Summer Training at
Care Hospitals, Banjara Hills, Hyderabad
(April 3 to June 2, 2017)

Reducing the Delay in Intra-Hospital Patient Bed Transfer Process Using DMAIC Approach

By
Sweta Kannepalli

Under the guidance of
Dr. S.D. Gupta

MBA Hospital & Health Management
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The IIHMR University, Jaipur
2017

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

CERTIFICATE

This is to certify that **Dr. Sweta Kannepalli** has undergone summer training in **CARE Hospitals**, Banjara Hills, Hyderabad 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

Dr. S.D.Gupta

Chairman

The IIHMR University, Jaipur

Quality Care India Limited

NABH ACCREDITED HOSPITAL
CIN : U85110AP1992PLC014728

CARE® HOSPITALS

Date: - 02-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Sweta Kannepalli** a student of IIHMR University, Jaipur has done project on "**Intra-Hospital Patient bed transfers**" in the department of Hospital Administration from 03-04-2017 to 02-06-2017.

During the above period her performance and conduct were found to be good.

We wish her all the best in her future endeavors.

For QUALITY CARE INDIA LIMITED,

QUALITY CARE INDIA LTD. HYD-01.

K.V.SUBBA REDDY
General Manager- HR

6-3-248/2, Road No.1, Banjara Hills, Hyderabad - 500 034. Phones: 040-30418888, 23234444, Fax: 040-30418488
Care Out Patient Center, # 8-2-620/A-E, Road No. 10, Banjara Hills, Hyderabad - 500 034.
Phones: 040 - 3931 0444, Fax: 040 - 3931 0772.
Care Hospital: # 5-4-199, Jawaharlal Nehru Road, Hyderabad - 500 001. Phones: 040-30417777, 24735465, Fax : 040-30417488
1-4-908/7/1, Bakaram, Musheerabad Main Road, Musheerabad, Hyderabad - 20. Ph.: 040-30219000, Fax: 040-30219288
Near Clock Tower, Market Street, Secunderabad - 500 003. Phones: 040-30486666, Fax: 040-27717738
Website: www.carehospitals.com, E-mail: info@carehospitals.com

ACKNOWLEDGEMENT

I feel privileged in expressing my deep sense of gratitude to **Dr. Naga Satish (assistant medical superindent)** Care Hospitals, Banjara Hills, Hyderabad for his expert guidance and encouragement which immensely helped in the process of making this report. Without his support, exploring such a vast organization could not have been possible.

I would like to express my deep sense of gratitude to **Dr.Shammem Rizwana (Hospital Administrator)** Who guided and gave this project. I would not have been able to get so much knowledge and experience about the work, analyzing the data preparing the report without her kind support and guidance.

I would also like to express my gratitude to the doctors, nurses, housekeeping and patients of the CARE Hospitals, BanjaraHills, Hyderabad.

I would also like to thanks to my parents for their blessings and my friends who motivated me and helped for my accommodation.

Dr.Sweta Kannepalli

TABLE OF CONTENTS

1. Acronyms/Abbreviations

FHA- Floor Hospital Administrator

ICU- intensive care unit

ICCU- Intensive coronary care unit

MICU- medical intensive care unit

IP- In Patient

OP- out patient

ER- Emergency department

HICC- Hospital Infection Control Committee

HID- Hospital Information Department

HOD- Head Of the Department

HR- Human Resources

LAMA – Left Against Medical Advice

DMAIC – Define, Measure, Analyse, Improve ,Control

SIPOC- Supplier ,Input, Process, Output, Customer

VOC- Voice of customer

DPO – Defects Per Oppertunities

DPMO – Defects Per Million Oppurtunities

Cp – Process Capability

USL – Upper Specification Limit

LSL – Lower Specification Limit

2. ORGANIZATION PROFILE:

The CARE Hospitals is a chain of healthcare providers, with 16 branches across India. The regional head is in South India, more than 30 specialties are covered by care hospitals.

It provides medical care at cost effective parameters, with an e purpose. "To provide care that people trust." Founded in 1997 by Dr B Soma Raju and a team of India's leading cardiologists, the CARE Hospitals' founders developed Asia's first indigenous coronary stent — the 'Kalam-Raju stent,' named after Dr APJ Abdul Kalam, former President of India, and Dr B Soma Raju, Chairman and Managing Director, CARE Hospitals Group. This is just one of the many innovations developed at CARE Hospitals, which strives to make healthcare affordable for all, while ensuring clinical outcomes at par with international standards.

CARE Hospitals is a complete healthcare system, with education,training and research.CARE Hospitals is owned by Quality CARE India Ltd.

PURPOSE: To provide care to people that is trusted.

VISION: To be a trusted, people-centric, integrated health care.

VALUES:

- Honesty & Integrity
- Team Work
- Empathy & Compassion
- Education
- Citizenship
- Equity
- Dignity & Respect

LOGO:

The base of the logo represents a level field provide to everybody. The column consisting of beams represents the multi-disciplinary teams of care hospitals. The person on the pedestal is a professional like a physician, nurse, or health care professional supported by excellence. The person trying to climb the apex of the pedestal is a patient suffering from illness or a student seeking knowledge and skills. The rectangular box refers to a well-defined framework within which the hospital functions.

CARE HOSPITALS, BANJARA HILLS, HYDERABAD

The CARE Hospitals was established in the year 2000. It has 435 beds with 120 critical care beds, with an annual estimated input of 1, 80,000 outpatients and 16,000 in-patients.

SPECIALITIES

- Endocrinology
- ENT
- Gastroenterology
- General Medicine
- General Surgery & Surgical Gastroenterology
- Haematology
- Hepato Biliary Surgery & Liver Transplantation
- Laboratory Medicine
- Anaesthesiology
- Cardiac Sciences
- Critical Care
- Dentistry
- Dermatology
- Dietetics & Nutrition
- Emergency Medicine
- Paediatrics
- Physiotherapy & Rehabilitation
- Plastic Surgery
- Pulmonology
- Radiology
- Rheumatology
- Urology
- Vascular Surgery
- Laparoscopic & Bariatric Surgery
- Nephrology
- Neuro Sciences
- Nuclear Medicine
- Obstetrics & Gynaecology
- Oncology
- Ophthalmology
- Orthopaedics
-

INFRASTRUCTURE

- Operation Theatres
- ICUs
- Endoscopy Suite
- Non-Invasive Laboratory
- Radiology
- Nuclear Medicine
- Catheterization Laboratory
- Dialysis & Department of Nephrology

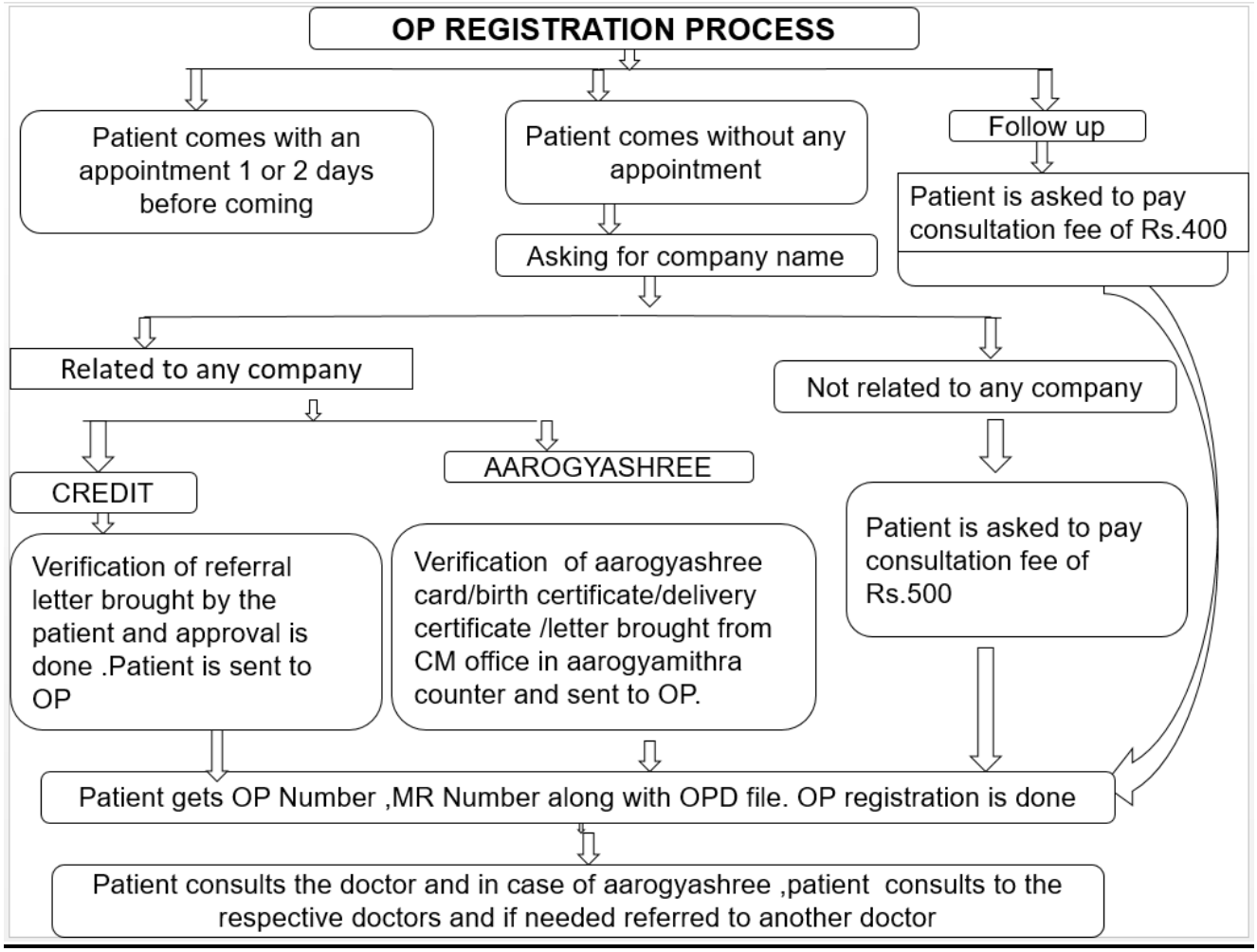
FACILITIES

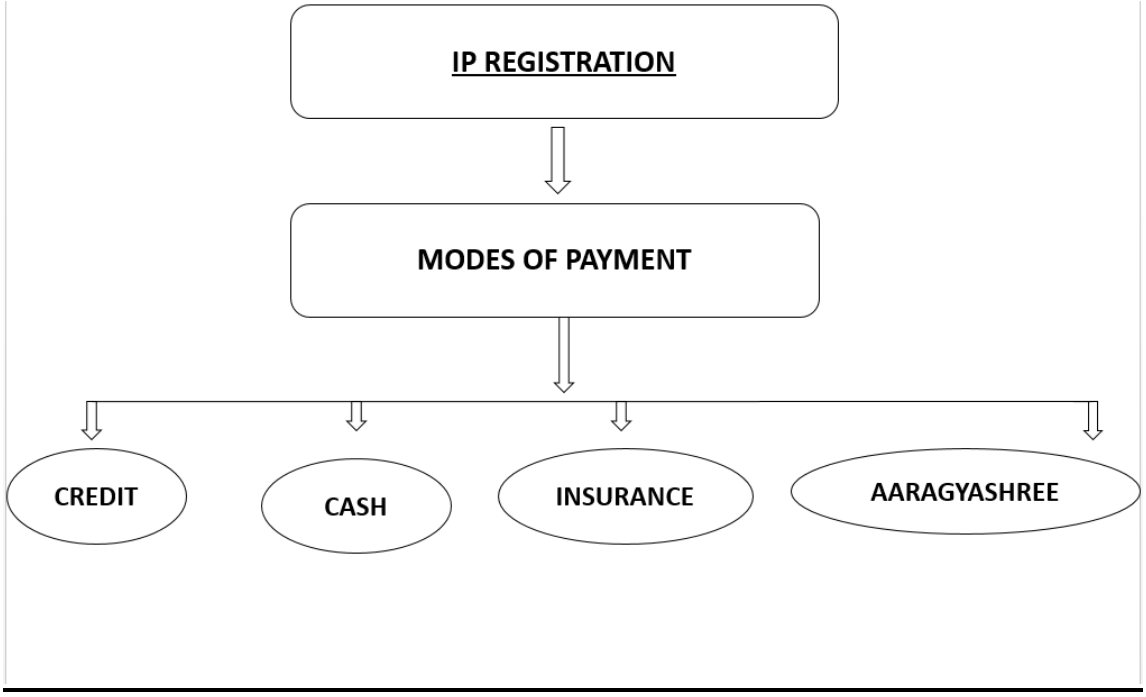
- Emergency Unit
- Blood Bank
- Ambulance
- Pharmacy
- Laboratory services
- Pathology
- Haematology
- Microbiology
- Biochemistry

