

**Summer Training at
Asian Institute of Medical Sciences, Faridabad
(April 3 to June 2, 2017)**

- **Green OT**
- **HIRA (Hazard Identification and Risk Assessment in OT)**

**By
Himanshi Batheja**

**Under the guidance of
Dr. Sandesh Kumar**

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

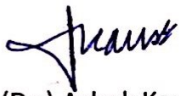

**Institute of Health Management Research
The IIHMR University, Jaipur
2017**

This is to certify that ~~Mr./Ms.~~ HIMANSHI BATHETA has undergone summer training in (Organization name ASIAN HOSPITAL) from 3rd April to 2nd June 2017.

FARIDABAD

The candidate herself/himself completed the project assign to his/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 him/her success in all her future endeavors.



Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affair)

The IIHMR University, Jaipur The IIHMR University



Name of the Mentor : Dr. Sandesh

Designation : Associate Prof

Certificate of Internship Completion

Date: 2nd June'17

TO WHOM IT MAY CONCERN

This is to certify that Dr. Himanshi Batheja – pursuing MBA in Hospital & Health Management from IIHMR University, Jaipur has successfully completed her internship at Asian Institute of Medical Sciences, Faridabad in the Department of Quality & Operations - from April 1st, 2017 to June 2nd, 2017. She has successfully completed projects on:

- **Green Operation Theatre Certification Audit**
- **Hazard Identification and Risk Analysis (HIRA) in Operation Theatre.**

Apart from projects, she actively contributed in following areas:

- Internal Audit Closures
- Quality Indicator Validation Exercise

During the period of her internship programme, she was found punctual, hardworking and inquisitive.

We wish her good luck for all her future assignments.



Dr. Ankur Kathuria

Sr. Manager – Quality & Operations

Asian Institute of Medical Sciences

Acknowledgement

I am extremely thankful to ASIAN INSTITUTE OF MEDICAL SCIENCES for giving me the opportunity for becoming part of the organization and completing my internship.

This study would not have been possible without the cooperation of and generous help from a number of people. While it may not be possible for me to express my gratitude to all of them individually, I wish to place on my record my appreciation to them for all the help they extended to me during the project.

I would like to express my gratitude to the Senior Management of Asian Institute of Medical Sciences, Faridabad– Dr. Ramesh Chandna (Director– Quality, Lab, Blood bank), for allowing me to this project.

I am very thankful to Dr. Ankur Kathuria, Sr. Manager Quality & Operations, Dr. Shashi Tiwari, Assistant manager Quality & operations Dr. Divesh Arora, HOD Anesthesia & OT, Miss Julie, Nursing in- charge OT, Mr. Sanjeev, OT Technician head who guided me in the whole process.

I would like to thank the whole team of Quality & Operations and all other employees of AIMS who helped me in my project.

I would also like to thank my mentor Dr Sandesh Sharma, The IIHMR University who guided me in my entire internship.

Dr. Himanshi Batheja

S.no	Chapters
1.	Introduction
2.	Method and data collection
3.	Hospital profile
4.	Organizational structure
5.	Front office
6.	Flow of Admission & Discharge of Cash Patient
7.	Flow of Admission & Discharge of TPA Patient
8.	Operation theatre
9.	Department of Critical Care
10.	Cath Lab
11.	CTVS
12.	Emergency Complex
13.	CSSD
14.	Blood Bank
15.	Lab Services
16.	Imaging & Radiology
17.	Human Resources
18.	Purchase
19.	Stores

20.	IPD Pharmacy
21.	Finance & Accounts
22.	Marketing Department
23.	IT Department
24.	Medical Records Department
25.	Clinical Nutrition & Dietetics Department
26.	Security
27.	House Keeping
28.	Laundry
29.	Maintenance & Engineering
30.	Special Study I: Green OT
31.	Special Study II: HIRA (Hazard identification and risk assessment in OT)

ABBREVIATIONS

AHU	-	Air Handling Units
ALOS	-	Average Length of Stay
CCTV	-	Closed Circuit Television
CCU	-	Critical Cardiac Care
CMD	-	Chief Medical Director
CMO	-	Causality Medical Officer
CSO	-	Chief Security Officer
CSSD	-	Central Sterile and Supply Department
CTVS	-	Cardio Thoracic Vascular Surgery
DG	-	Diesel Generator
DOR	-	Discharge on Request
ECG	-	Electro Cardiogram
ENT	-	Ear Nose Throat
ETO	-	Ethylene Oxide
FDA	-	Food & Drug Administration
FOC	-	Free of Cost
GDA	-	General Duty Assistants
HAZMAT	-	Hazardous Material
HIS	-	Hospital Information System
HOD	-	Head of Department
HRD	-	Human Resource Development
HVAC	-	Heating, Ventilation & A/C

