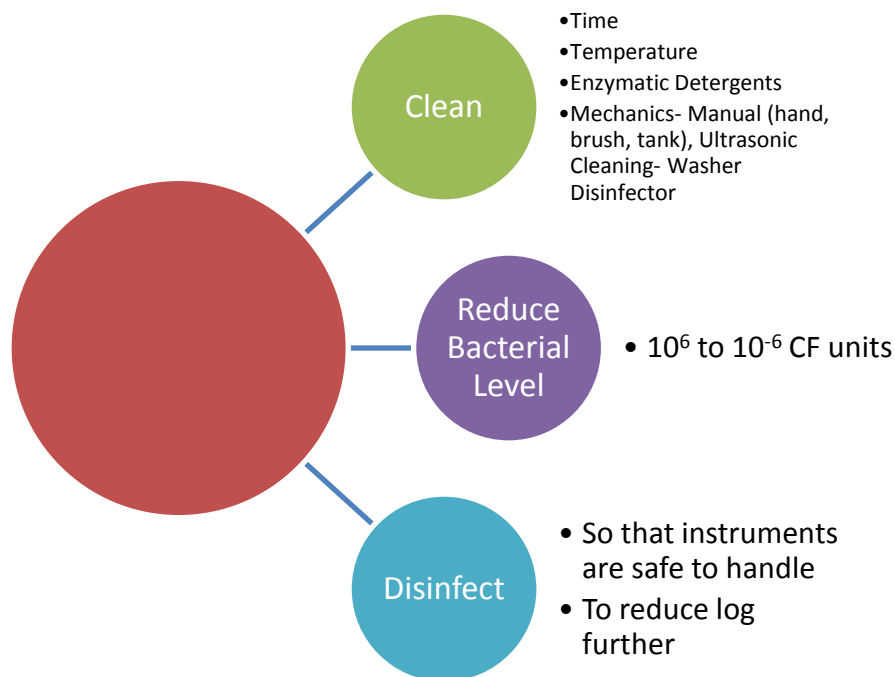
INTRODUCTION-

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} CF Units.

Objective of CSSD:

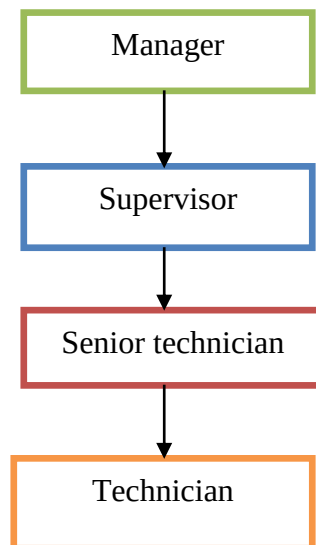


Types of Sterilization-

- Steam- uses saturated steam (heat + water) at 138°C for 4minutes
- Ethylene Oxide
- Plasma

Size of CSSD- should be 10 sq feet per bed, for a 500 bedded hospital.

HIERARCHY OF THE DEPARTMENT-

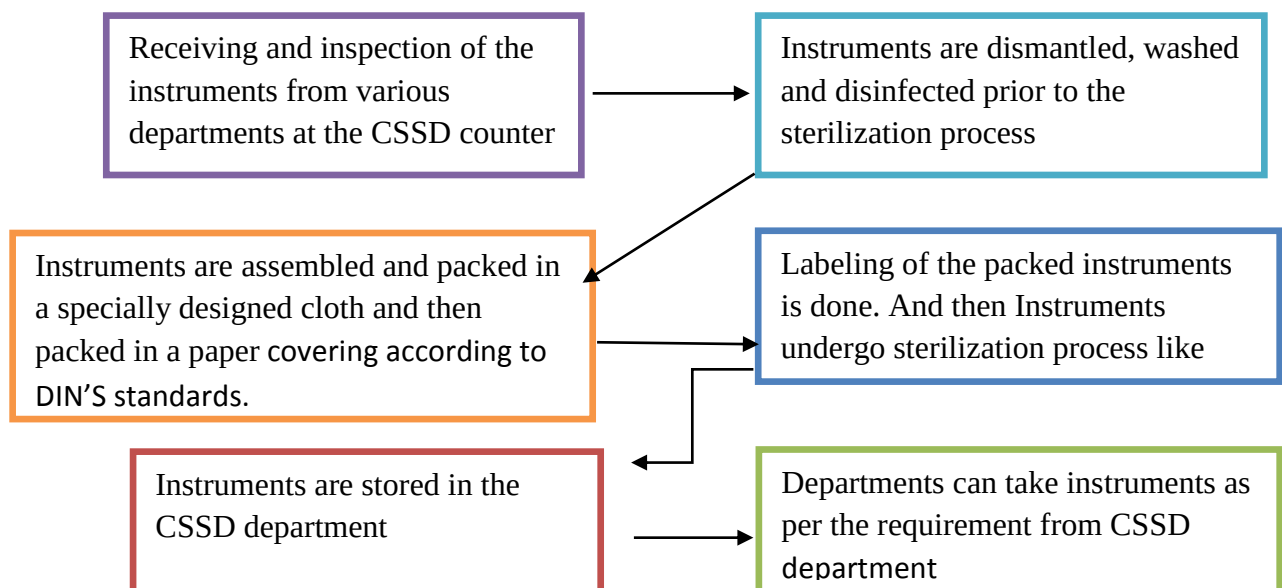


The Department is headed by Dr. Sanjeev Bhatia.

ZONES PRESENT (with color coding)-

- Decontamination Area
 - Clean Zone
 - Sterile Zone- Temperature- 18° to 20° C
- } 18° to 22° C

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 SMS (Stem-Mid-Stem bond) 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.

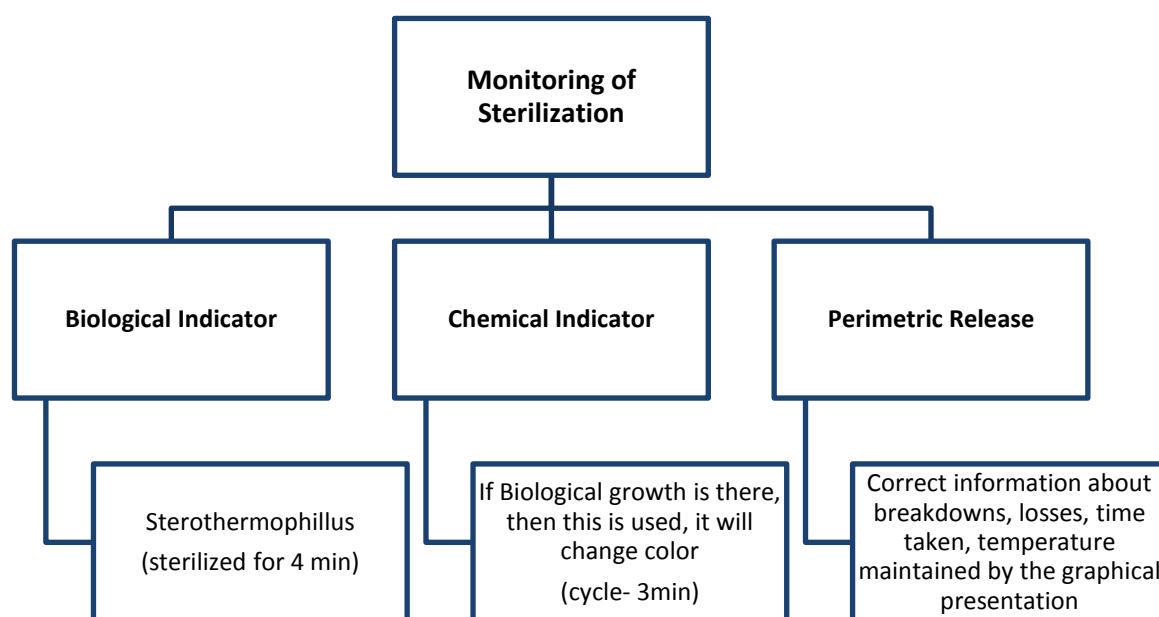
EQUIPMENT LIST-

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

QUALITY INDICATORS-

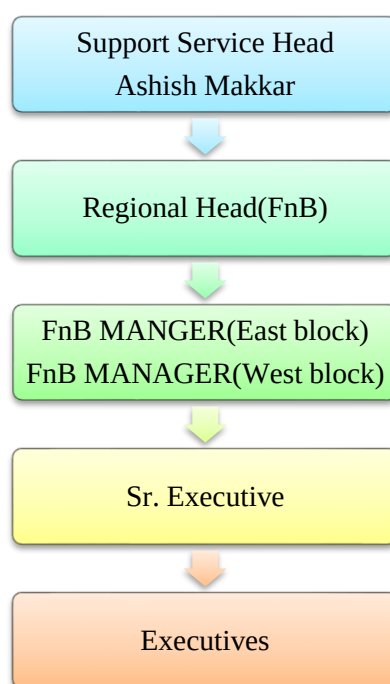
Various quality indicators used in CSSD are-

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



FOOD & BEVERAGES

- Food & Beverage department is responsible for the supply of food to the in-patients and sometimes their attendants (if required) and also for arranging food during various meetings and conferences in the hospital.
- It is approved by NABH and works on ISO 9000: 2008.
- The department has been outsourced to Sodexo Pvt., ltd., however, the management and supervisory staff is in-house.
- Staff- 230 (outsourced) ; 11 (Max in house)
- Hierarchy

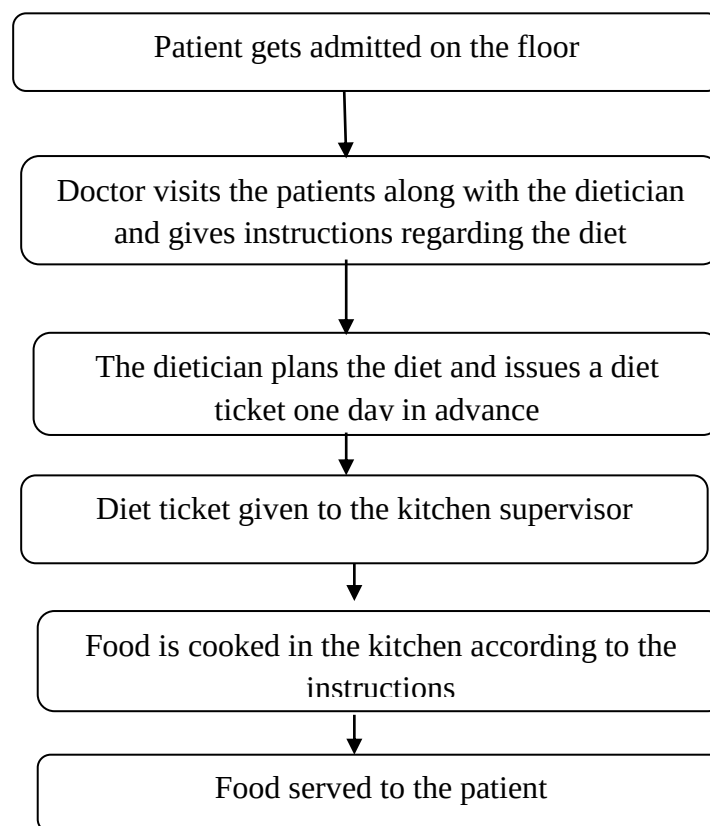


Time table for the diet of the patient: (7 meals/day)

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

- If the patient is on Liquid diet, it is provided every 2 hours, 10 liq. Diet/day.
- 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 want to have something extra, those can be provided to the patient after consulting dietician and calling on 4030 from their room, no extra charges.