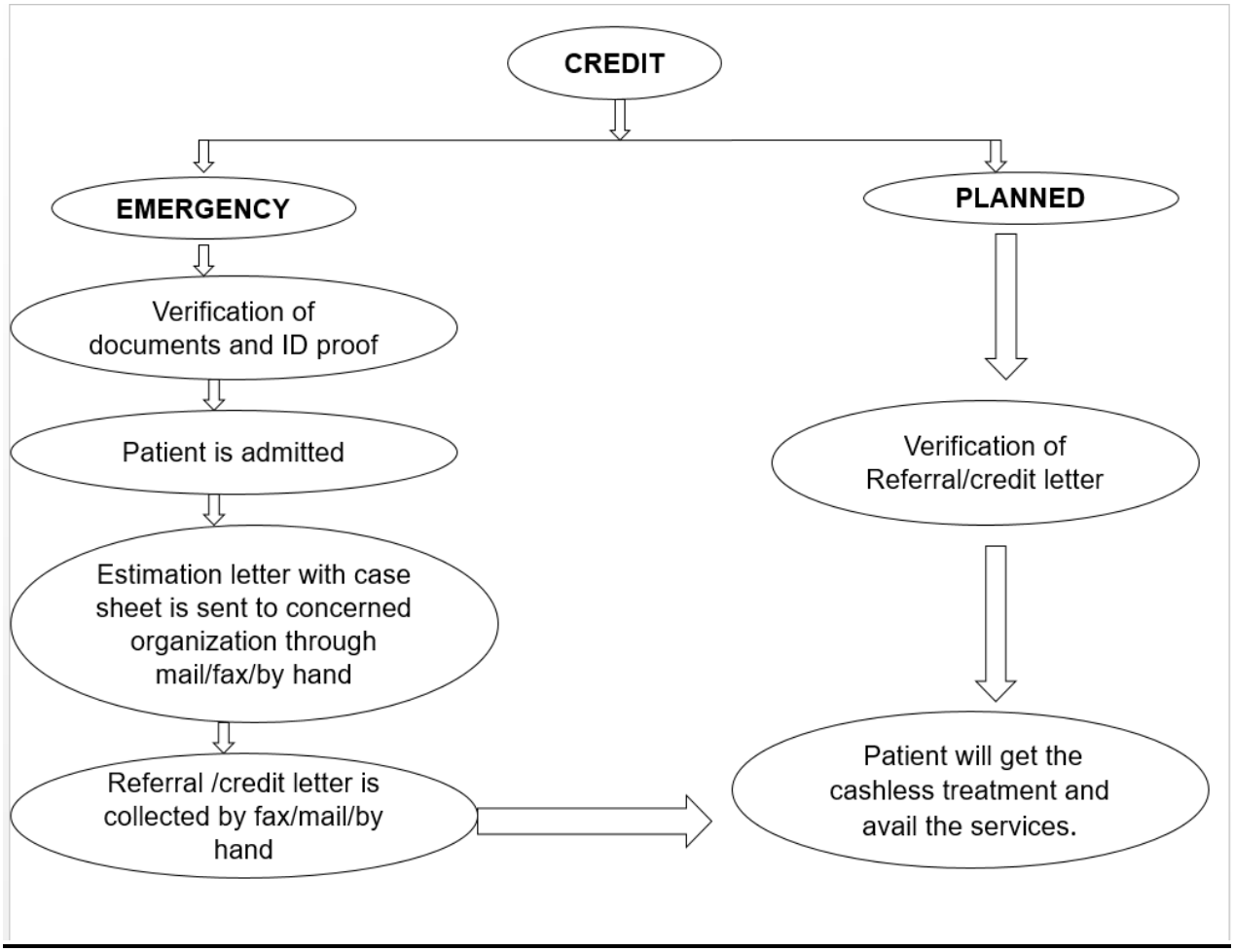
3. OBSERVATIONAL LEARNING

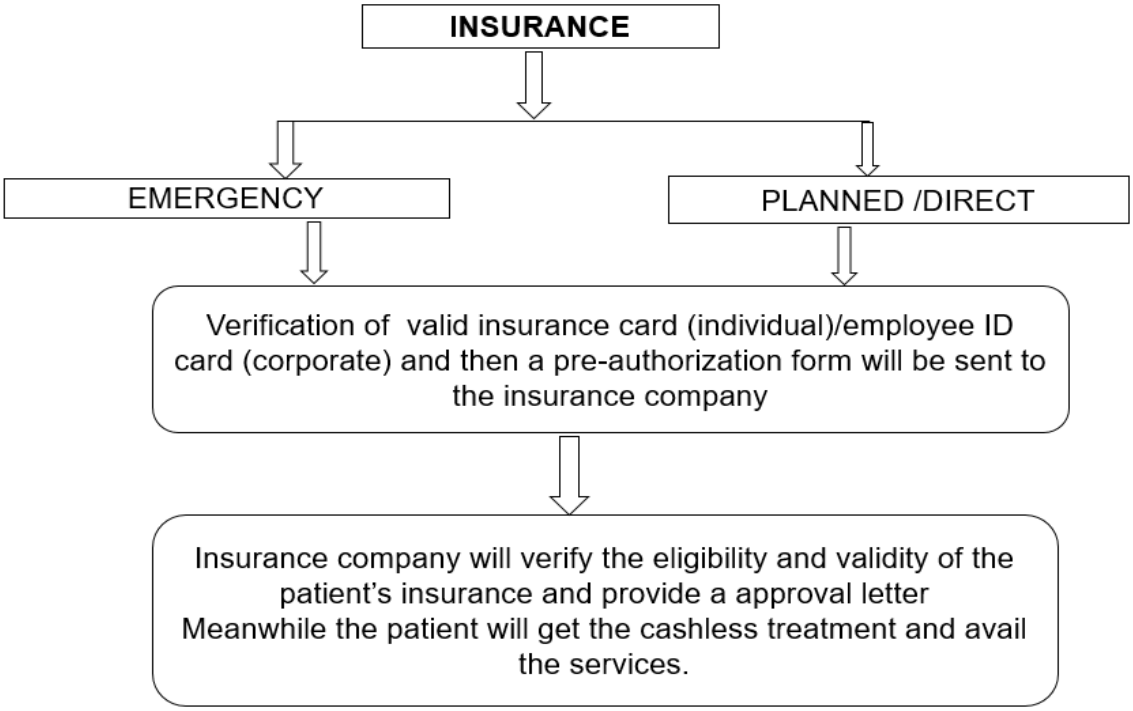
OP&IP Reception: OP reception is situated on right side once we enter the hospital and it is the place where the appointments are given and regular consultations occur.

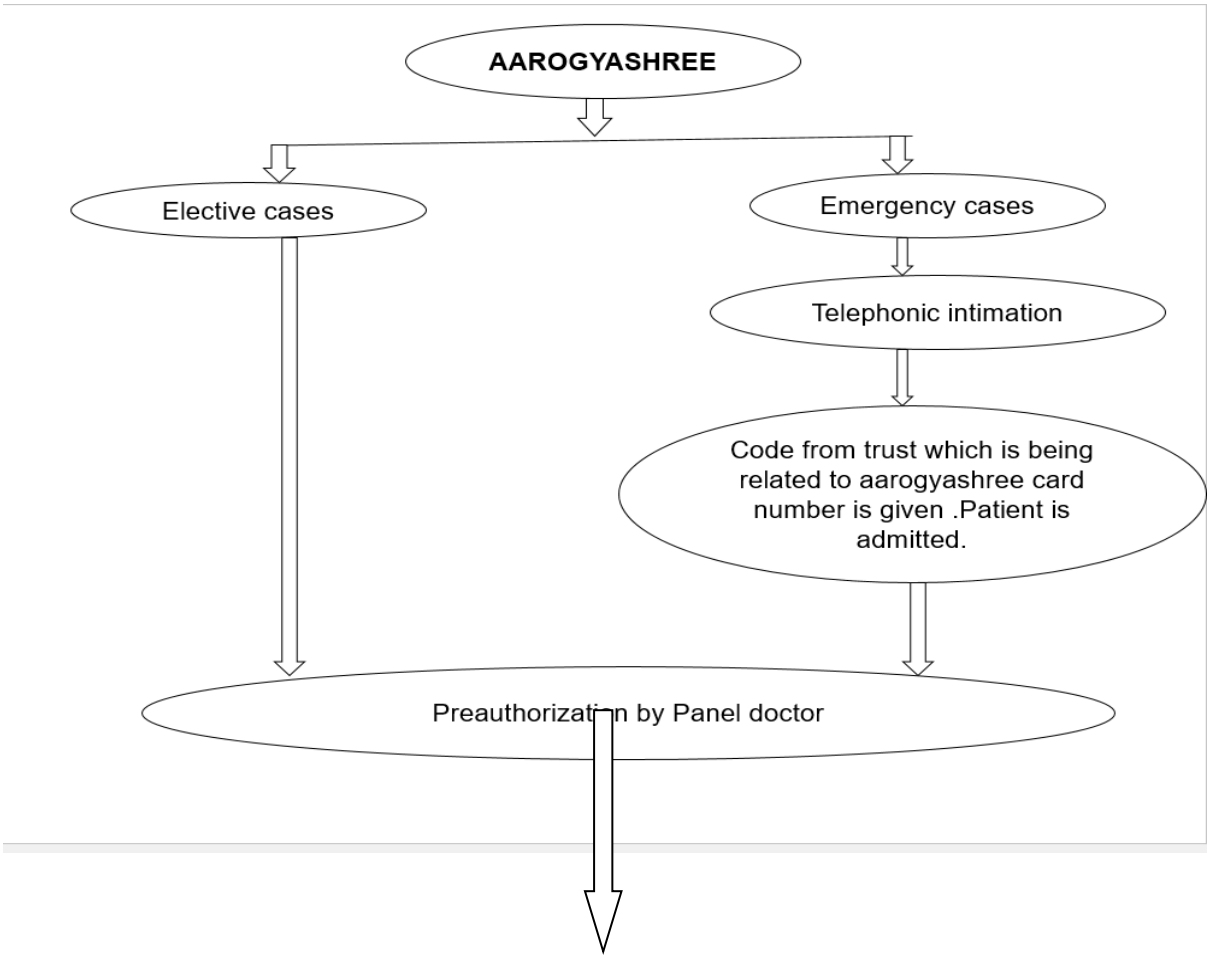
- IP reception is situated on left side and it is the placewhere admission and billing department functions round-the-clock.

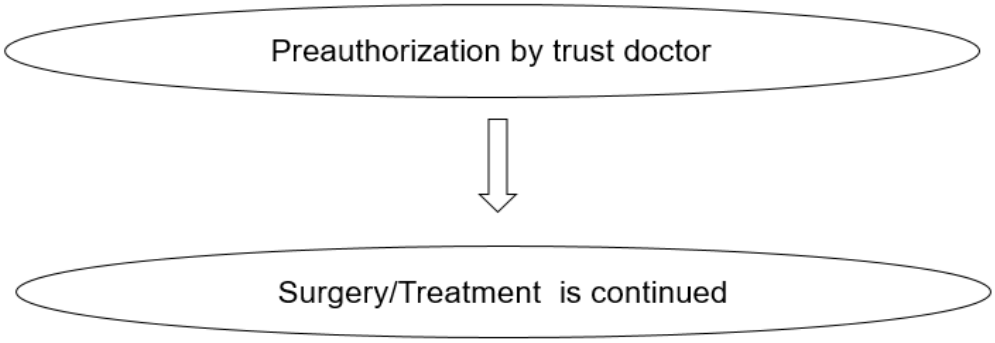

OP REGISTRATION PROCESS
Patient comes with an appointment 1 or 2 days before coming
Patient comes without any appointment
Follow up
Patient is asked to pay consultation fee of Rs.400
Asking for company name
Related to any company
Not related to any company
CREDIT
AAROGYASHREE
Verification of referral letter brought by the patient and approval is done .Patient is sent to OP
Verification of aarogyashree card/birth certificate/delivery certificate /letter brought from CM office in aarogyamithra counter and sent to OP.
Patient is asked to pay consultation fee of Rs.500
Patient gets OP Number ,MR Number along with OPD file. OP registration is done
Patient consults the doctor and in case of aarogyashree ,patient consults to the respective doctors and if needed referred to another doctor


IP REGISTRATION
MODES OF PAYMENT
CREDIT
CASH
INSURANCE
AARAGYASHREE


CREDIT
EMERGENCY
PLANNED
Verification of documents and ID proof
Patient is admitted
Estimation letter with case sheet is sent to concerned organization through mail/fax/by hand
Referral /credit letter is collected by fax/mail/by hand
Verification of Referral/credit letter
Patient will get the cashless treatment and avail the services.


INSURANCE
EMERGENCY
PLANNED /DIRECT
Verification of valid insurance card (individual)/employee ID card (corporate) and then a pre-authorization form will be sent to the insurance company
Insurance company will verify the eligibility and validity of the patient's insurance and provide a approval letter
Meanwhile the patient will get the cashless treatment and avail the services.


AAROGYASHREE
Elective cases
Emergency cases
Telephonic intimation
Code from trust which is being related to aarogyashree card number is given .Patient is admitted.
Preauthorization by Panel doctor

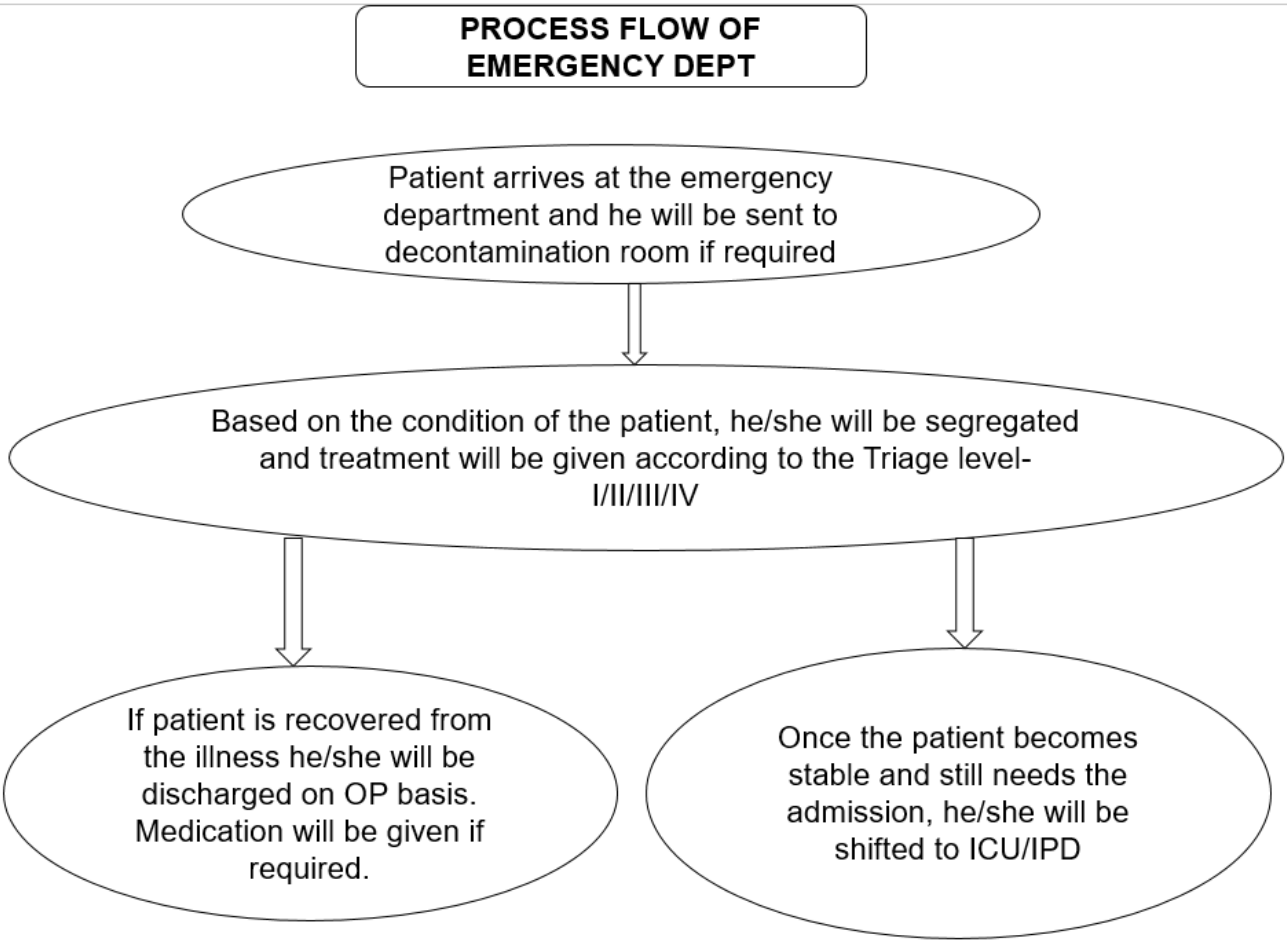


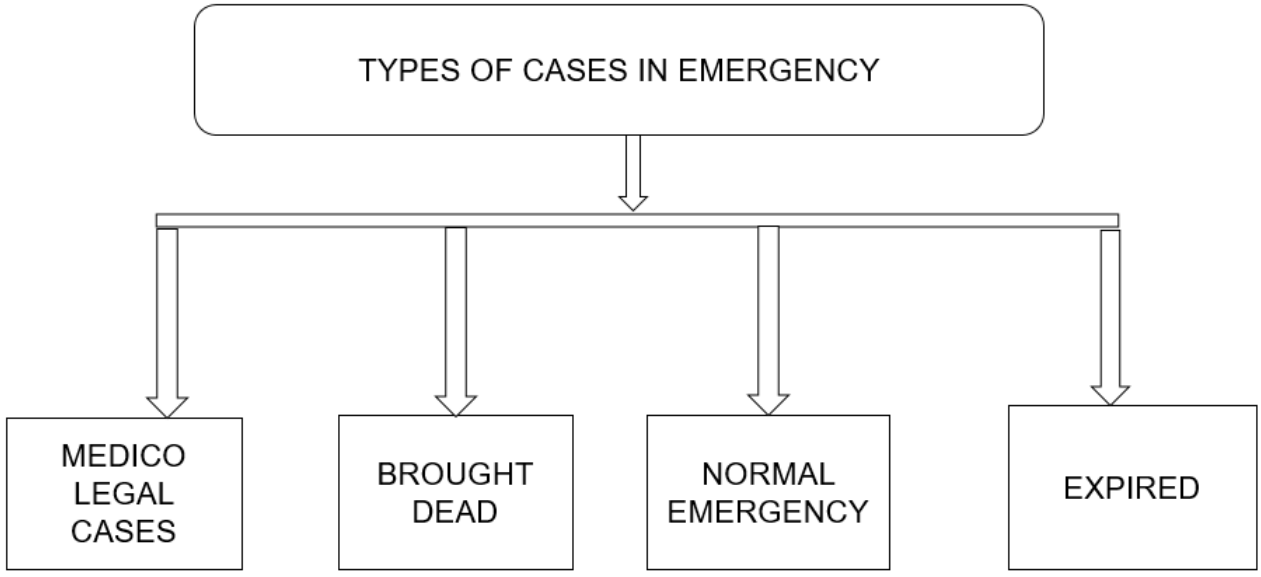
EMERGENCY DEPARTMENT: The Emergency department at CARE Hospitals is a 24-hour center,which treats to all types of accidents and emergency cases.

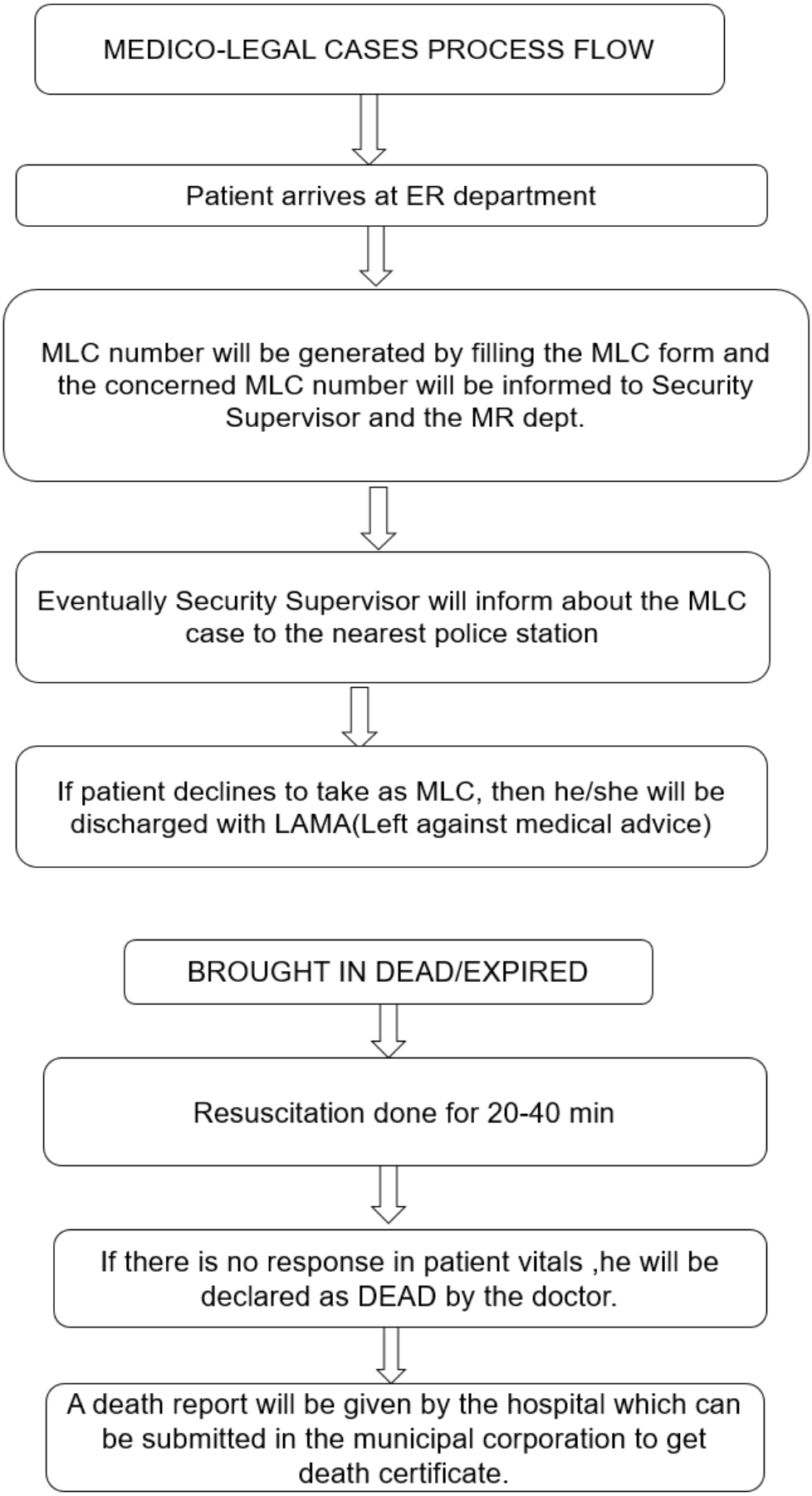
RADIOLOGY DEPARTMENT: The Radiology deparment and Imaging have complete range of diagnostic and image-guided therapeutic services. The hospital provides 24*7 emergency and routine diagnostic services.

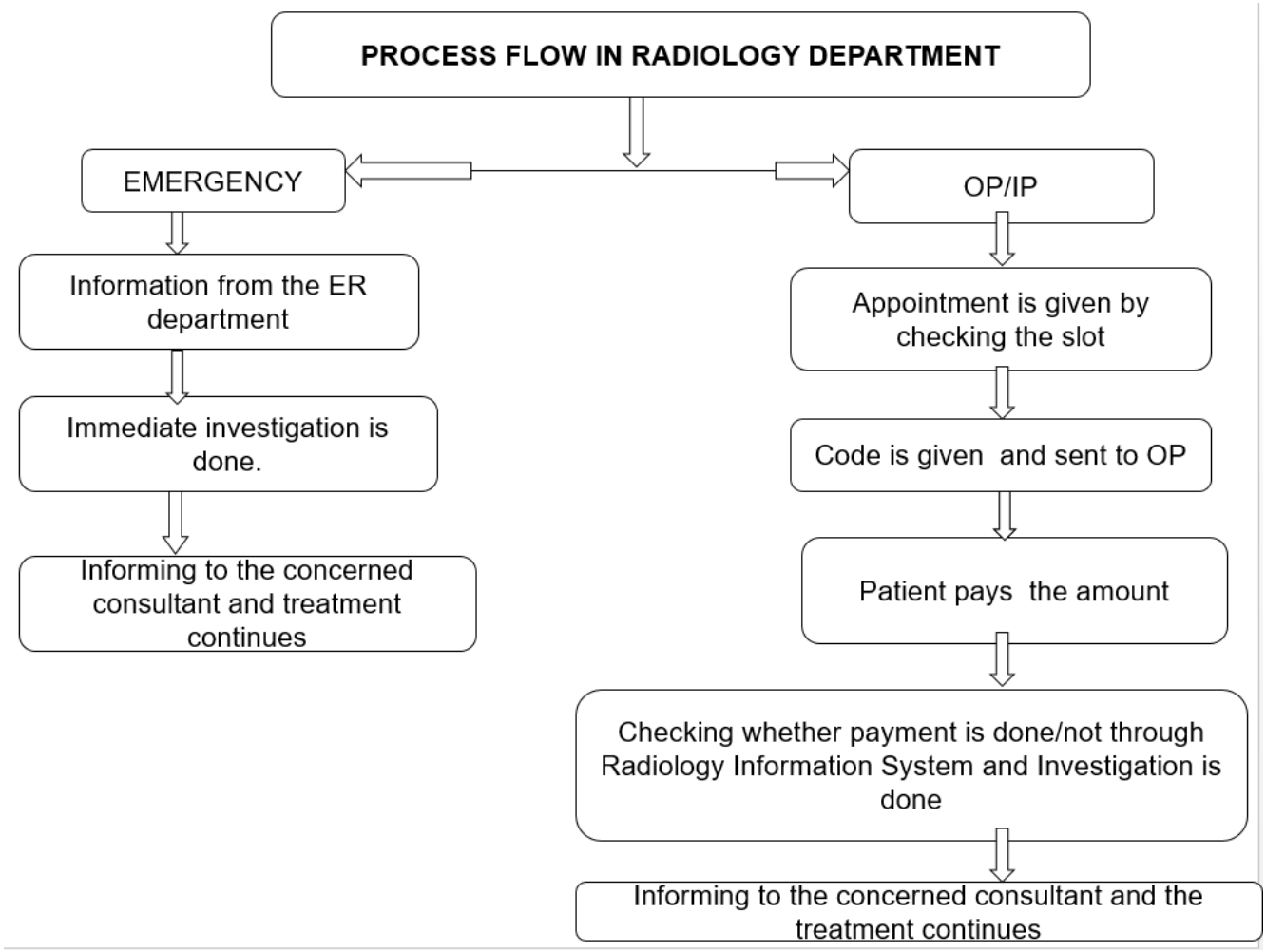
- Advanced imaging services of CT scan ,MRI,Ultrasonography,Digital radiography and special radiological procedures,Teleradiology.

Process flow - Emergency and Radiology departments are mentioned below:






MEDICO-LEGAL CASES PROCESS FLOW
Patient arrives at ER department
MLC number will be generated by filling the MLC form and the concerned MLC number will be informed to Security Supervisor and the MR dept.
Eventually Security Supervisor will inform about the MLC case to the nearest police station
If patient declines to take as MLC, then he/she will be discharged with LAMA(Left against medical advice)
BROUGHT IN DEAD/EXPIRED
Resuscitation done for 20-40 min
If there is no response in patient vitals ,he will be declared as DEAD by the doctor.
A death report will be given by the hospital which can be submitted in the municipal corporation to get death certificate.



QUALITY DEPARTMENT:

- **PURPOSE:** Getting accreditation and improvement in the system.
- Presently following the NABH standards for Hospitals 4th edition which includes 10 chapters, 70 quality indicators, 105 standards and 683 objectives.
- It mainly works on structure, process and outcome.
- Its main objective is to do analysis and take appropriate and preventive action in a prospective / retrospective manner.
- Conducts 4 quality meetings every month.