- Different menus offered are:
 - Continental
 - Afghani – for middle east patients
 - No onion and garlic – for middle east patients
 - Indian
- **Process flow** of the department

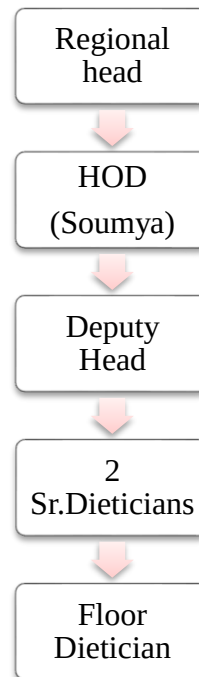


Quality Indicators for F n B department: Food Receiving, Food storage, Staffing

- The raw material is received everyday between 6:30-7am, washed and stored. The cutting is done on color coded chopping boards separately for Veg., Non-Veg. and Sea food.
- The food sample is tested for any infection every 15 days.

DIETETICS

- The department plans diet for all IPD patients in accordance with the primary consultant's opinion on the same.
- Staff- 13 in total.
- Hierarchy

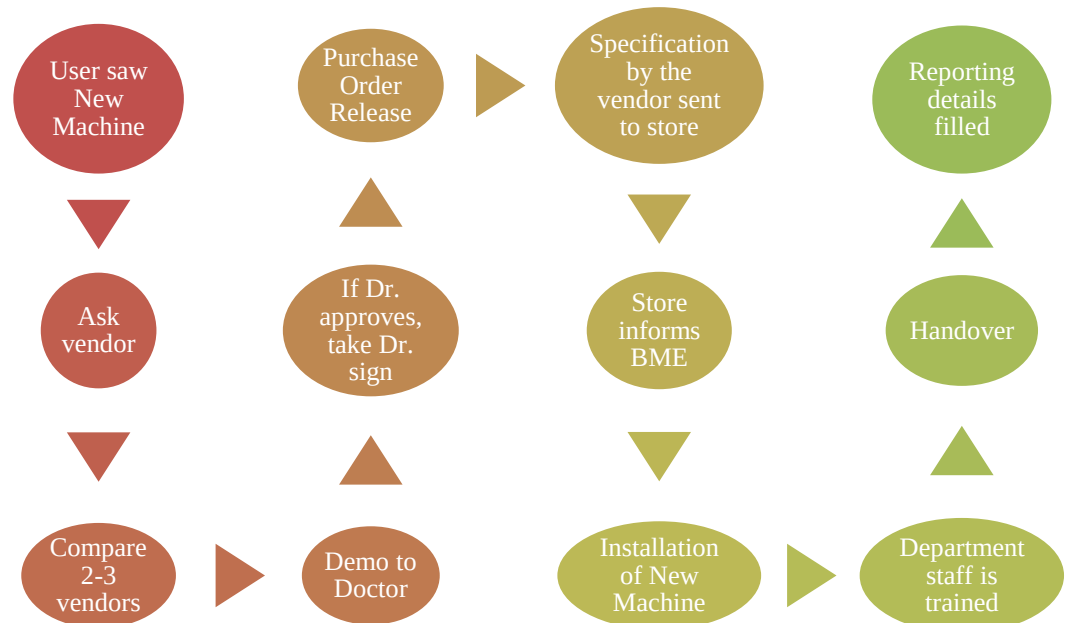


- Dietician: patient – 1:50
- Assessment of each patient to be done within 24 hours of admission and thereafter every 8th day after initial assessment.
- Scoring – Normal, Soft, Liquid Diet
- For enteral nutrition, all commercial supplements for each disease are available.
- Diet Note is put on CPRS on daily basis.

BIOMEDICAL ENGINEERING

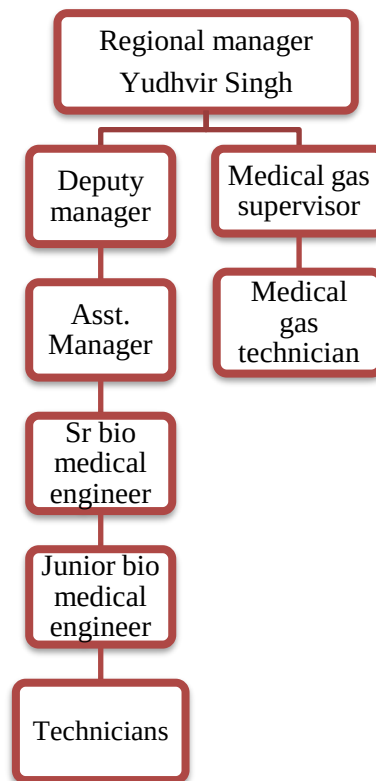
- This department deals with purchase, installation and commissioning, training on operating, handling and maintenance of medical equipment in all departments of the hospital.
- Looks after running equipment and new equipment.
- For Running equipment

- Preventive maintenance (PM) is done – to prevent breakdown, maintenance is done.
- Calibration is done – i.e. to check how accurate an equipment is functioning
There are white stickers on every machine that tells when the last PM and Calibration was done.
- Breakdown call is checked for
- Depreciation is measured
- For new equipment-
 - Installation and commissioning is done.



- Criteria for Up gradation-
 - i. The company supplying the equipment has been obsolete and BME recommends new machine
 - ii. The staff suggests a new machine, BME checks the budget of the department, if budget allows, and then procedure for procurement is done.
- AMC and CMC records are maintained.
- CAPEX (Capital Expenditure) and OPEX (Operating Expenditure) registers are maintained.
- Equipment Incident report is made in case of any physical damage – it is filled mentioning how the damage did happened. Thereafter replacement or repair whatever is required is done.

- Organizational chart



- Gas Manifold Department- Gas manifolds are also handled by this department and Max is awarded green OT certificate because of the efficient dispersion of OT gases. It maintains the supply of Oxygen, Air, Vacuum, Suction (-ve pressure).
- Compressors- in basement, for +ve and -ve pressure.

PHARMACY

Max pharmacy is self-owned with Central Pharmacy situated at corporate office, Okhla. There are 2 In-patient pharmacy stores, 2 Out-patient stores and 1 EWS pharmacy 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.

A (mostly used drugs), B (Less used), C (Least Used)

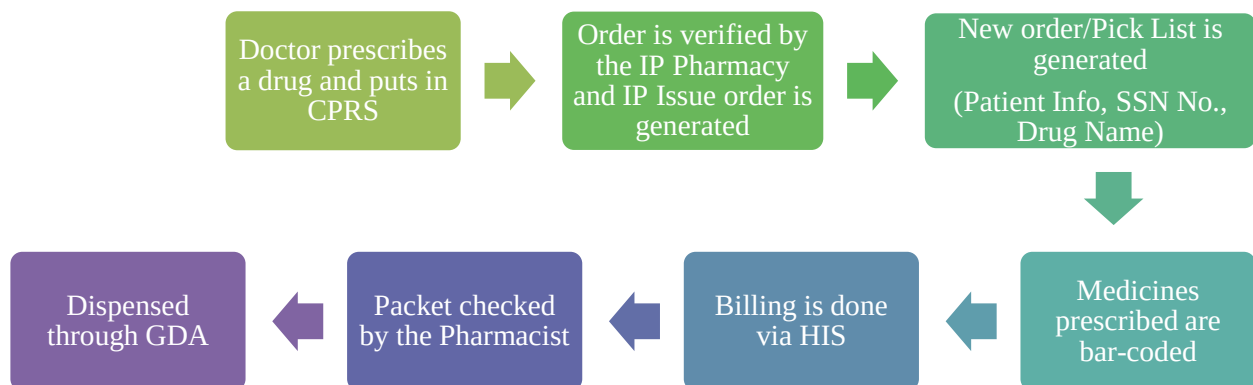
- Weekly requisition is done, and vendors take minimum 3 days for delivery of drugs to hospital.

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-



The **Stat orders** required immediately are dispensed within 30 minutes. The **Now order** is dispensed within 1 hour and routine order (White color) is delivered by 1 round per day.

NARCOTICS DRUGS

They are kept in a double lock and key system with a label “High Alert Medicines”. Documentation of narcotic drugs is appropriately maintained.

Narcotics drugs under statutory regulation being used in max hospitals include: 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 colored **sound alike** and pink colored **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.

Licenses 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)

Staff- In-patient pharmacy- 9 (Pharmacist) + 1 (Executive) + 8 GDA, 5 Data Entry Operator

Out-patient pharmacy-

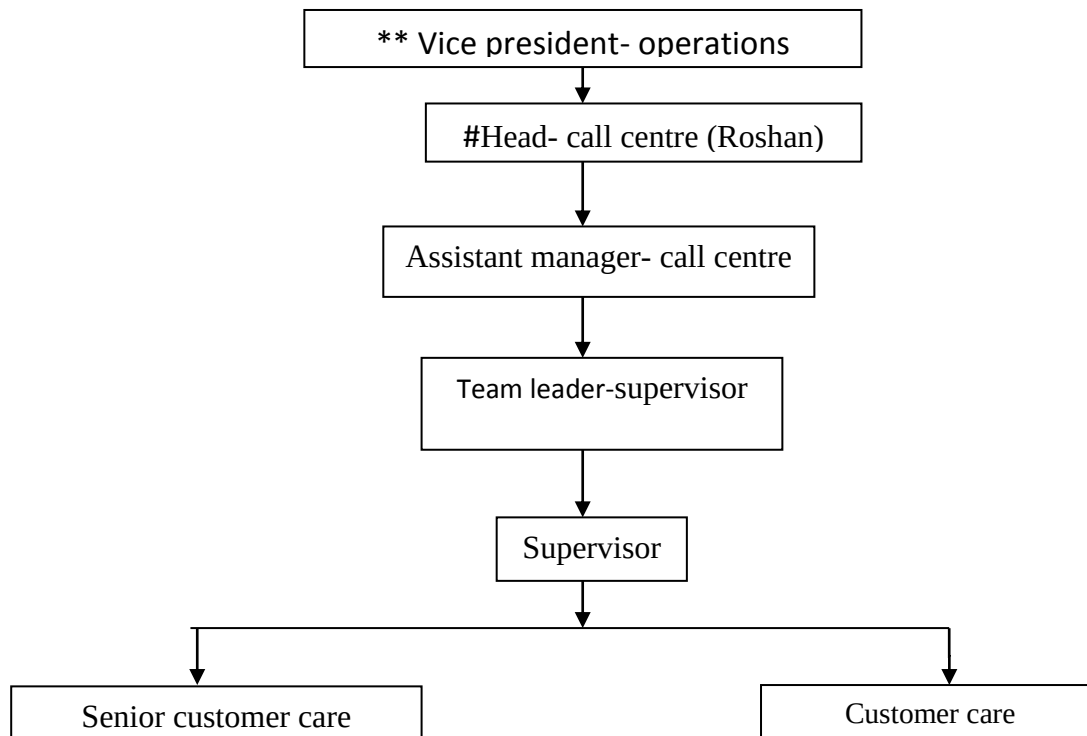
CALL CENTRE (in-house)

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
- Specialty information
- Other department information
- In-patient requests, ext. no. 4000
- It handles internal emergency e.g. at ext. no. "11" -Blue code, RRT, Code Yellow, Code Pink, at ext. no. "14", Code Red, Code Black
- Main board line number is: 26525050
- Ambulance Services

Organization chart:

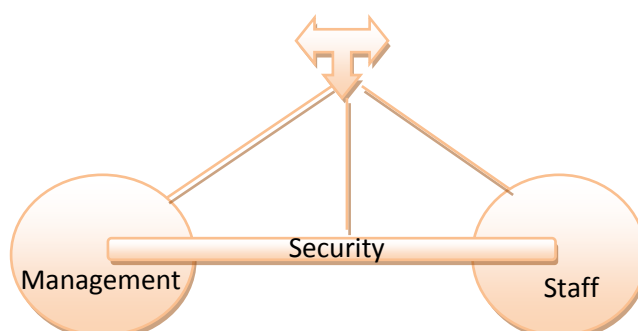


Ticket Process Flow



- If complaint is resolved, it closes automatically in 4 hours.
- Escalation Matrix- If any request is not fulfilled in appropriate time, this matrix enables a message on duty mobile of the department supervisor and so on, i.e. it escalates the unresolved issue to the higher authority concerned.
- All the HODs are messaged daily about the calls and the Turn Around Time (TAT) of the calls.