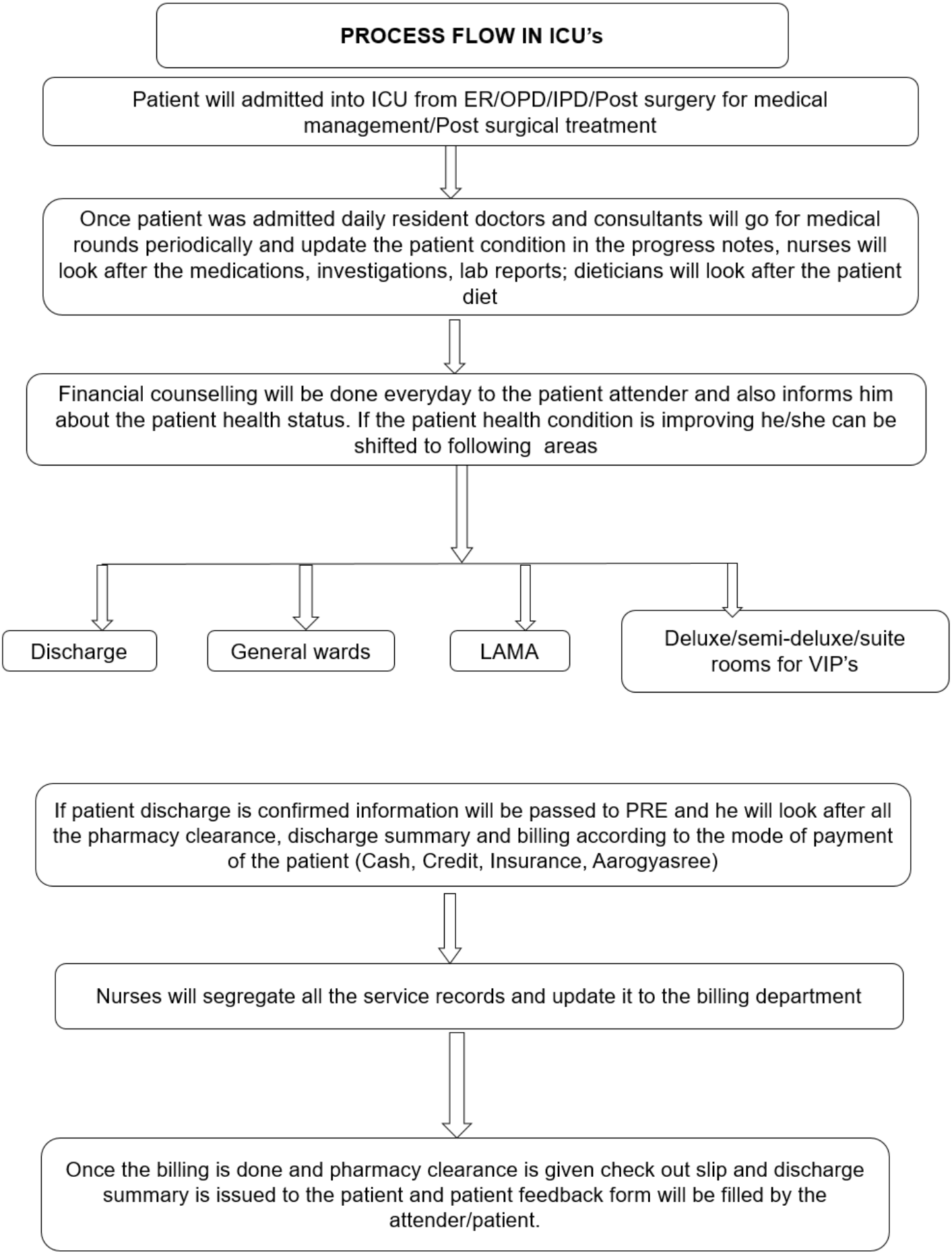
It has 8 committees

1. PQAC-Patient Quality Assurance Committee
2. DQAC-Diagnosis Quality Assurance Committee
3. AQAC-Admin Quality Assurance Committee
4. HICC-Hospital Infection Control Committee
5. CPRC-Cardio Pulmonary Resuscitation Committee
6. BTC-Blood Transfusion Committee
7. Document Committee
8. PTC-Pharmaco Therapeutic Committee

FIRST AND SECOND FLOOR ICU'S

- There are totally six ICU's situated in first and second floor, three in first floor and three in second floor.
- First floor ICU's : NICU, LIVER TRANSPLANT ICU & ICU
- Second floor ICU's : MICU-1,MICU-2 & ICCU
- There are two type of beds in every ICU namely alpha and nimbus beds which were used according to the duration of stay in ICU.
- Each ICU has crash cart, defibrillators, ventilators, dialysis ports, incubators, bed side x-ray machines, vital monitoring, suction apparatus, infusion pumps etc.
- EEG machine, TCD machine and video EEG room are the additional equipment present in NICU.

NUMBER & TYPE OF BEDS	NICU	ICU	MICU-1	MICU-2	ICCU
TOTAL BEDS	12	12	14	12	14
ISOLATION BEDS	4	0	4	2	4
OPEN BEDS	8	12	4	6	10
CUBICLES	0	0	6	4	0


PROCESS FLOW IN ICU's
Patient will admitted into ICU from ER/OPD/IPD/Post surgery for medical management/Post surgical treatment
Once patient was admitted daily resident doctors and consultants will go for medical rounds periodically and update the patient condition in the progress notes, nurses will look after the medications, investigations, lab reports; dieticians will look after the patient diet
Financial counselling will be done everyday to the patient attender and also informs him about the patient health status. If the patient health condition is improving he/she can be shifted to following areas
Discharge
General wards
LAMA
Deluxe/semi-deluxe/suite rooms for VIP's
If patient discharge is confirmed information will be passed to PRE and he will look after all the pharmacy clearance, discharge summary and billing according to the mode of payment of the patient (Cash, Credit, Insurance, Aarogyasree)
Nurses will segregate all the service records and update it to the billing department
Once the billing is done and pharmacy clearance is given check out slip and discharge summary is issued to the patient and patient feedback form will be filled by the attender/patient.

LABORATORY MEDICINE:

- It consists of

1) Haematology department

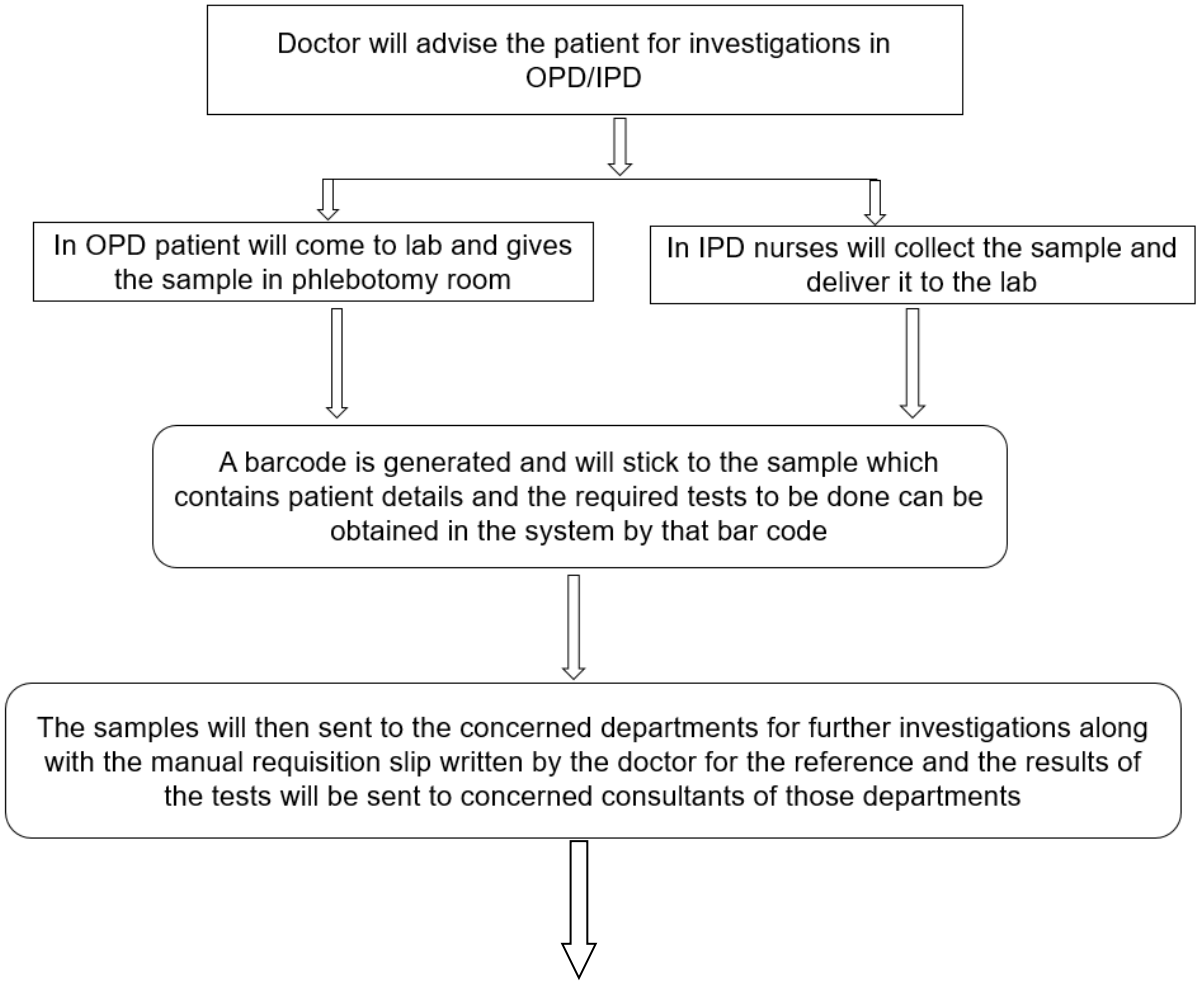
2) Biochemistry department

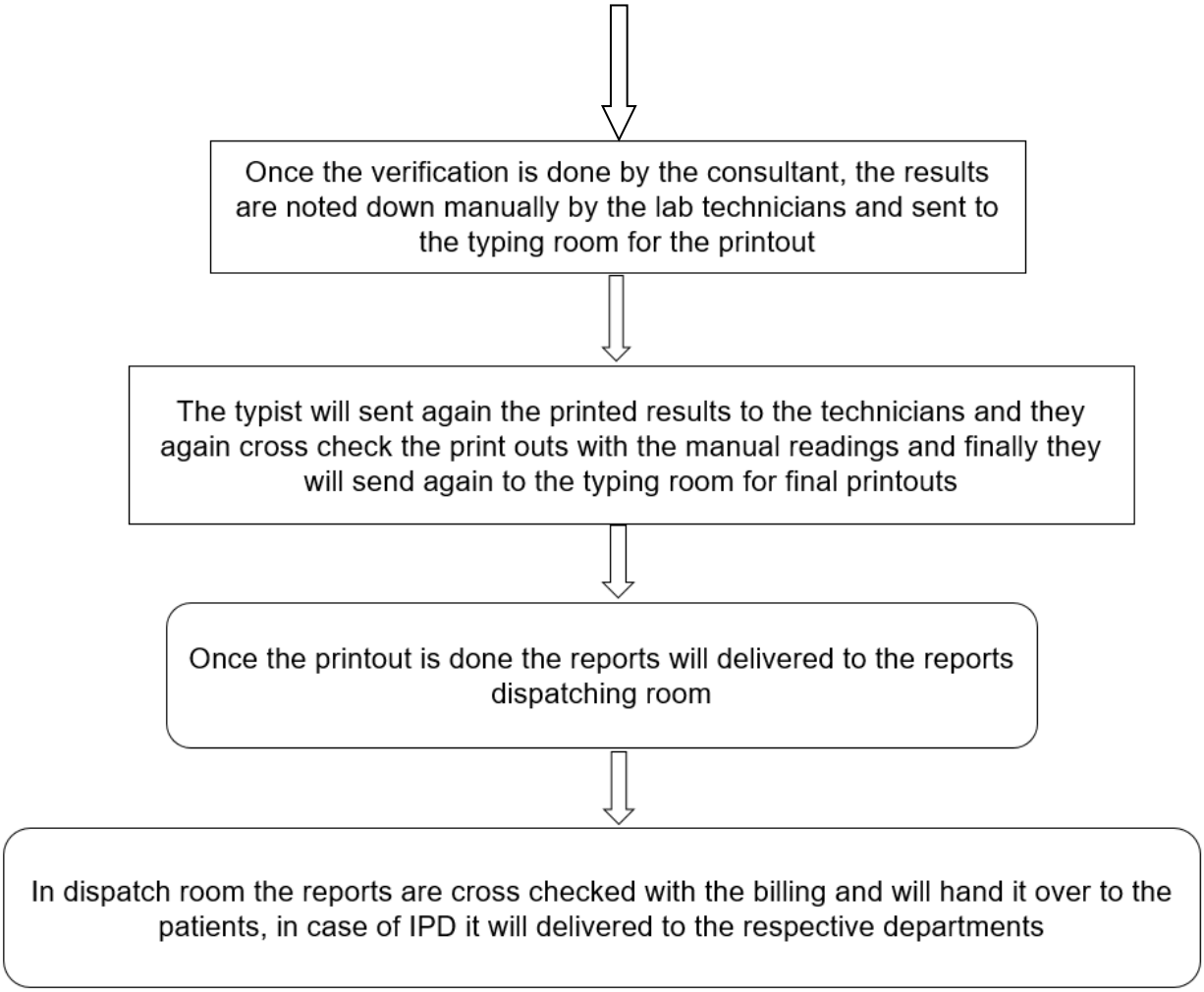
3) Microbiology department

4) Histopathology department (out sourced)

- Each department has a consultant who is the head of that particular department and verifies the test results and gives approvals for those tests.