SECURITY DEPARTMENT



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

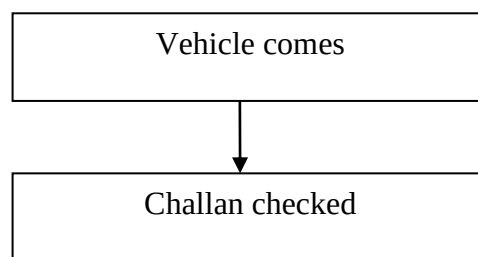
Functions of Security Department: -

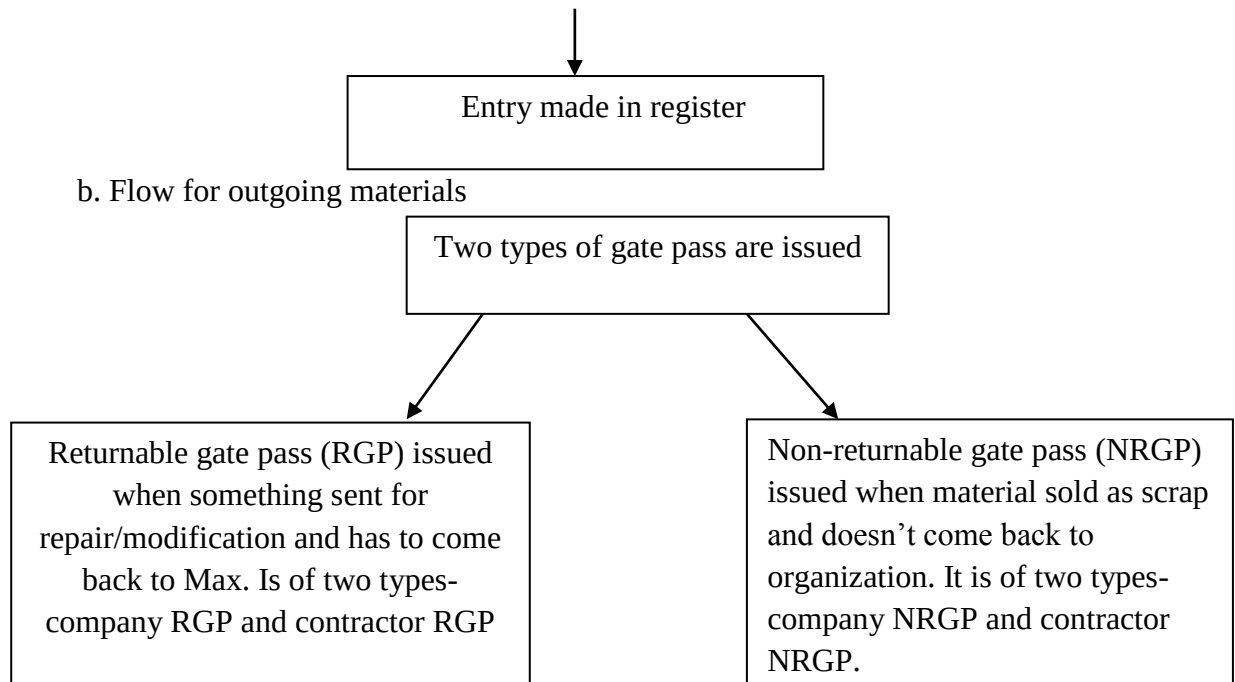
1. Security management: -

- Selection of people (guards and supervisors)
 - Deploying of security staff to different floors and departments
 - Checking of people entering hospital- Frisking
 - Turnout and grooming of security staff
 - Death handling
 - Training of security staff
 - MLC handling- filling MLC intimation and re-intimation (if any) form
Re-intimation is made when a MLC patient gets admitted again within 10 days of the discharge.
 - Dispute handling
- There are 192 CCTV Cameras recording every action in the hospital premises.
- Two Teams- IRT (Initial Response Team) and ERT (Emergency Response Team)
- ERCC system- Emergency Response Coordination and Communication system sends a voice message (1000 messages on 1 go) on the duty mobile number in an emergency.
- Security divides the RRT in 4 teams to act in an emergency
1. Action taking
 2. Rescue Team
 3. Salvage Team- to remove important documents from that area.
 4. Cordon off Team- to not to allow anybody inside the threat zone.
- If emergency occurs during an occupied OT, Security has put up a provision for OT to run for 45min on UPS, so basic stabilization of the patient can be done.
- There is a secret entry for the VIP security in the hospital.

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: -





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.

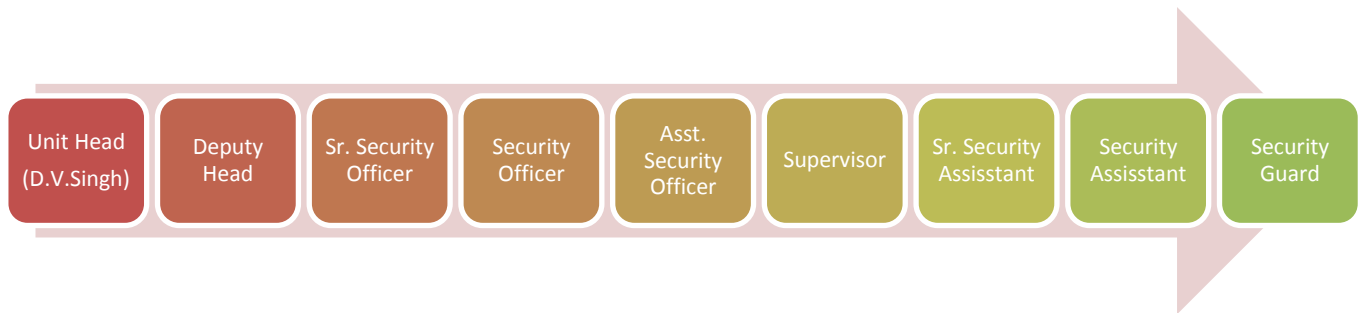
4. Valet management: -

- Helps internal and external customer 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.

Staffing

The Security department in Max Healthcare, Saket consists of 26 on- roll staff and 144 outsourced staff.



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.

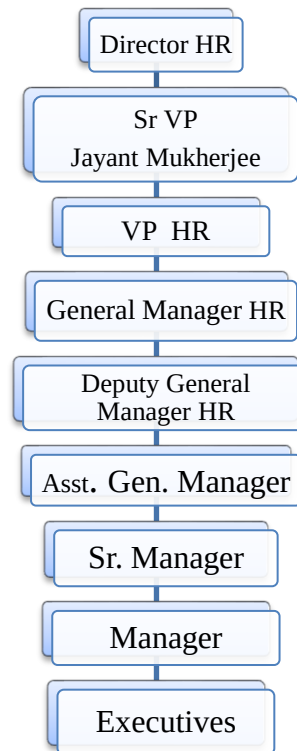
Core Values of HR: Excellence, Credibility and Seva bhavna

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 Hierarchy



Staff- Manpower of 15 staff is handling the HR system of Max Healthcare, Saket



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 Lakh 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

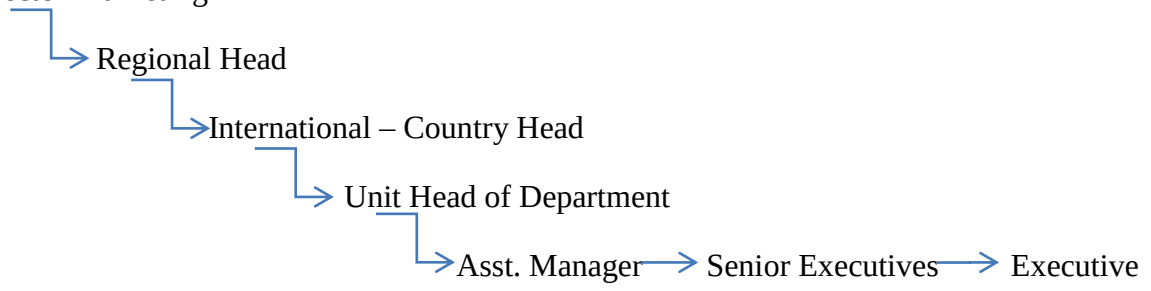
International patients avail treatment in India mainly because these facilities or treatments are not available in their respective countries, and are available at a much cheaper price in India than other countries such as US, UK or European countries. The countries from where patients come to seek treatment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



CONCLUSIVE LEARNING

1. There is an information board on every nursing station which includes all the details of on-duty staff, is updated on daily basis.
2. Some of the Nursing station information board has Positive Thoughts (e.g. MAMBS recovery area, 2nd floor, East wing) and some have Good morning and smiling face smiley (e.g. 4th Oncology department)
3. The Emergency area is not designed within easiest reach, as it is not easily visible from the main entrance of the hospital.
4. The board depicting Emergency department does not has a good contrast background. “Emergency” is written with very light color on a bright background, difficult to read.
5. There are no directions in the hospital to reach Emergency department.
6. The Doctors feel very difficult to put notes in CPRS immediately, as they cannot find any system free. Some doctors also suggested of keeping Transcriptors for the same.

PROJECT REPORT

Analysis of door to balloon time and the reasons for delay in STEMI patients

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Acknowledgment

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ABBREVIATIONS

ABBREVIATIONS	MEANINGS
D2BT	Door to Balloon time
PCI	Percutaneous Coronary Intervention
STEMI	S T segment elevation Myocardial Infarction
ACC-AHA	American College Of Cardiology and American Heart Association
CMS	Centers For Medicare and Medicaid Services
ED	Emergency Department
CATH LAB	Catheterisation laboratories
JAMA	Journal of the American Medical Association
EMS	Emergency Medical Services
PH-ECG	Pre- Hospital Electrocardiogram

INTRODUCTION

Over the past decade, primary percutaneous coronary intervention (PCI) has emerged as an effective treatment strategy for acute ST-segment-elevation myocardial infarction (STEMI). Compared with thrombolytic therapy, the benefits of primary PCI include a reduction in the frequency of total stroke and hemorrhagic stroke, a reduction in the frequency of reinfarction, and an increase in the frequency of infarct-related artery patency, resulting in improved in-hospital and long-term survival. In addition, the availability of primary PCI provides a valid alternative for patients who have contraindications to thrombolytic therapy.

Primary percutaneous coronary intervention (PCI) is currently the preferred treatment for acute ST-segment elevation myocardial infarction. Previous observational studies have shown a strong association between prompt performance of primary PCI, as assessed in terms of the door-to-balloon time (the interval from the patient's arrival at the hospital to inflation of the balloon to restore flow), and reduced mortality. On the basis of these data, current joint clinical practice guidelines of the American College of Cardiology and the American Heart Association (ACC–AHA) endorse a door-to-balloon time of 90 minutes or less as the goal, giving it a Class I (highest level) recommendation. Because of this recommendation, door-to-balloon time has become the focus of local, regional, and national quality-improvement initiatives and is currently tracked by a number of clinical registries. Consequently, door-to-balloon times are now publicly reported, and the percentage of patients for whom the door-to-balloon time is 90 minutes or less has evolved into a key quality metric. Institutional door-to-balloon times also have financial implications, since they are now tied to reimbursement from the Centers for Medicare and Medicaid Services (CMS).

Although these efforts have been remarkably successful in reducing national door-to-balloon times, it is not known whether these improvements are associated with an overall reduction in mortality. A recent study from a large regional cardiovascular collaborative did not show that annual mortality decreased among patients undergoing primary PCI, despite large reductions in door-to-balloon times. However, that study was limited to regional results and may have lacked sufficient power to detect a survival benefit related to the improved treatment times. Therefore, we used national data to evaluate annual trends in door-to-balloon times to assess whether shorter times are associated with a change in in-hospital mortality among patients undergoing primary PCI for ST-segment elevation myocardial infarction.

Rapid and successful reperfusion with primary percutaneous coronary intervention (PCI) is the goal of initial treatment in patients presenting with ST-segment elevation myocardial infarction

(STEMI). Supporting the belief that “time is muscle,” previous studies have validated that incremental delays in door-to-balloon time (D2BT) negatively affect clinical outcomes, including both in-hospital and long-term mortality rates. Determining reasons for D2BT delay in primary PCI for STEMI patients provides an opportunity to improve quality of care for these patients.

The door-to-balloon (D2B) refers to the time interval counting from the arrival of a patient with STEMI at a hospital to the time of the balloon inflation (or stent deployment) that reopens the occluded artery. The purpose of the quality improvement project is to evaluate the causes of delay for patients with acute ST-segment elevation myocardial infarction (STEMI) requiring primary percutaneous coronary intervention (PCI) upon arrival at the emergency department (ED) and implement recommendations to reduce delays and analyze the impact of recommendations to reduce the door-to-balloon time. Primary PCI has developed as an effective treatment strategy for acute STEMI, the survival rate and patient outcome are however dependent on the time to treatment. The international benchmark for all programs dealing with acute coronary syndrome patients suffering from STEMI has been established as 90 minutes or less from the time the patient arrives at the hospital to the opening of the affected vessel in the cardiac catheterization laboratory “door-to-balloon time” or D2B.

Factors that have been found to be associated with delays in door-to-balloon time include female gender, contraindication to thrombolytic therapy, age >65 years, atypical symptoms or absence of chest pain at presentation, and additional “environmental” challenges represented by providing timely care on weekends, holidays, and off-hours. Furthermore, coronary reperfusion with primary PCI requires the complex integration of multiple units and healthcare providers within a given hospital system. Thus, it depends on the function of what could be characterized as a complex system—a system that constantly evolves over time, a system with an evolution that is very sensitive to small changes, a system with a large number of independent interacting components, or a system that can evolve through multiple pathways. This complexity further enhances the challenge of achieving timely reperfusion with primary PCI and raises the question of how institutions can succeed in achieving such a goal. In response to these system reasons for delays, a number of organizations have implemented programs to meet the D2BT benchmark of ≤ 90 min and timely access to PCI, with improvements in D2BT compliance.

CLINICAL PATHWAY FOR MI

CHEST PAIN / DISCOMFORT CONSISTENT WITH CORONARY ISCHEMIA ATYPICAL PRESENTATION – WOMEN/ DIABETES/ ELDERLY

CHEST PAIN UNIT IN ER

ER PHYSICIAN

- Focussed history/physical/ P/BP/RR/O₂ Sat
- CHEST / CVS
- Assess time since onset of MI

CHEST PAIN

≤ 10 MIN

ECG 12 LEADS

STEMI

Posterior MI / LBBB

NSTEMI

Non diagnostic

CODE STEMI

NURSE /ER PHYSICIAN

Chewable Aspirin

IV heparin 70 u/ kg

18G cannula * 2
electrode on limbs
defibrillator

Prepare groin sample –
Cardiac Enzymes

SHIFT TO LAB

Door to Cath Lab time < 30
min

J/C Cardiology / SR Consultant
Cardiology

Age > 75 wt < 60

H/o TIA / STROKE /IC Hge

RECENT SURGERY OAC /NO AC

GI bleed/any bleed Prasugrel/
Ticagrelor/ Clopidogrel

Cath lab to flow ≤ 40 min

CONSENT

DUTY Manager

ADMISSION

+

FINANCIAL
UNDERTAKING

ANS

CATH LAB
PREPARAT-
ION

ADDITIONAL

STAFF OFF
HOURS.

D₂ – B

GOAL < 90 MIN

Cath lab
nurse

CATH LAB
TECHNICI
AN.

Cardiac
Anaesthes
iologist

Each MI File – RED STICKER

At discharge – discharge summary, angioplasty report and CD of proceed should be submitted to Quality dept

REVIEW OF LITERATURE

-Caputo et al reported the effect of a detailed quality improvement intervention aimed at reducing door-to-balloon time in a single institution. The intervention included avoidance of pre-evaluation by referring cardiologists; education of emergency room staff, transport personnel, and cardiology staff on the importance of rapid diagnosis of myocardial infarction and rapid transport to the catheterization laboratory; immediate activation of the cardiac catheterization laboratory on notification of a patient with suspected acute myocardial infarction; requirement for the catheterization laboratory staff to be in the hospital within 30 minutes; and target time of 30 minutes for interventional staff for first balloon inflation after xylocaine administration.[1]

-“Achieving Door-to-Balloon Times in Less than 90 Minutes” by Benitez Jr. and Pattillo was published in Critical Care Quarterly in 2011. The authors piloted a STEMI flow sheet in an ED and hypothesised that it would improve the flow of STEMI patients through the ED, decreasing their D2B time .The article used 11 references, with five references less than five years old. [2]

-“Association of Door-to-Balloon Time and Mortality in Patients Admitted to Hospital with ST Elevation Myocardial Infarction: National Cohort Study” by Rathore et al. was published in the British Medical Journal in 2009. – Compared how mortality rates of STEMI patients were affected by D2B times of greater or less than 90 minutes (Rathore et al., 2009). – Followed 43,801 STEMI patients and found that any reduction in D2B time, even decreasing the time from the goal of 90 minutes, had a positive effect on mortality rates and resulted in better clinical outcomes (Rathore et al., 2009).[3]

-“An Emergency Physician Activated Protocol, ‘Code STEMI’ Reduces Door-to-Balloon Time and Length of Stay of Patients Presenting with ST-Segment Elevation Myocardial Infarction” by Parikh et al. was featured in the March, 2009, issue of the International Journal of Clinical Practice. – Compares standard care to a newly designed “Code STEMI protocol,” initiated in a 660- bed acute tertiary care teaching hospital to patients presenting to the ED with STEMI (Parikh et al). – “Code STEMI protocol” significantly reduced the D2B time and length of stay in STEMI patients (Parikh et al., 2009).[4]

-“An Association between Timeliness of Reperfusion Therapy and Clinical Outcomes in ST-Elevation Myocardial Infarction” by Lambert et al. was featured in the Journal of the American Medical Association (JAMA) in June, 2002. – Significance of timeliness of fibrinolysis and primary percutaneous coronary intervention (PCI) in the STEMI patient

(Lambert et al., 2010,). – Delayed reperfusion “significantly increased 30-day mortality, a statistically non-significant increase in 1-year mortality, and significantly increased risk of the composite of mortality or readmission for acute myocardial infarction or heart failure at 1 year” (Lambert et al., 2010) .[5]

- In the Global Use of Strategies to Open Occluded Arteries in Acute Coronary Syndromes (GUSTO-IIb) substudy, the lowest 30-day mortality rate was observed in patients undergoing primary PCI within 60 minutes from presentation to the emergency room, whereas the highest mortality rate was observed in patients undergoing PCI >90 minutes from presentation (1.0% versus 6.4%). Similar compelling data were reported in an analysis of data from the National Registry of Acute Myocardial Infarction (NRM). In that analysis, which included 27080 patients, the lowest mortality rate again was observed in patients undergoing PCI within 60 minutes from presentation, whereas significantly higher mortality rates were observed in patients undergoing PCI beyond 120 minutes.[6]

RATIONALE

This report is intended to analyse the door to balloon time in STEMI patients by evaluating the average time taken in D2B time procedure and reasons of delay in it in emergency department and catheterisation laboratories in max hospital, saket as main goal is to provide best patient care. The purpose is to decrease mortality and improves long-term outcomes for patients with STEMI. To be most effective, it needs to be performed expediently; with door-to-balloon times (D2B) less than 90 min. Reducing the delays in door to balloon time can lead to significant increase in enhancing the hospital's image.

OBJECTIVES

General Objective - To study the average time taken in door to balloon procedure and reasons of delays in it at Max Hospital, Saket.

Specific Objective –

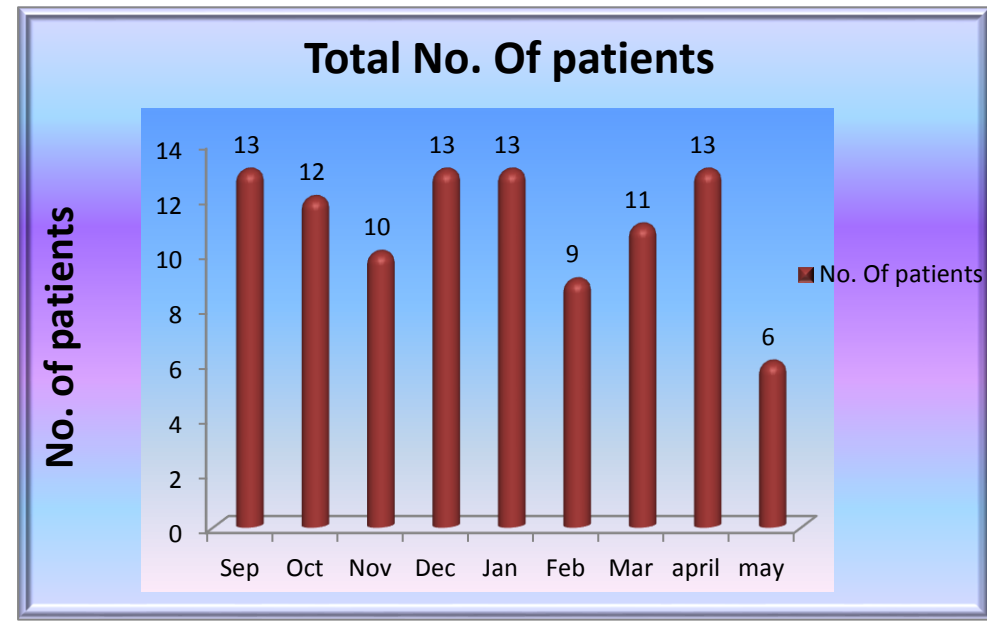
- 1) To evaluate the average time taken in door to ballooning procedure.
- 2) To identify In-hospital factors that cause delay in achieving the target.
- 3) To give recommendations for further improvement in the door to balloon time procedure.