PROCESS FLOW IN LABORATORY MEDICINE





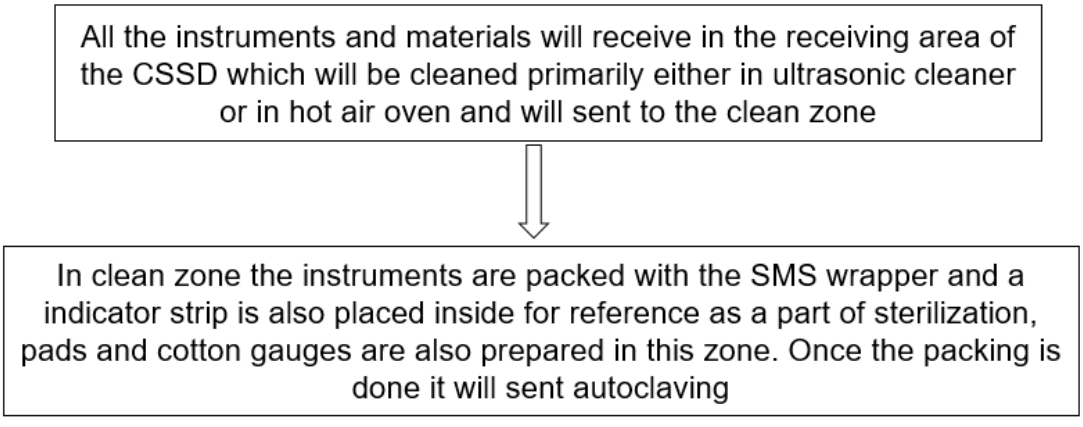
CENTRAL STERILE SERVICES DEPARTMENT:

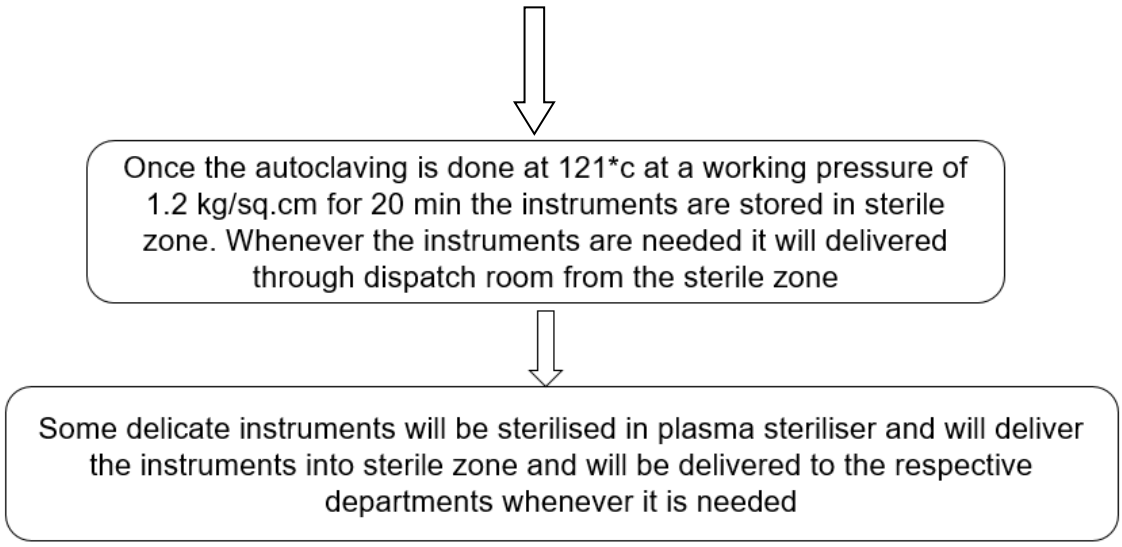
It has 3 zones

1) Receiving zone
2) Clean zone
3) Sterile zone

- It has 6 indicators to verify the sterility level.
- This department consists of 2 autoclaves, 1 plasma sterilizer, 1 ultrasonic cleaner and 1 hot air oven
- An indicator strip will be placed both inside and outside the pack as a level of indicator of proper sterilization.

PROCESS FLOW IN CENTRAL STERILE SERVICES DEPARTMENT [CSSD]





GENERAL STORES:

It deals with the following items with the respective codes:

A – Visiting cards and letter heads

B - Engineering and electrical items

C – Printing stationary

D – General items

E – Housekeeping

F – Bulk items

G – Computer items

- They issue items for different floors in different days
- Audit will be conducted for every 3 months.

HUMAN RESOURCE DEPARTMENT:

RECRUITMENT PROCESS:

- There will be a requisition from concerned department for new manager or forreplacement.
- First screening and initial interview is done.
- Salary is being fixed and selected person will be getting a medical checkup and a joining date is fixed.
- First day all documents are verified and an enterprise resource planning (ERP) number is given.
- Chief of human resource (CHR) will giveapproval.
- Induction program is given at corporate level and continues at unit level.
- Number of days= salary

PAY ROLL:

- Based on qualification, requirement, experience salary is divided.
- Salary is divided into 3 parts –basic (60%), HRA (house rent allowance (25%)), conveyance (15%).
- Deduction is by statutory charges and non-statutory charges

HEAD COUNT:

- There are 26 to 27 departments where 1400 number of employees are working. Among them mostly are nursing others are clinical side technicians, administrative staff, resident doctors, consultant doctors.
- Every HOD is responsible for head count.
- Leave approval is through ERP.

GRIEVANCE HANDLING:

Committees which handle grievance handling are sexual harassment committee, personal issue committee, salary review committee, finance committee.

EMPLOYEE REWARDS SYSTEM:

- Spot award
- Best associate award (monthly)
- Appreciation certificate
- Best employee of the week or in a floor

❖ Types of leaves are sick leaves, earn leaves and casual leaves.

❖ Training is by external /internal by following a training calender

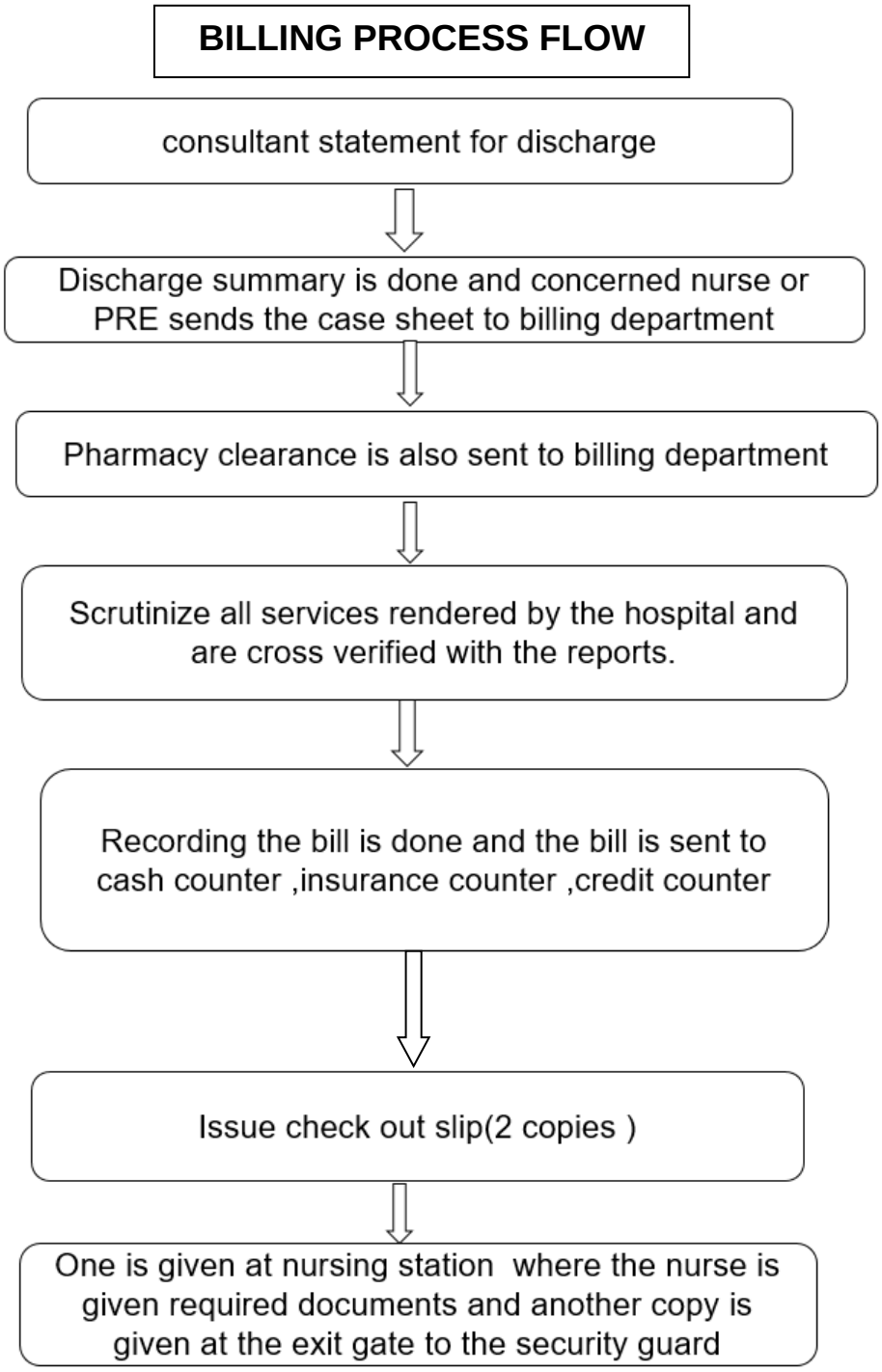
❖ Job description is about target to be achieved, duties to be performed,station standing orders, key result areas, (KRA)key performance indicators (KPI)

❖ Performance appraisal is done yearly.

❖ All employees are segregated to

- G1,G2,G3 – entry level
- G4,G5,G6 – middle level
- G4,G5,G6 – middle level

- G4,G5,G6 – middle level

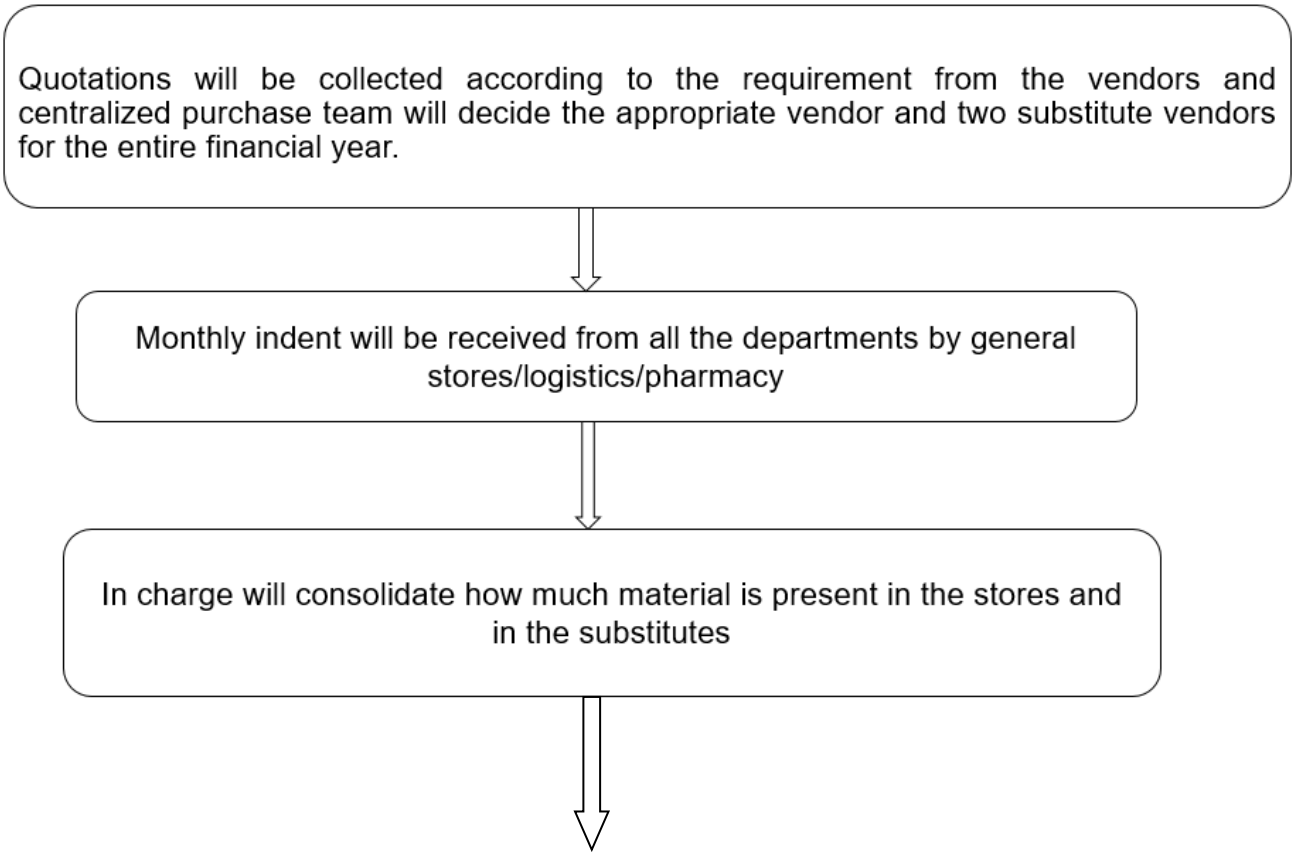


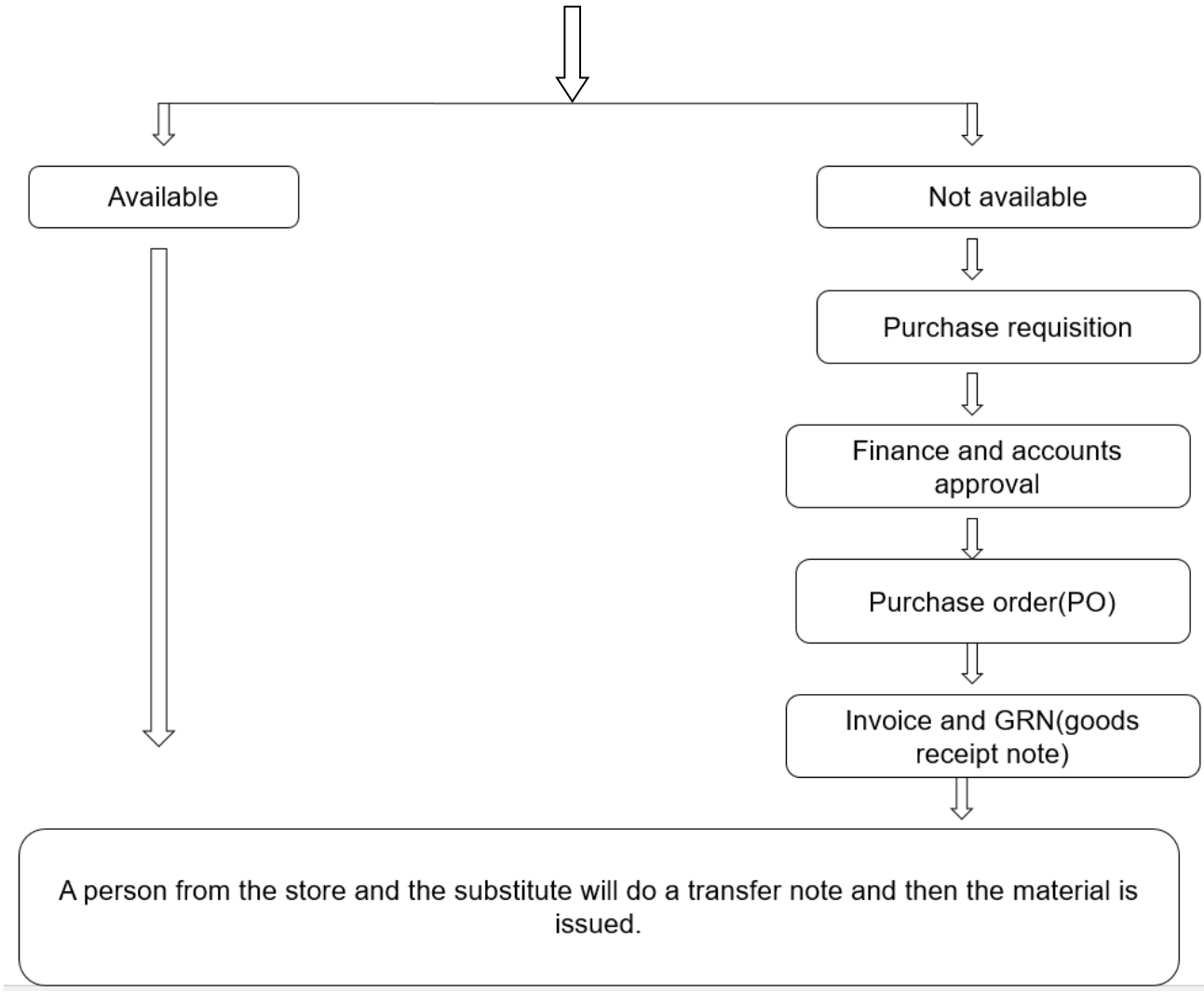
LOGISTICS/PHARMACY

1. Central drug store
2. Central surgical store
3. Pharmacy
   - ER pharmacy
   - IP pharmacy

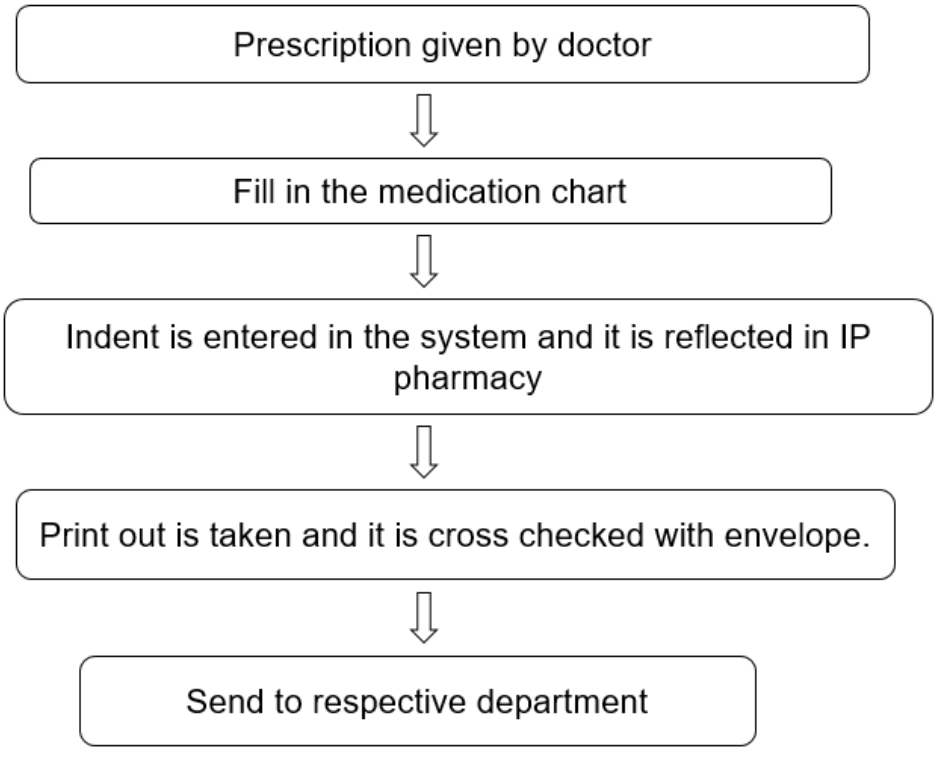
- OP pharmacy

PROCESS FLOW





IP PHARMACY PROCESS FLOW:



MEDICAL RECORDS:

TYPES:

1. Discharge
2. Death
3. MLC (medico legal cases)

RETENTION PERIOD:

- Discharge – 3years
- Death – 10 years
- MLC – forever
- According to IP number, medical records are arranged with ICD code generated by them.

RETRIEVAL POLICY:

- Death/ discharge - 1-2min
- MLC- 3-4 min

NURSING DEPARTMENT:

This department mainly focuses on 3 aspects. They are

1. Education
2. Quality
3. HICC

EDUCATION

1. Clinical rounds
2. In-service education
3. Briefing & induction sessions
4. In charge nurses- Training
5. BLS training
6. Bed side teaching
7. Monthly sessions
8. Coordination with CON & SON
9. Manage nursing library
10. Maintain educational data

QUALITY

1. Clinical rounds
2. Tissue viability-nurses
3. BAER programme
4. Transportation –pool
5. Event & code blue/ CPR forms
6. Root cause analysis
7. PQAC presentation
8. Blood transfusion-feedback forms
9. Champions audit
10. Home care

HICC

1. Clinical rounds
2. Data capturing
3. Surveillance
4. Employee vaccination
5. HICC presentation
6. Protocol timing
7. Monthly audit

4. SPECIFIC PROJECT LEARNING

REDUCING THE DELAY IN INTRA-HOSPITAL PATIENT BED TRANSFER PROCESS USING DMAIC APPROACH

1) INTRODUCTION

Intra hospital patient bed transfer is an important aspect of patient care which is often undertaken to improve upon the existing management of the patient. It may involve transfer of patient within the same facility for any diagnostic procedure or transfer to another facility with more advanced care (ICU) or for monitoring /observation of stable patients (Wards). The main aim in all such transfers is maintaining the continuity of medical care.

This project is constrained to intra-hospital patient bed transfer from ICU to wards. Optimal use of intensive care unit beds is an important goal for individual hospital and health care system. Emergency department (ED) patients in need of an intensive care unit (ICU) admission are very sick. Reducing the time delay in transferring these patients to ICU beds is associated with improved clinical outcomes. This depends upon availability of vacant ICU beds. ICU beds are made available by quick transfer of stable patients to wards.

Transfer process of patient from ICU s to wards involves different steps, from doctor advice till transfer of patient to ward. Delay in transfer process leading to inefficiencies in acute bed usage.

CARE Hospitals is a tertiary care hospital located in Banjara Hills, Hyderabad. It is a 435-bedded multispecialty hospital including 120 critical care beds. It was set up in year 2000 and accredited with NABH and NABL.

The study mainly focuses on streamlining the current patient bed transfer process of CARE Hospital using Six Sigma approach.

Six Sigma is a tool, which deploys Brainstorming and Statistical tools to identify the vital root causes, and finding a solution to optimize the Output.

Six Sigma improves the process performance, decreases variation and maintains consistent quality of the process output. This leads to defect reduction and improvement in profits, product quality and customer satisfaction. Six Sigma uses a methodology known as DMAIC.
Time taken for each step-in patient transfer was recorded, analyzed and causes for delay at every step were identified using DMAIC.

2) RATIONALAE

Delay in transferring critically ill and stable patients to various clinical areas within the hospital.

Variation exists in the effective utilization of intensive care beds and ward beds resulting in

1) Delay in patients moving from emergency department to the ICUs and ICU s to wards.

2) Increased waiting time potentially may decrease the patient and patients' family satisfaction.

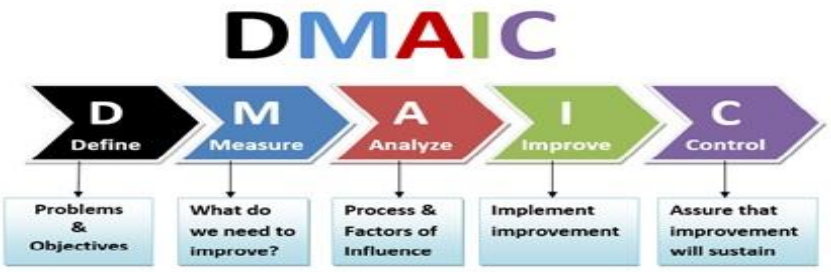
3) OBJECTIVES

- To study the existing patient bed transfer process from ICUs to ward.
- To suggest improvement solutions to decrease the delay in transfer of patients to wards, in turn making the ICU beds available to critically ill patients.

4) STAGES OF STUDY

DMAIC is methodology commonly used in Six Sigma. DMAIC is a tool for improving an existing process. It consists of following 5 steps -

- **D**efine the problem
- **M**easure current performance
- **A**nalyse performance
- **I**mprove performance
- **C**ontrol the improved performance



DEFINE PHASE

Statement of problem –

To reduce the time taken for intra-hospital patient transfer from ICU s to wards.

Project Schedule –

Table 1 – Project Plan

Phase	Start	End	Remarks
Define	4/4/2017	6/4/2017	completed
Measure	7/4/2017	3/5/2017	completed
Analyze	4/5/2017	25/5/2017	completed
Improve	-	-	-
Control	-	-	-

SIPOC –

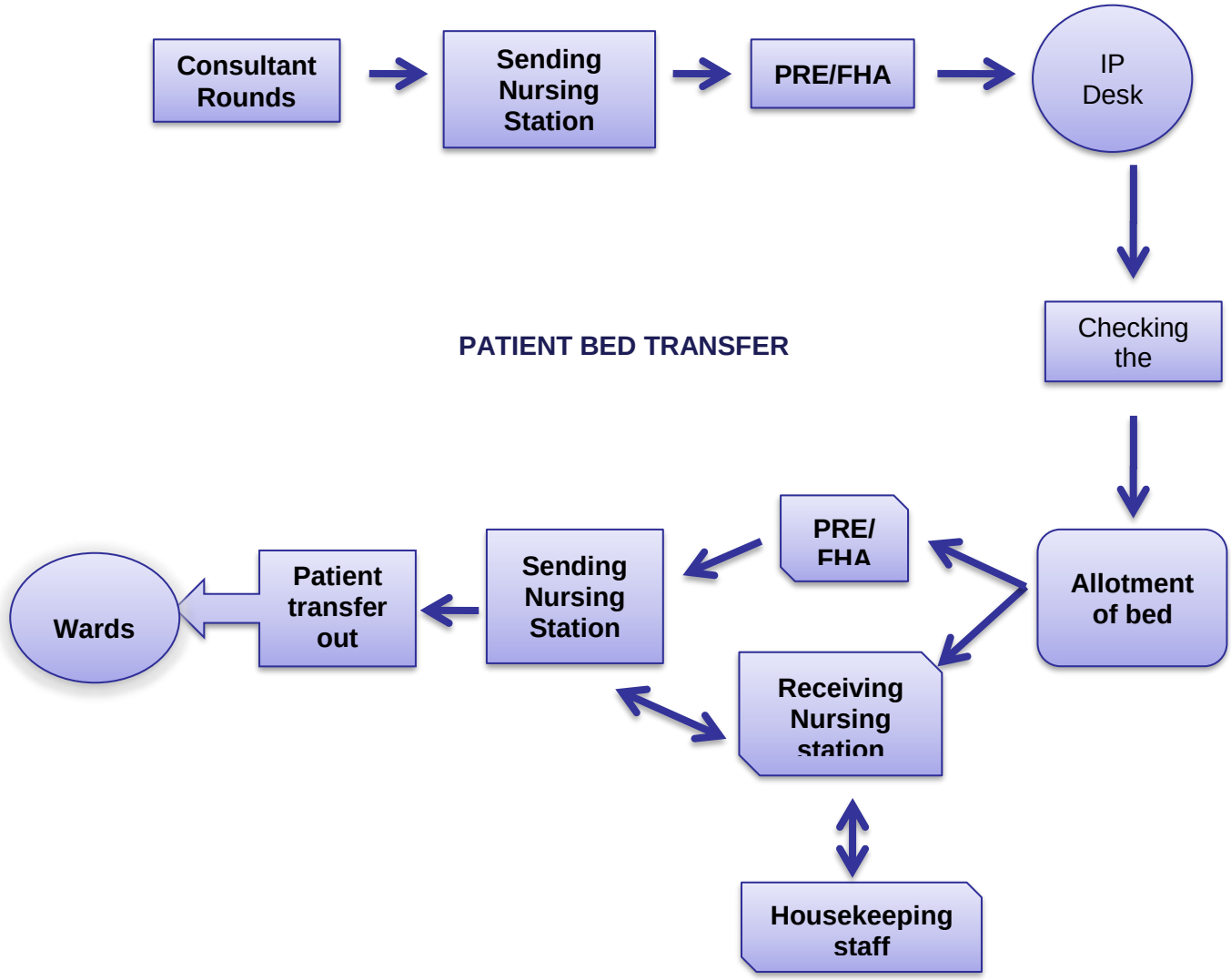
SIPOC Stand for supplier, input, process, output, customer. The following SIPOC diagram explains transfer process.

Table 2 – SIPOC for transfer process

SUPPLIERS	INPUTS	PROCESS	OUTPUTS	CUSTOMERS
Physicians	Patient clinical condition	- Identifies the patients to be transferred Requirements for transfer specified	- Transfer Order	Transferring NS Patients/attendants
Transferring NS	Transfer order	- Inform PRE/FHA - Patient preparation for transfer. - Checking indents - Return pharmacy etc.	- handing over patient to receiving NS	Patient PRE/FHA Receiving NS Housekeeping
PRE/FHA	Checking the case sheets for transfer out orders and collecting information from nursing	- Checking & conforming room eligibility. - Counseling of Patient/attendants -Bed request raised at IP Coordinating with floor admin	- Transferring the Patient	Transferring NS IP Desk

IP desk	Request for bed from PRE/FHA Bed occupancy status All NS & Discharge pool	IP checks the availability of bed through system and phone calls. - Informing receiving nursing station about shifting.	- Allotment of beds by IP.	Receiving & Transferring NS PRE/FHA
Receiving NS	IP Desk Transferring NS HK	Making necessary arrangements for bed allotment	Taking handover of the transfer patient.	Patients/attendants
Housekeeping	Transferring & Receiving NS	Transfer of Patient Bed making	- Transferring the Patient	Receiving NS PRE/FHA

Process map



VOICE OF CUSTOMER

"Voice of the customer" is a procedure used to capture the expectations, preferences and feedback from the customer (internal or external).