RESEARCH METHODOLOGY

- **Type of study:** descriptive study (retrospective for 7 months and prospective for 2 months)
- **Study population:** STEMI patients at Max Super Speciality Hospital, Saket, Delhi
- **Study area**– emergency department and catheterisation laboratories Max Super Speciality Hospital, Saket, Delhi
- **Duration of Study**– 3 weeks
- **Type of Data-** Quantitative
- **Technique**– primary data analysis and secondary data review
- **Sample size** – 100
- **Data collection** -primary data collection(checklist), secondary data collection (previous data records, articles)
- **Data entry-** Manually
- **Data Analysis-** Using bar charts, pie charts in Microsoft Excel

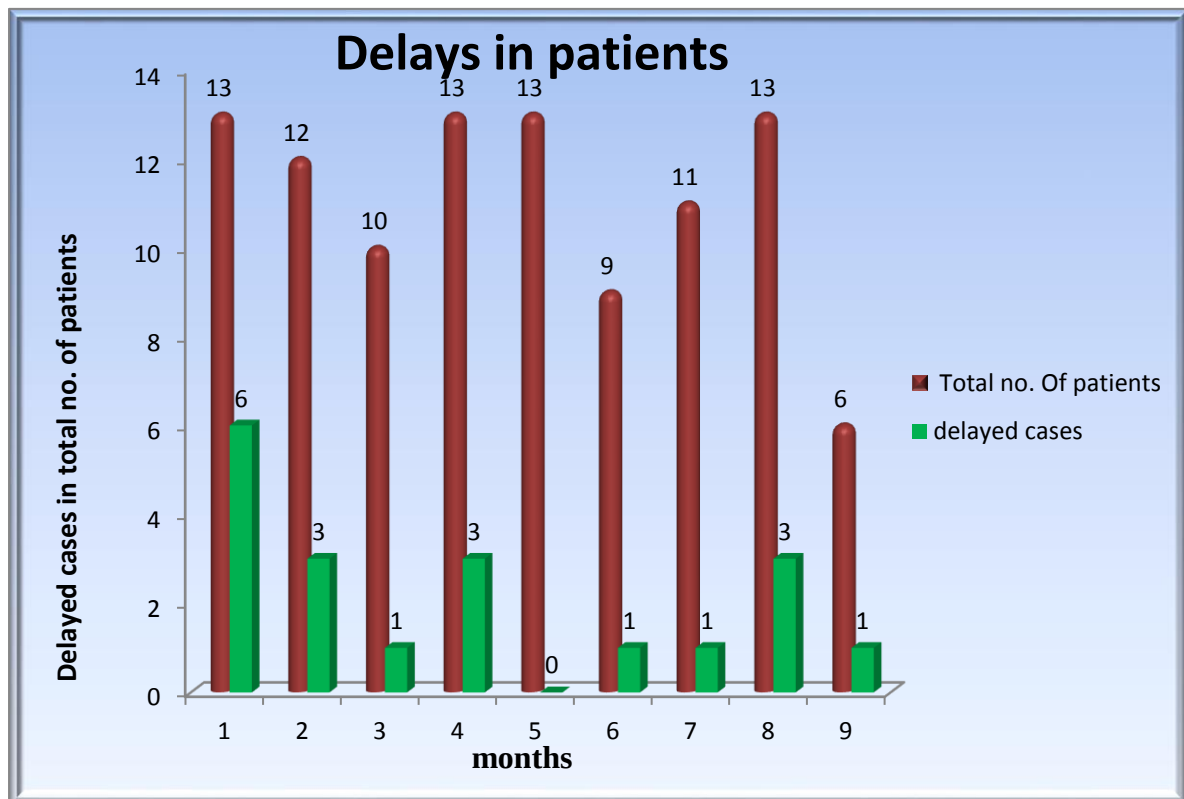
DATA ANALYSIS& INTERPRETATION

Figure-1



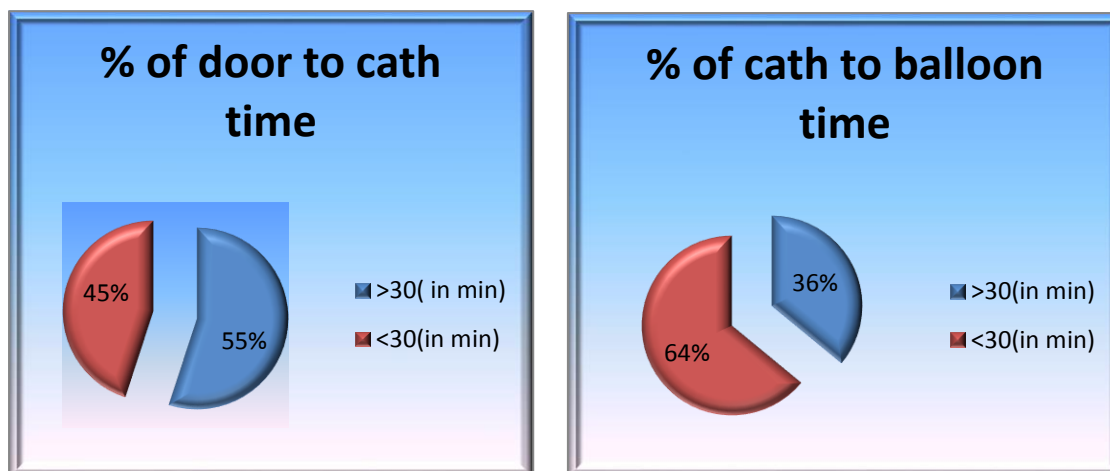
INFERENCE: The figure reveals that majority of patients came in month of September, December and January i.e. out of 100, 13 patients came in month of December and January followed by October. It is due to rising of blood pressure and also increased level of certain proteins that could risk for blood clots.

Figure-2



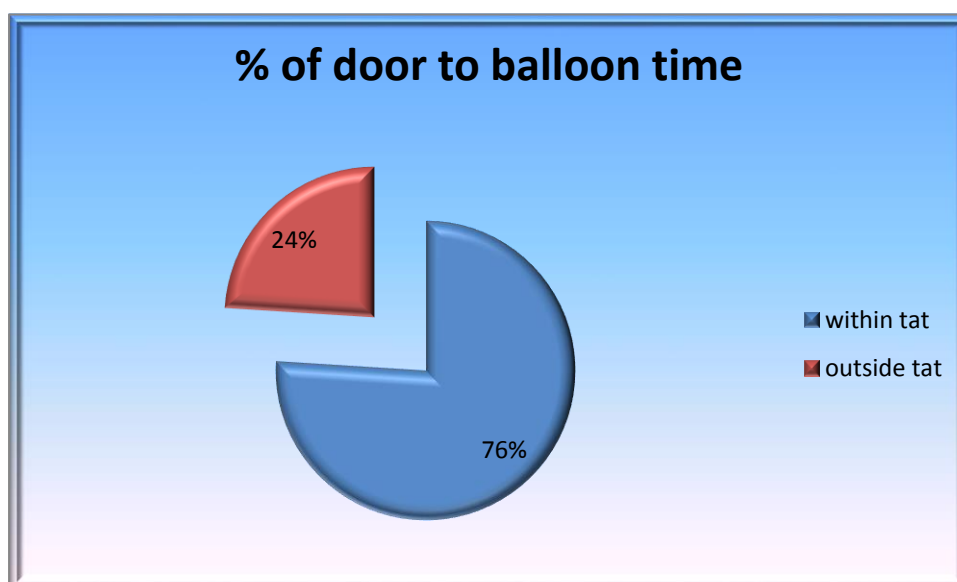
INFERENCE: The figure reveals that maximum Delays occurred during the month of September i.e. 6 out of 100 as there are more occurrence of myocardial infarction with greater risks. It gradually decreased in next months.

Figure-3



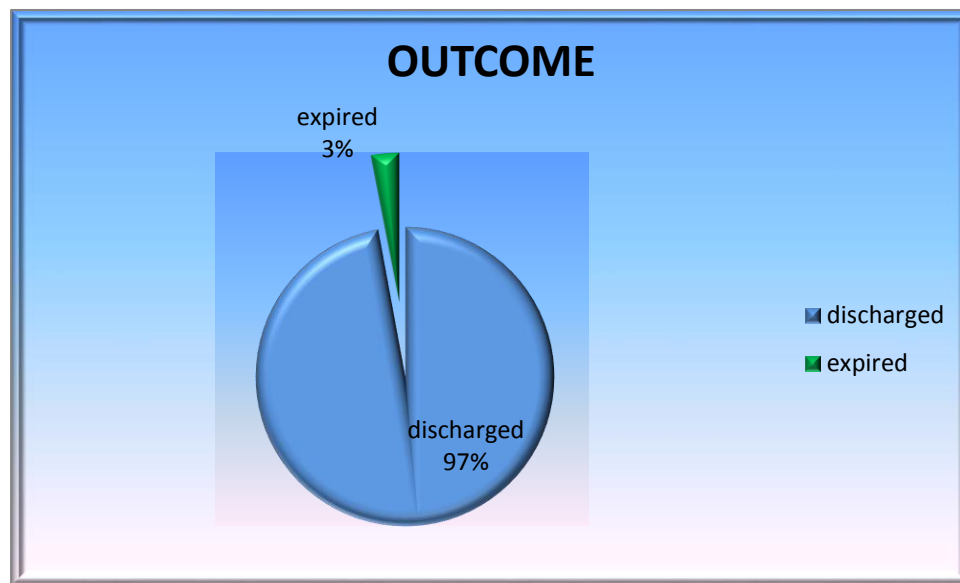
INFERENCE: The figures reveal the % of door to Cath time and Cath to balloon time. In door to Cath time 45% cases are within 30 minutes and 55% cases are outside 30 minutes. In Cath to balloon time 64% cases are within 30 minutes and 36% cases are outside 30 minutes.

Figure-4



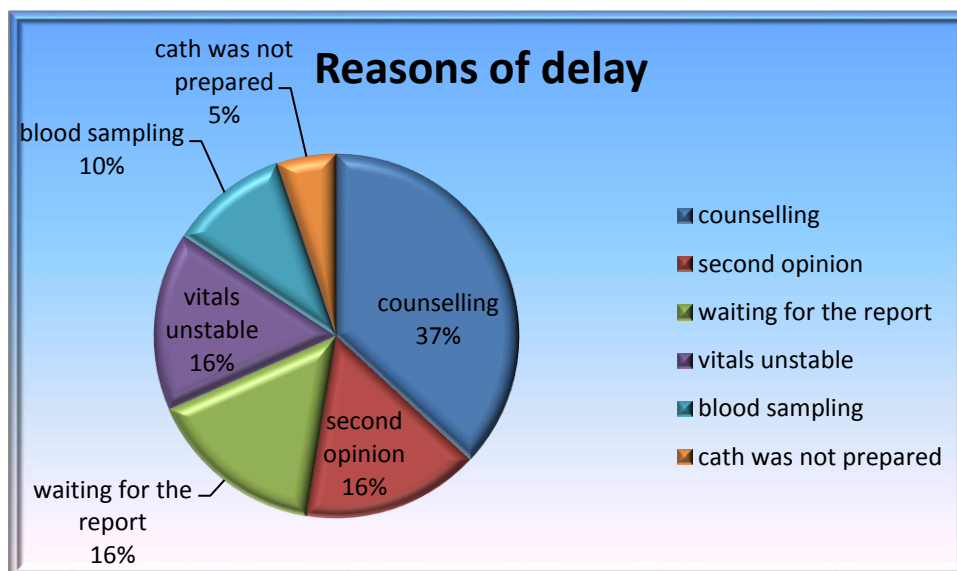
INFERENCE: The figure reveals the %age of door to balloon time in which 76% cases are within TAT i.e. 90 minutes and 24% cases are outside TAT i.e. taking time more than 90 minutes.