VOC is collected after identifying the external and internal customers. Patients and patients attendees are external customers while Physicians, nurses, Admin, FHA, PRE, housekeeping are internal customers. Based on the feedback the acceptable transfer out time from ICU s to wards or upper specification limit was set as 300 minutes and lower specification limit as 180 minutes.

Table 3- Voice of customer

Voice of customer	
External customer Long waiting time for transfer of patient.	Internal customers Delay in allotment of beds. Delay in vacating the allotted bed by previous patient. Delay in transfer of patient due to shift change of nurses.

MEASURE PHASE

The objective of measure phase

- ❑ To develop data collection plan
- ❑ To collect data
- ❑ To determine current performance (baseline performance).

Data Collection Plan

- **Study Area -** 2nd floor ICU s of CARE Hospitals, Banjara hills, Hyderabad which include three major ICU s (ICCU, MICU1, MICU2) having a total of 40 beds.
- **Measurement Method –** The time taken from doctor advice for transfer of patient from ICU s till transfer out of the patient to ward. It was recorded using the data collection sheet.
- **Measurement System Analysis** – The chances of repeatability error are avoided by using a standard data collection sheet.
- **Sampling Method** – Convienence sampling.
- **Sampling Timeframe** – Data was collected from 07/04/2017 to 03/05/2017.
- **Sample Size** –110 transfer outs

  Inclusions criteria - Transfer orders advised between 8AM – 8PM.

  Exclusions criteria - Transfer outs on Sundays, special needs (HD, Infusions, etc.).

Baseline Performance (Current Performance)

- Sample Size - 110
- Minimum – 40 minutes
- Maximum – 1015 minutes
- Mean - 579 minutes
- Standard Deviation – 260.648 minutes
- USL – 180 minutes (as per VOC)
- LSL - 300 minutes (as per VOC)

DPO and DPMO

Defect per opportunity (DPO) is the number of defects in a sample divided by the total number of defect opportunities.

Defect is anything outside the customers' satisfaction.

Opportunity is total number of possible defects.

No. of Units =110

Defects – no. of samples with transfer time above 300mins.

No. of defects – 90

Opportunities - 5

DPO = Total no. of defects / Total opportunities

= 90/5

= 18

DPMO is the defect per million opportunities.

DPMO = (Number of Defects X 1,000,000)/ (Number of Defects Opportunities/Unit) * Number of Units

= (90 X 1000000)/ (110 X 5)

= 163636.3636

Current Sigma Level and Process capability

Current sigma level was calculated using the yield to sigma conversion table. 163636.3636 defects per million opportunities is equivalent to a sigma performance of between 2.5-2.4.

Process capability = (USL-LSL) / (6*standard deviation)

= (300-180)/(6*261)

= 0.076

Cp less than 1 indicates the current process is not capable of meeting the customer demand and has many defects.

Data Collection Sheet has 5 major parameters –

1. Transfer order by Consultant
2. Information to PRE-about transfer order.
3. Information to IP
4. Allotment of bed by IP
5. Transfer out of the patient

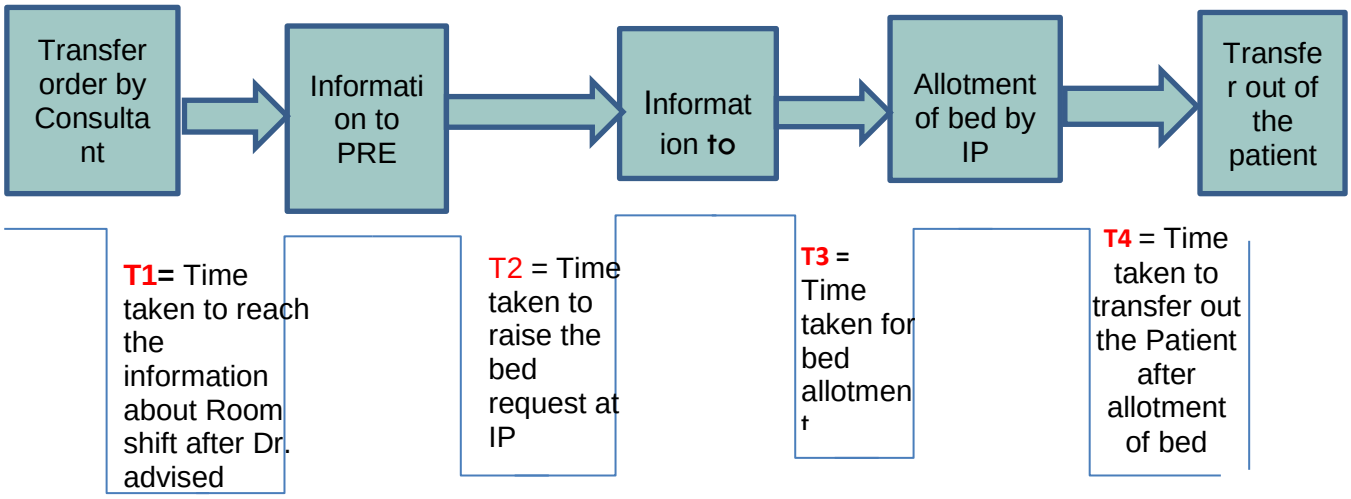


Table 4 -TURN AROUND TIME FOR INDIVIDUAL EVENTS (AREA WISE)

	ICCU	**MICU1**	**MICU2**	**ALL THREE AREAS**
PROCESS	**AVERAGE TAT**	**AVERAGE TAT**	**AVERAGE TAT**	**AVERAGE TAT**
T1= Time taken to reach the information about Room shift after Dr. advised	0:17	0:11	0:25	**0:17**
T2 = Time taken to raise the bed request at IP	0:34	0:32	0:44	**0:37**
T3 = Time taken for bed allotment	3:53	3:49	4:06	**3:57**
T4 = Time taken to transfer out the Patient after allotment of bed	3:41	4:59	5:41	**4:46**
T_T = Total time for the process i.e. T1+T2+T3+T4 TOTAL TAT	**8:25**	**9:31**	**10:56**	**9:37**

Graph 1 -Control chart of total turnaround time of patient transfer to wards

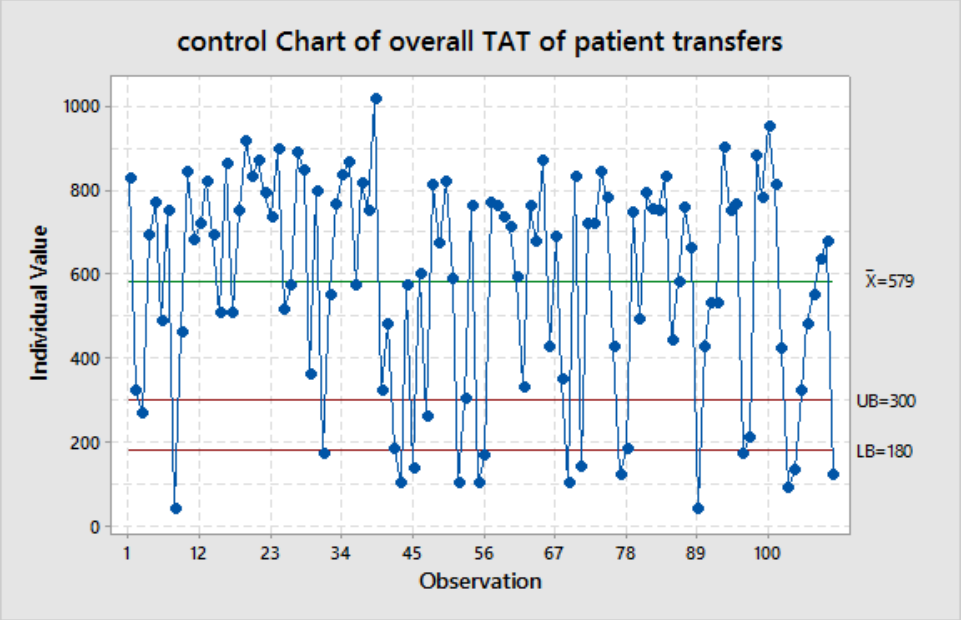
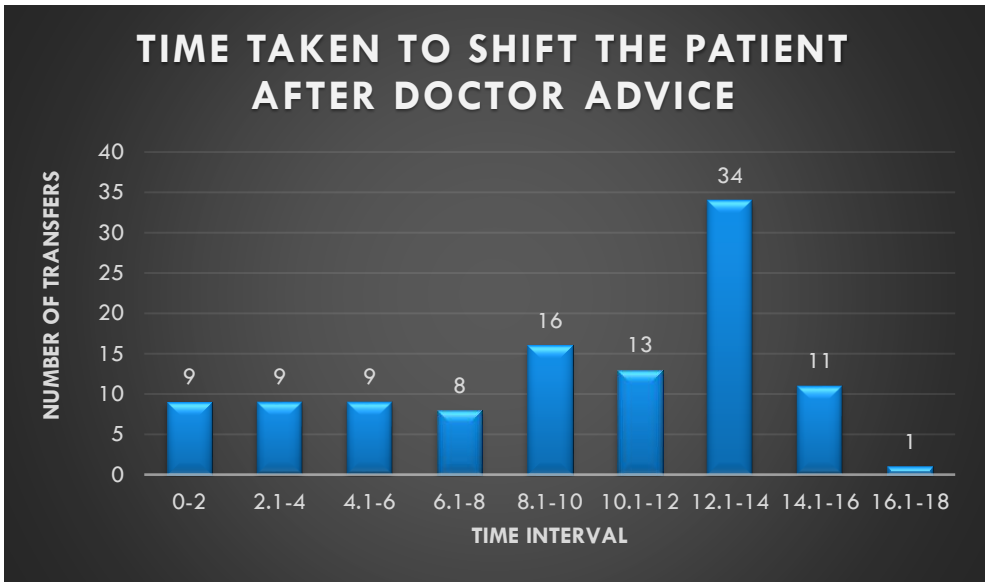


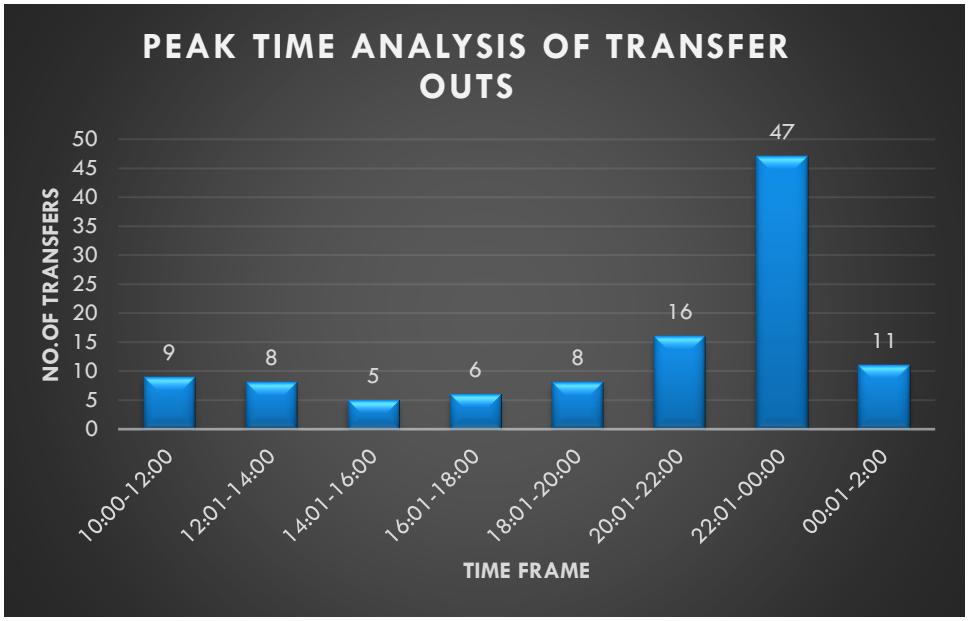
Table 5 – Average Time Taken for Transfer from ER to ICU s

AREA TO WHICH ER PATIENTS SHIFTED	AVERAGE TIME TAKEN TO TRANSFER IN HOURS
ICCU	10:39
MICU1	9:07
MICU2	6:10
ALL THREE AREAS	9

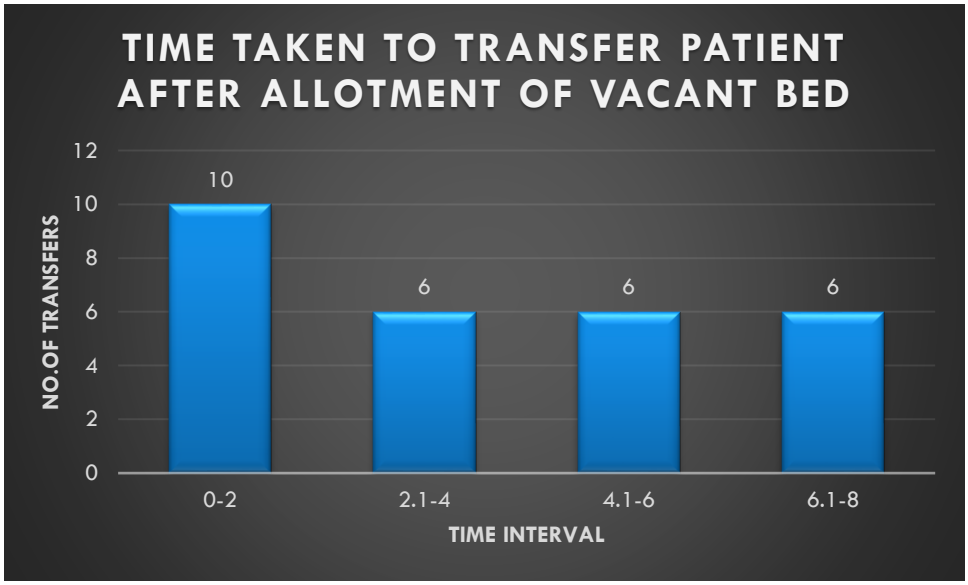
Graph 2- Transfer Out Against Time Frame



Graph 3 - Peak Time Analysis of Transfer Outs



Graph 4-Time Taken to Transfer Patient after Allotment of Vacant Bed

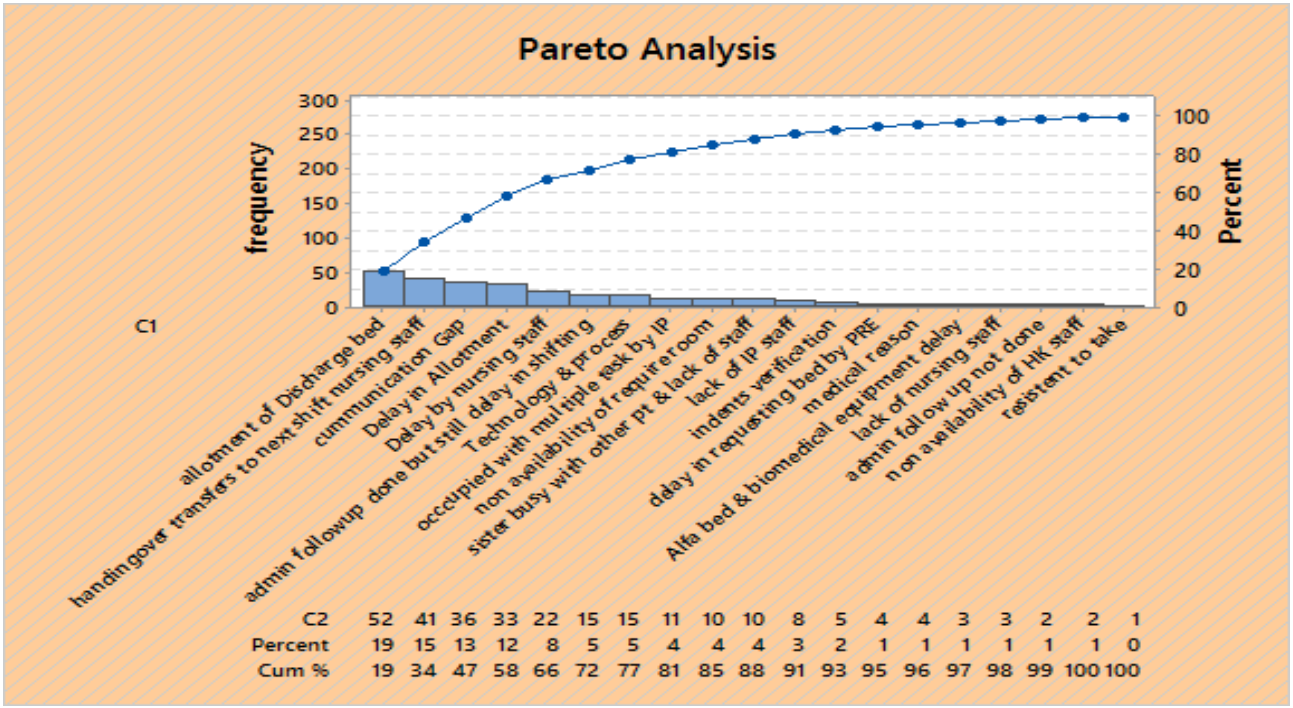


ANAYLYSIS PHASE

The objectives of analysis phase are:

- ❑ To analyse possible causes
- ❑ To shortlist major suspected causes
- ❑ To verify root causes

Graph 5 – Pareto Analysis



Interpretation –

The following causes contribute to 80% of delay in transfer of patients –

- Allotment of discharge beds.
- Handing over transfers to next shift nursing staff.
- Communication gap.
- Delay in allotment of beds.
- Delay by nursing staff
- Technology and process

Cause and Effect Diagram

Cause and effect diagram(or) fish bone diagram shows the possible causes of delay in patient bed transfers from ICU s to wards.

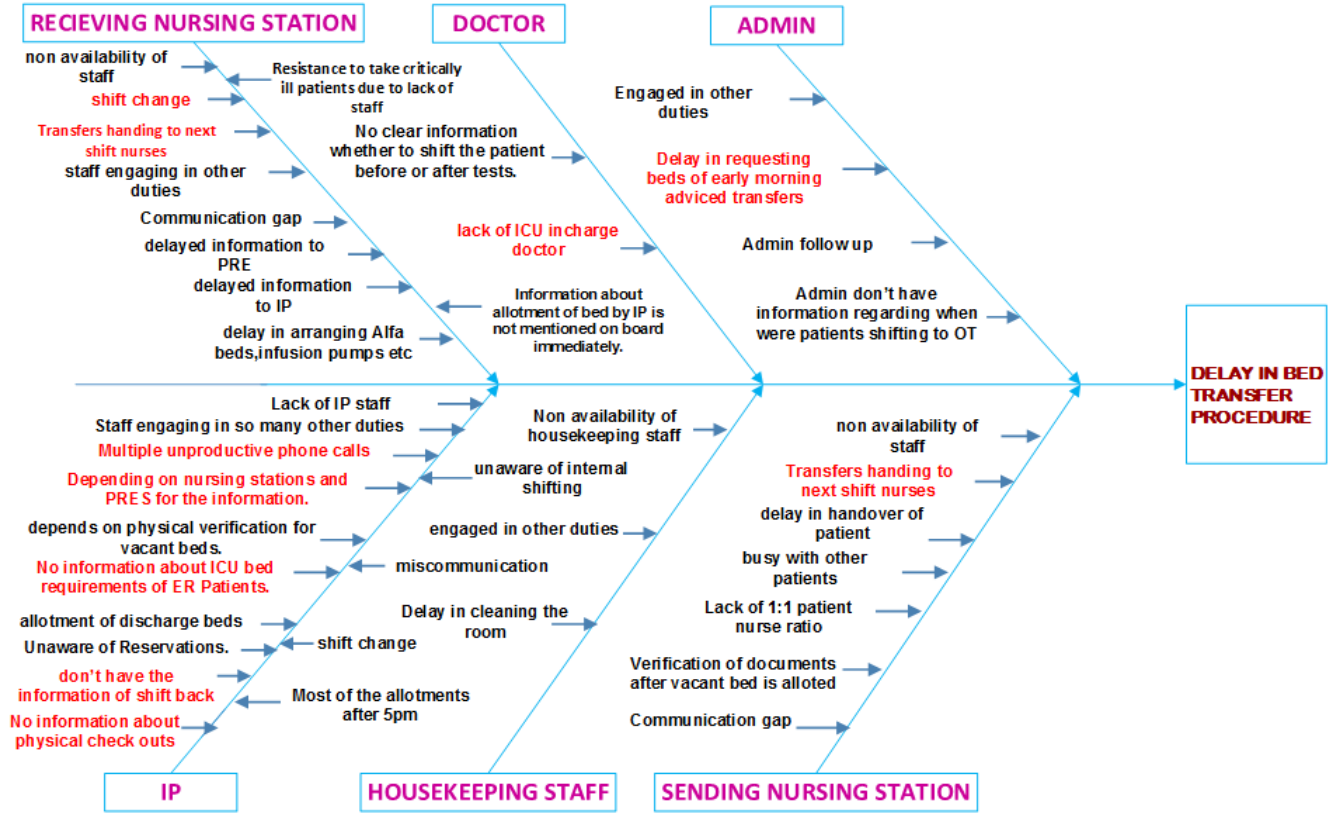


Figure 1 – Fish bone diagram showing reasons for delay due to people

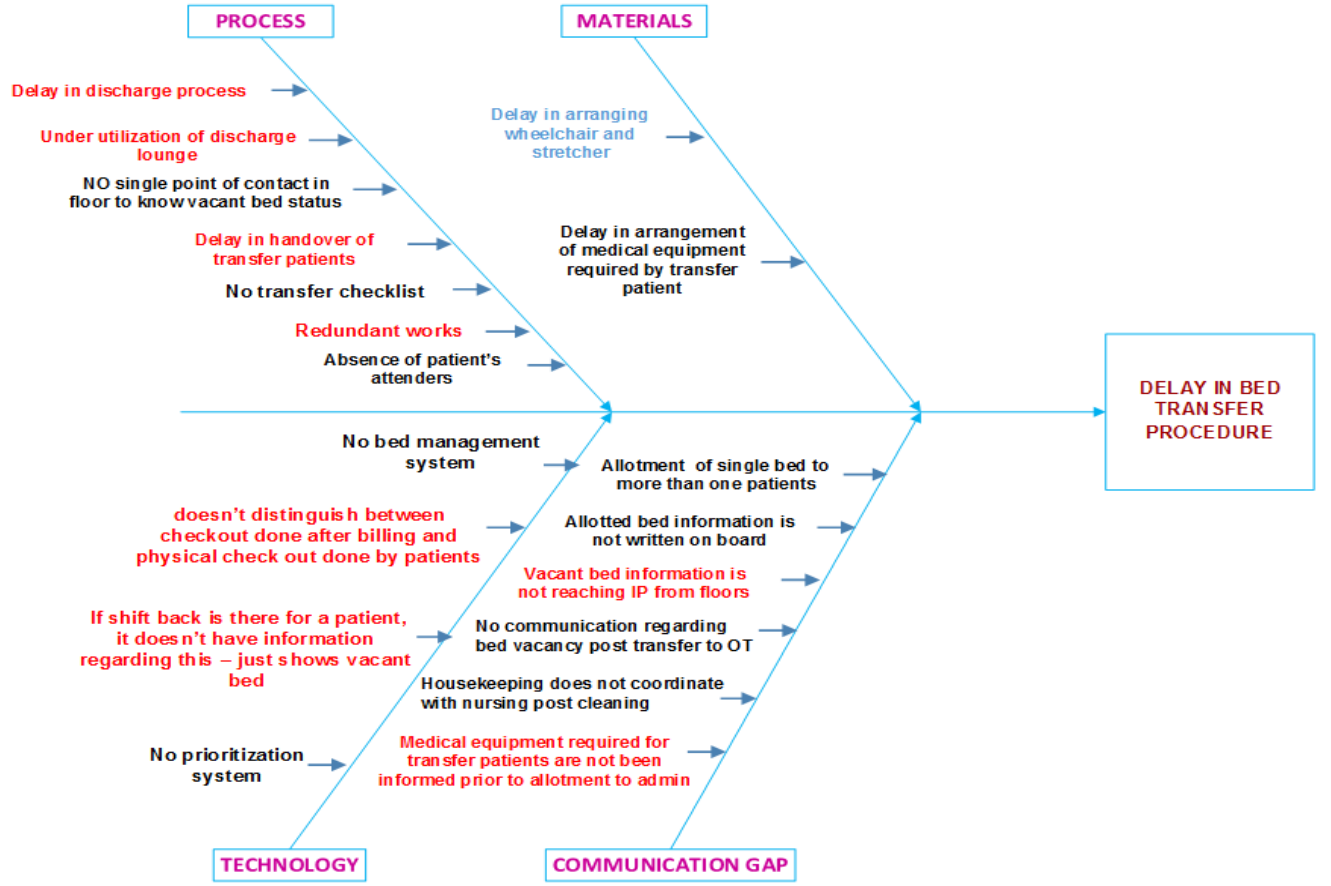


Figure 2 – Fish bone diagram showing reasons for delay

IMPROVE PHASE

The objective of the improve phase are:

- ❑ To identify possible improvement solutions
- ❑ To implement the improvement solutions for optimization of process

The implemented solution also needs to be measured to ensure there is an Improvement. The results of the implementation should be become quite clear on control chart. The result of improved performance, influence the Management to accept and implement the recommendations.

The study revealed that the present patient bed transfer process is taking too long leading to patient dissatisfaction and blockage of beds for long duration causing loss of revenue to the hospital. The results of current process along with recommendations for improvement were presented and discussed with the management, consultants, and nursing in charges.

Improvement solutions

- ➢ Bed management System
- ➢ Appropriate bed allocation.
- ➢ Preparation of transfer check list.
- ➢ Speed up discharge process.
- ➢ Effective utilization of discharge lounge.
- ➢ The BiPAP/CPAP/Defibrillator /infusion pumps Arrangements should be under one control.

- Room eligibility information should gather within 24hrs of admission by concern Admin
- Early morning advised transfers should also reach the IP immediately.
- Physical verification of vacant beds by IP desk strictly
- ER/Cath lab/floor should request beds through IP simultaneously
- Preparation of patient for transfer should start immediately after advice to transfer.
- Patient handover time can be decreased by having a document which briefly explains the entire procedures patient underwent and medications etc.
- Housekeeping -Immediate cleaning of vacant beds and flag on notice board

To achieve the satisfactory outcomes and reducing the defect level, management needs to implement and standardize the improvement plan. Constant tracking of the data and documentation should be done.

Control Phase

This is the most important phase of DMAIC and plays a crucial role to attain long term success of the implementations made. Objective of Control phase is to document and standardize improvement.

CONCLUSION

Patient bed transfer process from ICU s to wards is an important aspect in patient care. Delay in patient transfer from ICU s to wards not only lead to decreased patient and patient family satisfaction but also have adverse clinical outcomes in case of critically ill patients who need ICU s bed.

The study shows that the current average time taken for the transfer of patients from ICU s to ward is 9hours39mins and from ER to ICU s is 9 hours which is too long.

Implementation and control of the suggested improvement solution derived from DMAIC methodology would reduce the defect level and time taken for the patient bed transfer to satisfactory level.

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6) ANNEXURE

Data collection sheet

S.NO	Date	Area	IP.NO	Patient Name	Payment Mode	Eligibility	Transfer time adviced by doctor	Information at IP	Allotment Time by IP	Transfer Time	Room no/type	Remarks