Figure-5



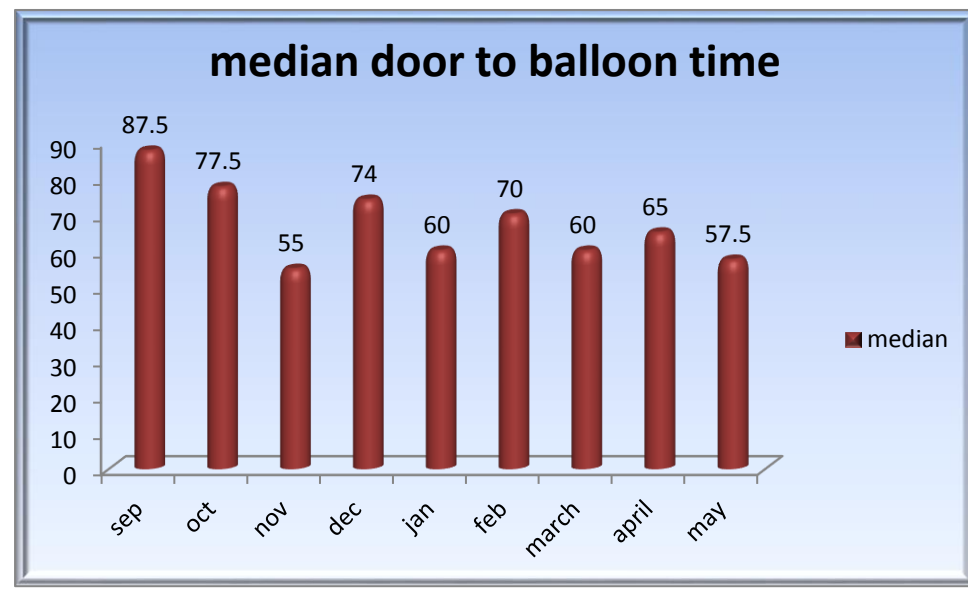
INFERENCE: The figure reveals the outcome of STEMI patients, 97% got discharged whereas 3% expired in hospital.

Figure-6



INFERENCE: The figure depicts that out of the six main reasons of delay of Door to Balloon time, most of the delays occurred because of the delay in counselling, i.e., 37%). In 16% cases, the reason of delay is waiting for the report and vitals instability.

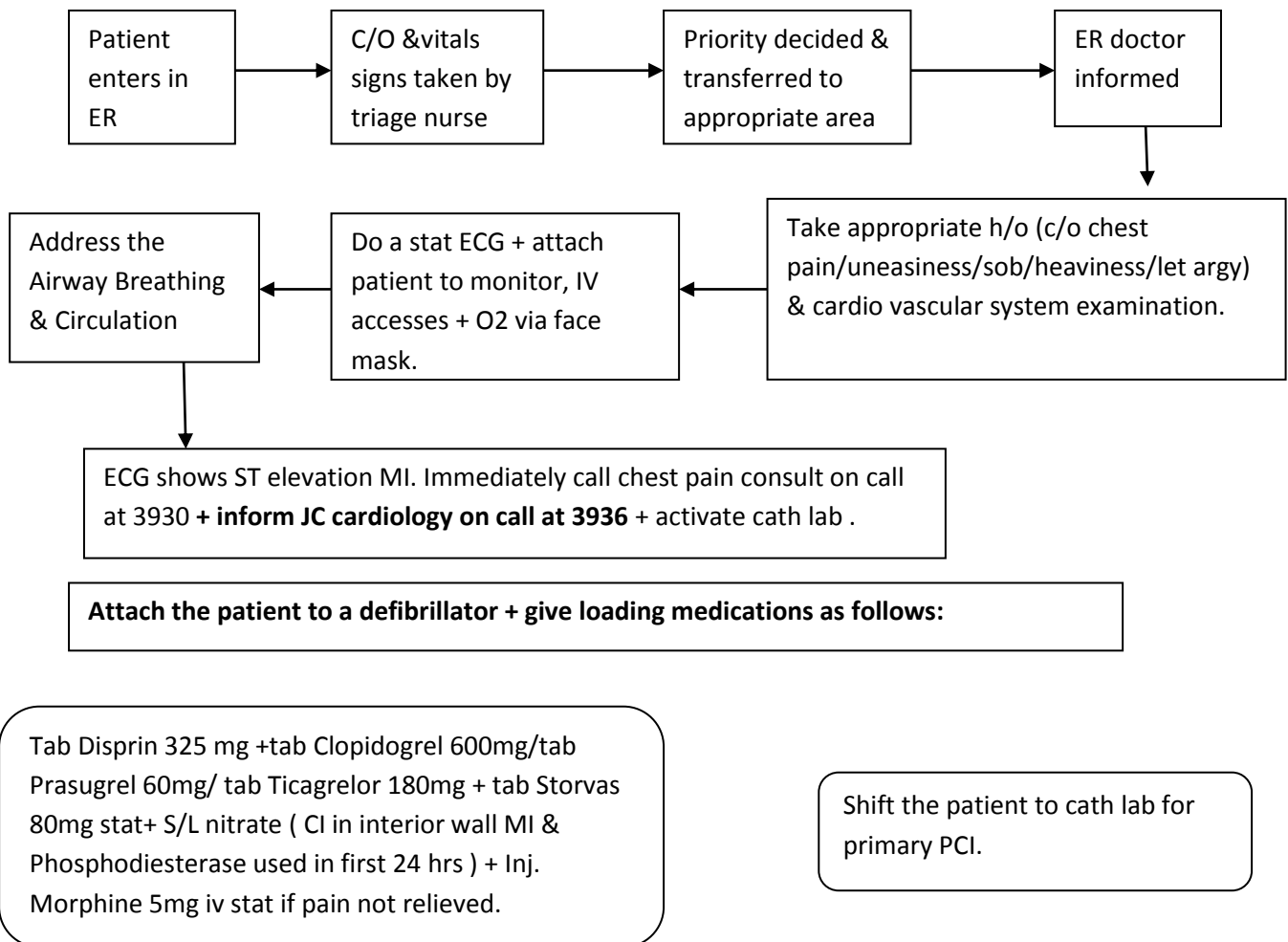
Figure-7



INFERENCE: The figure shows that the door to balloon time in STEMI patients was more in month of September i.e.87.5 minutes followed by October and December i.e. 77.5 minutes and 74 minutes respectively.

OBSERVATIONS AND FINDINGS

▪ Pathway followed by STEMI patients:



- Majority of patients came in month of October, December and January as per the secondary data.
- Most of the delays occurred more in month of September, December and January as per the secondary data and in month of April as per the primary data collection.
- On the basis of secondary data collection and primary data collection, most of the delays occurred in door to cath time.i.e. took more than 30 minutes. It is the time interval taken when patient reaches to emergency department till the transfer in cath lab. The delays in Cath to balloon time are comparatively less i.e. within 30 minutes. It is the time interval taken when the patient reaches to cath lab till the time of balloon inflation.
- According to the secondary data collection of seven months and primary data collection of two months, the door to balloon time meeting the TAT i.e., < 90 minutes. The door-to-balloon (D2B) refers to the time interval counting from the arrival of a patient with STEMI at

a hospital to the time of the balloon inflation (or stent deployment) that reopens the occluded artery.

- The areas where delays have occurred are counselling i.e. counsel the patient or the relatives regarding the financial requirement and the procedure and signing of the consent form, waiting for the report when there is some complicated findings in first cardiac enzymes and hence wait for the findings of second enzymes. Same delays in case of blood sampling. Other reasons are choice of second opinion. Patients or the relatives go for second opinion by some other doctor. Delays may also occur due to vitals instability, it could be due to age factor or some critical condition. Difficulty in vascular access could be one of the reasons of delay. Sometimes delays occur when the cath is not prepared i.e. non-availability of bed, appropriate staff or due to some other reasons.

RECOMMENDATIONS

- Earlier identification and treatment of STEMI patients should be done.
- The STEMI flow chart should be used that allows the nurse to follow a step by step protocol to ensure the patient is ready for PCI in a timely manner.
- Education of staff on performance measures and changes should be done.
- The doctor should counsel the patient or the relatives regarding the procedure with the help of some bullet points so as to reduce the time in counselling.
- The cath lab team should become active as soon as code STEMI announces so that delays can be minimised.
- There should be monthly multidisciplinary team meetings to evaluate outcomes and quality improvement data. Operational issues should be reviewed, problems identified, and solutions implemented.
- There should be organised inter- departmental communication and collaboration between the ED staff and Cath Lab staff members to facilitate patient care services.
- Train and instruct new comers and trainee technicians.
- These people should be informed as soon as code STEMI announces.

EMO, J C Cardio, Sr. consultant Cardio, ANS/ DNS, Duty Manager, Manager(Emergency), night Mod, Cardiac Anaesthesia, Cath Lab Tech., Cath Lab nurse.

- Timely training and mock drills of the staff members in six months gap period.

- Remote defibrillator/monitors carried by emergency medical services (EMS) can transmit ECG waveforms from the field to receiving stations at hospitals for immediate reading and interpretation. Cardiologist can then make a diagnosis and start activating the Cath lab before the STEMI patient arrives, reducing preparation time.
- Training EMS staff to read and interpret PH-ECGs on the scene also allows for faster diagnosis of STEMI and subsequent activation of the Cath Lab.
- Direct transfer to catheterization - using protocols such as PH-ECG for STEMI diagnosis and early cath lab activation, patients can sometimes be transferred directly from the care of EMS staff to cath lab , avoiding time – potential delays in the ER altogether.

CONCLUSION

Primary PCI is an effective treatment strategy for STEMI. Current guidelines for the treatment of STEMI recommend a D2B time of 90 min or less for patients undergoing primary PCI. D2B time has become a performance measure and is the focus of regional and national quality improvement initiatives. Currently fewer than half of STEMI patients receive reperfusion with primary percutaneous coronary intervention within the guideline-recommended timeframe.

Most of the cases with higher incidence in winters due to increased blood pressure and also increased level of certain proteins that could risk for blood clots. Hence most of the delays in door to balloon time occur during these months.

Ideally the hospital follows <90 minutes door to balloon time and to maintain this procedure certain protocols should be followed. The delays in door to balloon time can be minimised by providing the counselling of patient or the relatives by the doctor with the help of some bullet points regarding the procedure and the outcome. Less time should be taken by the patients for second opinion. An organised interdepartmental communication and collaboration between the ED department and Cath Lab for preventing miscommunication.

To reduce the order to reduce the D2B time, the ED triage nurse must have the knowledge of what type of procedure to follow if a patient presents with sign and symptoms of a STEMI. The STEMI flow chart allows the nurse to follow a step by step protocol to ensure the patient is ready for PCI in a timely manner. Education of staff on performance measures and changes i.e. regarding the outcome of the procedure. Delay in door to balloon time i.e. more than 90 minutes result in high critical outcomes.

ANNEXURE

- 1) [analysis 1.xlsx](#)

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A study on Linen usage on per bed per day on a floor

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Acknowledgment

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INTRODUCTION

Hospital management in modern milieu has become patient oriented. It is a established fact that the patient outcome is a result of efficient and appropriate medical, nursing and allied care along with provision of good hygienic food, clean linen, safe environment, congenial atmosphere and good interpersonal relationship.

The support services for patient care are indispensable for a hospital to perform in true perspective and facilitate the patient care process. Linen and laundry is a recognized support service which not only ensures prevention and containment of hospital infection but also contributes to widen the image of the hospital in the eyes of public. The dictionary meaning of linen is a flex or an article of cotton. However, in hospital the term is used for clothing of the patient, medical and Para-medical staff and also the clothing material used for the patients care services in operation theatres, beds trolleys including the mattresses, pillows, blankets, sheets and towels etc.

The Clean linen installs psychological confidence in the patients and the public and enhances their faith in the services rendered by the hospital. Simultaneously an efficient linen and laundry service is of advantage for hospital marketing and speaks of ability of the medical care service.

The term 'hospital linen' includes all textiles used in the hospital including mattress, pillow covers, blankets, bed sheets, towels, screens, curtains, doctors coats, theatre cloth and table cloths. Cotton is the most preferred and frequently used material. The hospital receives all these materials from different areas like Operation Theatre, wards, outpatient departments and office areas. The OT linen materials need special care since it has to be washed & sterilized carefully. So if possible, the hospital can go for separate laundry process for OT linen materials alone.

In today's medical care facilities, patients expect daily linen changes. In areas like ICUs, linen has to be changed even more frequently. Some hospitals also have contract with third parties to manage its laundry requirements. Relationships between the launderettes and hospitals get strained as hospitals face shortage of linen during crisis. Many a time, it is difficult to count soiled linen. This creates a rift between the hospital and the linen contractor. Consequently, hospitals lose on stock of linen, as new linen needs to be constantly bought to replace torn and soiled ones.

Shortage of linen leaves patients dissatisfied. Sometimes, even surgeries get cancelled due to shortage of operation theatre linen. In order to overcome the above problems, it is imperative to have a linen management system that automatically tracks soiled and clean linen items continuously through the entire linen cycle. It is also essential to reduce the quantity of buffer linen stock at hospitals and ensure service quality standards in healthcare facilities.

The linen may be cotton or terry-cotton, printed or plain, with or without logo of the hospital printed on it. It could be contaminated with blood or other body fluids, or due to improper handling and storage. Clean linen does not need to be sterile but correct handling can help

prevent the growth of micro-organisms that can develop under poor conditions. Although soiled linen can be contaminated with microorganisms, actual disease transmission from linen has been demonstrated to be negligible if it is handled, transported and laundered in a manner that avoids dispersal. The right choice of linen should also be kept in mind as it affects patient care and healthcare costs. The inventory needs to be scientifically stocked and maintained.

REVIEW OF LITERATURE

On review of the literature, a number of studies were uncovered which considered the potential for the spread of infection through used linen and the subsequent need for appropriate control measures.

In order to start the project, research needed to be conducted in several dimensions. First, there is a description of the data collection methods selected based on the type of research required. Then, there is an explanation of how to determine the linen par levels and cart quotas for different floors in hospital. This is continued by a list of the steps to successfully implement Six Sigma in an organization. Finally, a case study is presented as an example for a successful Six Sigma implementation project where linen loss was reduced and the textile resources in the hospital were optimized.

The terms 'linen' and 'laundry' are used interchangeably in this area of research to refer to materials which have the potential for becoming contaminated during healthcare activity.

The term used linen refers to all used linen irrespective of state, apart from linen from infectious patients or those suspected of being infectious.

Soiled/foul linen refers to linen contaminated with blood or other body fluids, e.g. faeces.

Infected linen, in contrast, refers to linen from patients with or suspected to be suffering from enteric fever, other salmonella infections, dysentery, hepatitis A and B, HIV (and AIDS), notifiable diseases, or other infections specified as hazardous by the infection control officer.

The term 'heat labile linen' refers to linen which needs to be washed at lower temperatures to avoid shrinkage.

Used/soiled/infected 'linen' or 'laundry' from healthcare settings can harbour large numbers of microorganisms, according to the literature.

Between 2008-2016, linen consumption has steadily increased from 7.5 million pounds to over 9 million pounds. With the amount of linen consumption increasing, the associated total expense required to support laundry services is growing as well.

The cause of the increase in linen usage is unknown, however, speculations exist that there is a direct relationship between overall usage and linen waste. There are many different opportunities for linen to be wasted. One such way is through bed changes: all patients' beds need to be changed frequently. There are also inconsistent uses of the nurse servers, which are the cabinets outside the patient rooms used to store medical supplies and linens in UH. Linens are sometimes left in patients' rooms – these linens need to be discarded after the patient leaves regardless of whether or not it was used. All these opportunities can cause waste, emphasizing the importance to verify or dismiss the existing waste perceptions to narrow down the cause of linen waste.

Lean Six Sigma is an approach focused on improving quality, reducing variation and eliminating waste in an organization. It is the combining of two improvement programs, Six Sigma and Lean Enterprise. Six Sigma is a quality management philosophy and methodology that focuses on reducing variation, measuring defects (per million output/opportunities) and improving the quality of products, processes and services.

RATIONALE

This Report is intended to find out the linen usage per bed per patient on the floor(ward) of Max Hospital, Saket as main goal is linen optimization. Reducing the over usage in linen can lead to significant increase in enhancing the hospital's image.

OBJECTIVES

General Objective - linen usage on per bed per patient on a floor(ward).

Specific Objective –

1. To reduce the number of linen per patient per bed.
2. To reduce hospital cost for laundry.
3. To recommend the process improvements that would reduce further linen loss.

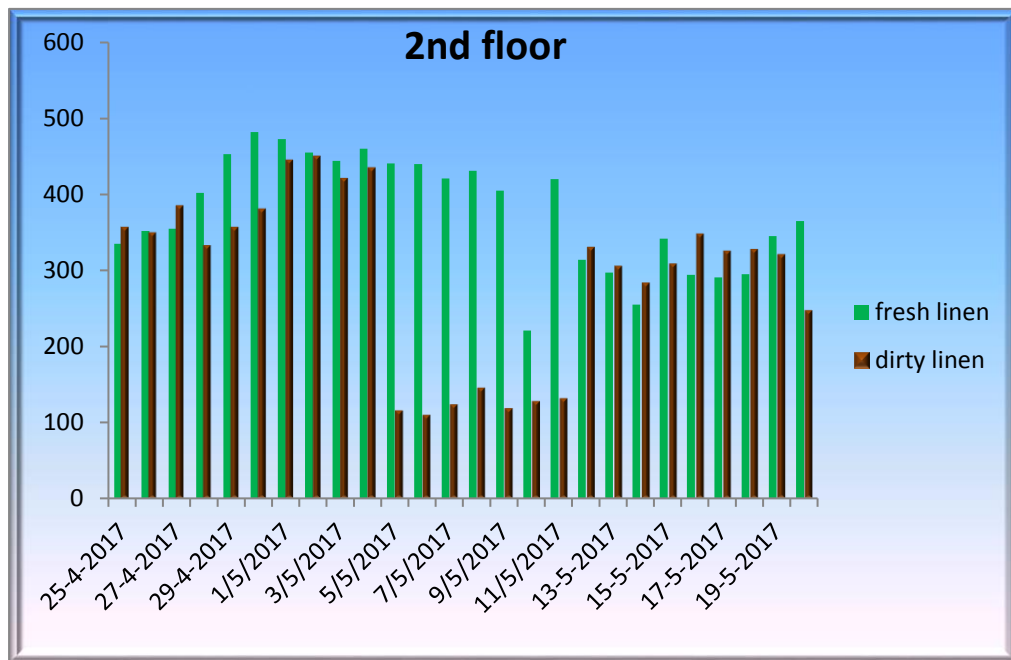
RESEARCH METHODOLOGY

- **Type of study:** Descriptive
- **Study population:** patient's beds at Max Super Speciality Hospital, Saket, Delhi
- **Study area**–2nd Floor, West wing, Neurology Department Max Super Speciality Hospital, Saket, Delhi

- **Duration of Study**– 3 Weeks
- **Type of Data**- Quantitative
- **Technique**– Direct Observation of floor of Neurology department
- **Sample size** – 2nd floor ward (27 beds)
- **Sampling technique**- simple random sampling
- **Data collection**-Primary and Quantitative (3 weeks)
- **Data entry**- Manually
- **Data Analysis**- Using bar charts, pie charts in Microsoft Excel

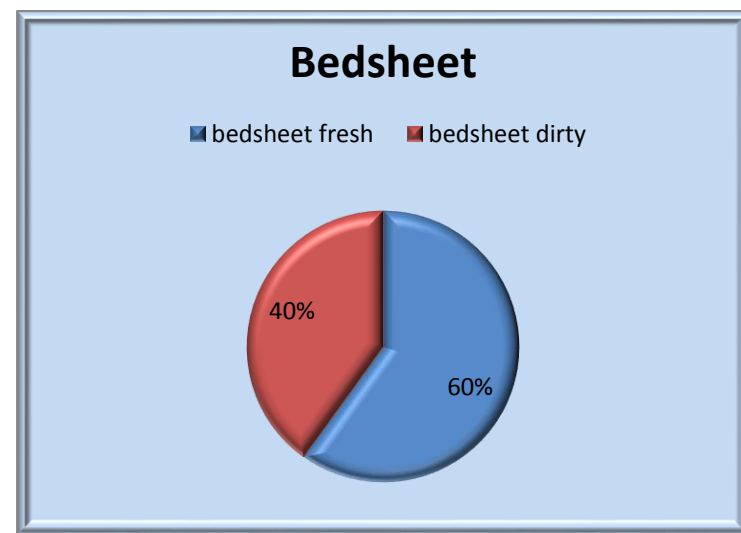
DATA ANALYSIS& INTERPRETATION

FIGURE -1



INFERENCE: The figure depicts the amount of fresh linen and dirty linen per bed per day on the floor (ward).

FIGURE- 2



INFERENCE: The figure depicts that per bed per day 60% fresh bed sheet are used and 40% dirty bed sheet are elicited for washing.

FIGURE- 3



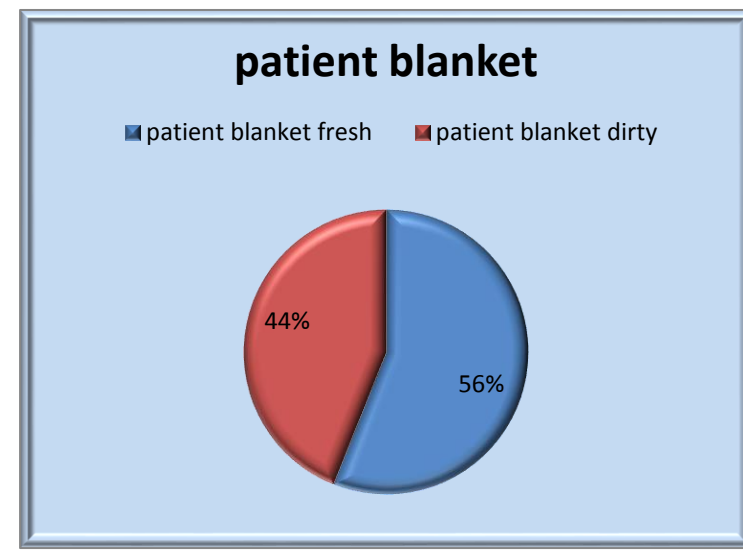
INFERENCE: The figure depicts that per bed per day 59% fresh hand towel are used and 41% dirty hand towel are elicited for washing.

FIGURE-4



INFERENCE: The figure depicts that per bed per day 59% fresh bath towel are used and 41% dirty bath towel are elicited for washing.

FIGURE-5



INFERENCE: The figure depicts that per bed per day 56% fresh patient blanket are used and 44% dirty patient blanket are elicited for washing.

FIGURE-6



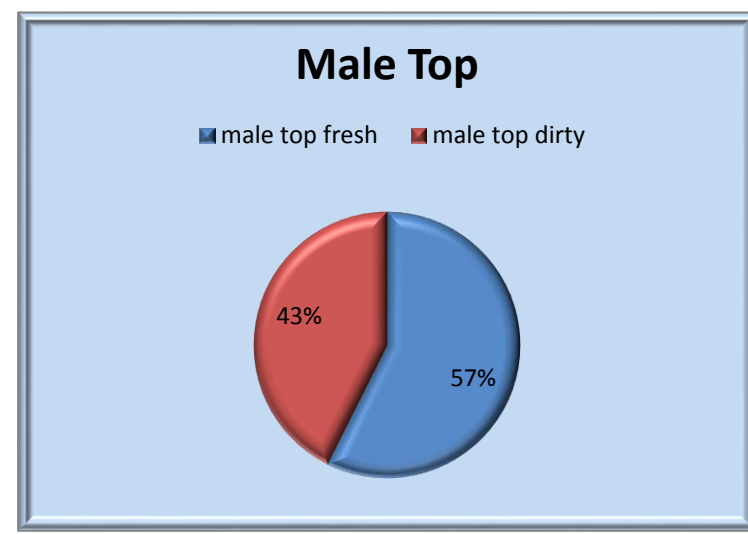
INFERENCE: The figure depicts that per bed per day 52% fresh pillow are used and 48% dirty pillow are elicited for washing.

FIGURE-7



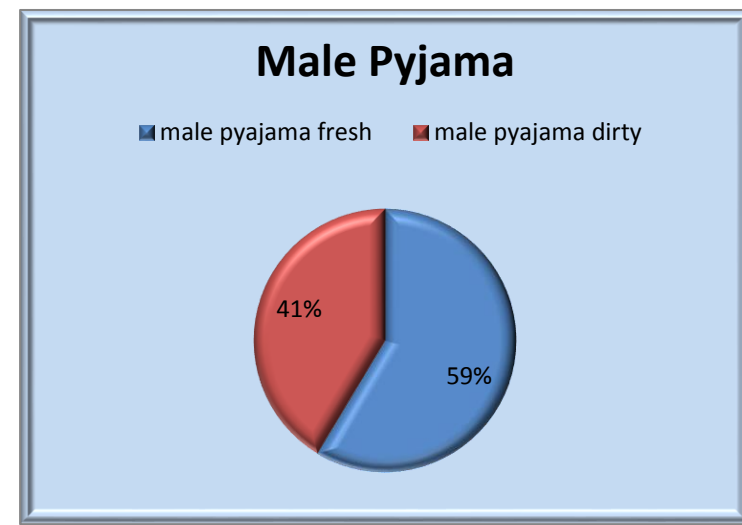
INFERENCE: The figure depicts that per bed per day 52% fresh pillow covers are used and 48% dirty pillow covers are elicited for washing.

FIGURE-8



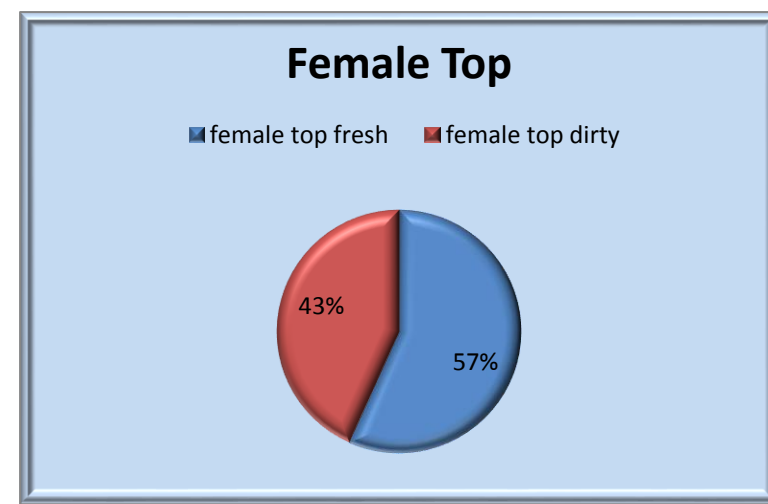
INFERENCE: The figure depicts that per bed per day 57% fresh male tops are used and 43% dirty male tops are elicited for washing.

FIGURE-9



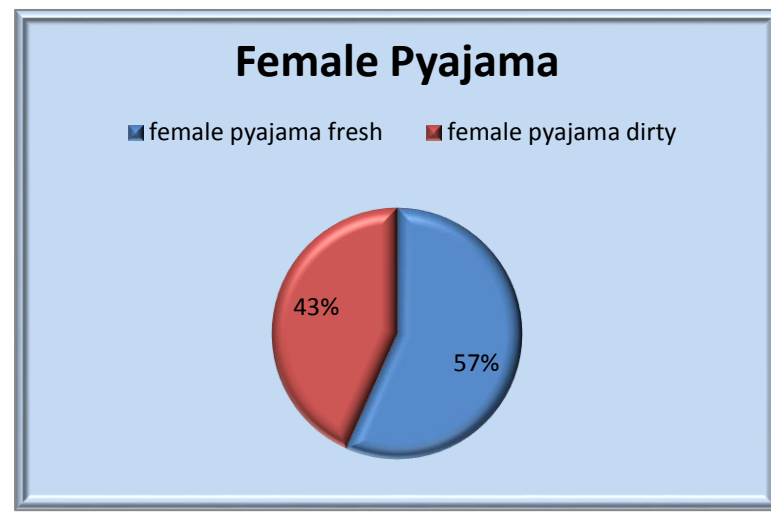
INFERENCE: The figure depicts that per bed per day 59% fresh male pyjamas are used and 41% dirty male pyjamas are elicited for washing.

FIGURE-10



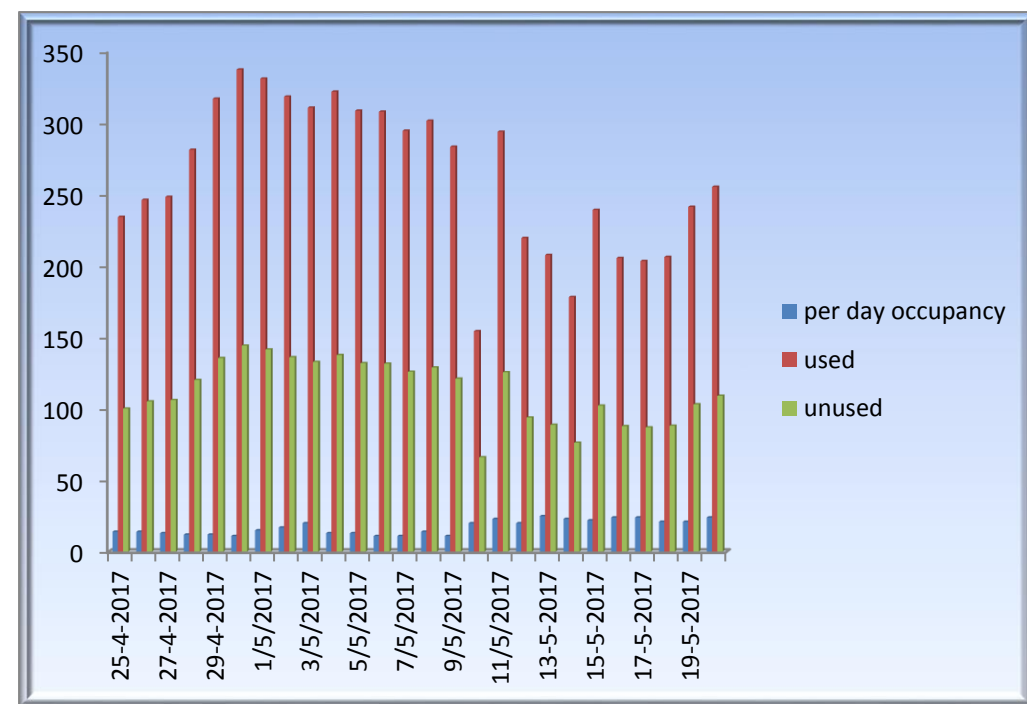
INFERENCE: The figure depicts that per bed per day 57% fresh female tops are used and 43% dirty female tops are elicited for washing.

FIGURE-11



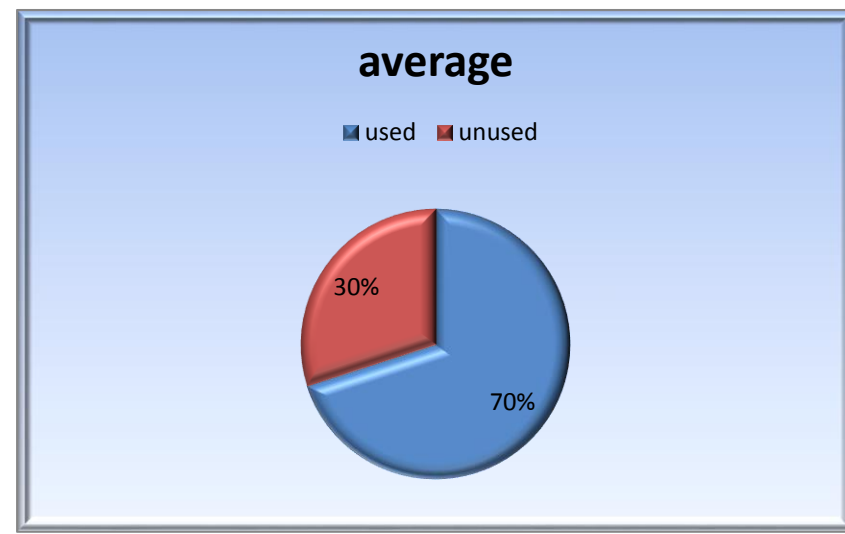
INFERENCE: The figure depicts that per bed per day 57% fresh female pyjamas are used and 43% dirty female pyjamas are elicited are used.

FIGURE-12



INFERENCE: The figure depicts the amount of used and unused linen pieces at per day occupancy.

FIGURE-13



INFERENCE: The figure depicts the average between used and unused linen pieces on the floor.

OBSERVATIONS & FINDINGS

- The amount of linen used per bed per day on the floor (ward) is 15.
- Supply of linen per bed per day:

2 bed sheets

2 hand towels

2 bath towels

1pillow

1pillow cover

2 patient blankets

2 pieces of dress

To attendants:

1 bed sheet

1blanket

1 pillow

- The cost of linen for washing is Rs 3.5 per linen piece.
- The reasons for the overuse of the linen on the floor could be as follows:
 - Floor occupancy
 - Number of patients coming from OT (operation theatre) to the ward.
 - New admission of patients in the ward
 - Sick patients in the ward
 - Discharge of the patients
- The amount of the fresh linen supplied to the patient is 377 on an average. Out of which 264 are used and 113 remain unused. The difference between used and unused linen is 151.

RECOMMENDATIONS

- Clear communication, education and support are necessary for each department to fully understand the cost associated with linen consumption, effective utilization techniques and ultimately cost containment. There are three main components required for success: Assurance, Awareness, and Accountability; referred to as the 3 A's.
- The clean linens observed in the ward does not always necessary equate to waste; at least some of the linens become used. Thus, the linen placed in the ward which is unused can be further used.
- It is recommended to increase awareness that clean linens placed inside the ward should not be more than required. If necessary extra linen could be supplied later.
- Reducing the difference the between fresh used and unused linen pieces supplied in the ward.
- Reducing the amount of linen supply per bed per day from 15 to 11.

Supply of linen per bed per day

2 bed sheets
 1 hand towel
 1 bath towel
 1 pillow cover
 1 patient blanket
 2 pieces of dresses

Attendants

1 bed sheet

1blanket

1 pillow

- Reduction in fresh linen reduces the hospital cost for laundry.
- Reduction in linen usage scales down the time-consuming procedure as well as manpower and increases the efficacy.

CONCLUSION

Linen and laundry is a recognized support service that contributes to widen the image of the hospital. Reduction in number of linen pieces per bed per day reduces the unnecessary wastage of linen as most of the time fresh unused linen left by the patient that transfer to the laundry along with the dirty linen. Hence it is recommended to increase awareness that clean linens placed inside the ward should not be more than required. If necessary extra linen could be supplied later. It could further reduce the hospital cost on laundry and also scales down the time-consuming procedure as well as manpower that improve the efficacy. Thus, we conclude that by reducing 30% fresh unused linen from the total, it would contribute in reduction of unnecessary usage of linen on the floor that will reduce the manpower and hospital cost of laundry.

ANNEXURE 1

[LINEN analysis.xlsx](#)

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