ICD	-	International Classification of Diseases
ICU	-	Intensive Care Unit
IGRT	-	Image Guided Radiotherapy
IMRT	-	Intensity Modified Radiotherapy
IPD	-	In Patient department
IT	-	Information Technology
LAMA	-	Leave Against Medical Discharge
MLC	-	Medico Legal case
MRD	-	Medical Records department
MTP	-	Medical Termination of Pregnancy
NICU	-	Neonatal Intensive Care unit
OPD	-	Out Patient Department
OT	-	Operation Theatre
PET/CT	-	Positron Emission Tomography/ Computerized Tomography
PICU	-	Pediatric Intensive Care Unit
PNDT	-	Pre-Natal Determination Test
RMO	-	Resident Medical Officer
TPA	-	Third Party Administrator

INTRODUCTION

As an integral part of the **MBA course**, the summer training helps us in understanding the overall functioning of the hospitals from a managerial point of view. Keeping this factor in view, I tried to visit different hospital departments of **ASIAN INSTITUTE OF MEDICAL SCIENCES (AIMS)** with a special focus on understanding the various procedures in place. I visited different departments, met the department In-charge and interacted with the doctors, nurses and other staff.

The **Aim** of the summer training was:

“To study the administrative and managerial functioning of ASIAN INSTITUTE OF MEDICAL SCIENCES (AIMS)” with special reference to the different areas / departments of the Hospital.

The **Objectives** of summer training were:

- To learn the daily operational management of the Organization and its various departments / areas.
- To study the salient and critical features about the functioning of these departments / areas.
- To identify issues / problems associated with some specific departments / areas.
- To undertake the projects / special tasks assigned to us.

HOSPITAL PROFILE



Asian Institute of Medical Sciences is the vision and dream of renowned surgeon, **Dr. N.K. Pandey**, FRCS (Edinburgh), FRCS (Glasgow) FACS, FICS, a 2008 Dr. B.C. Roy National Awardee.

The institute is centrally located in Sector 21-A, Faridabad in the National Capital Region (NCR) and conveniently accessible from Delhi, NCR and other parts of Northern India.

Asian Institute of Medical Sciences (AIMS) is a 400-bedded super specialty tertiary care hospital, truly futuristic in its services and technology and brings together some of the most talented medical professionals. The institute provides preventive, diagnostic, therapeutic, rehabilitative, palliative and support services under one roof and is designed to meet patient care and research requirements of the new millennium.

The facility is planned with international quality specifications and equipped with state of the art equipment in all specialties. The institute with 10 operation theatres, 80 critical care beds, high-end diagnostics, therapeutic and preventive health facilities, is set to become a preferred destination for quality healthcare services.

All this makes AIMS not just another hospital, but a complete solution in the philosophy of healthcare.

SPECIALTIES OFFERED

Oncology, Cardiac Diseases, Renal Diseases, Neonatal, Pediatric /Medical & Cardiac Intensive care, Orthopedics, General Surgery, Nephrology, Endocrinology, Gastroenterology, General Medicine, Gynecology, Pediatrics, Laboratory Medicine, Neurology, Ophthalmology, Radiology, Pulmonology, Urology, Aesthetic & Cosmetic Surgery, Dermatology, Pulmonary Medicine, ENT, Physiotherapy, Critical care, Dental, Alternative Medicine.

ASIAN CENTRE OF EXCELLENCE

- Asian Cancer Centre
- Asian Heart Centre
- Asian Centre For Advanced Surgery
- Asian Centre For Mother and Child
- Asian Centre For Neurology & Neurosurgery
- Asian Centre For Renal Diseases
- Asian Centre For Bone & Joints
- Asian Centre For Imaging & Advanced Imaging

VISION

“To be the most trusted healthcare partner for people through our unsurpassed quality & care and by striving to provide **accessible, affordable** and best **available** healthcare services in India”.

MISSION

- To give world class patient care.
- To revolutionize our healthcare services by genuinely caring.
- To be an active participant in the local community and provide the very best medical expertise for general welfare & wellbeing.
- To make specialized medical care available to every individual.

MOTO

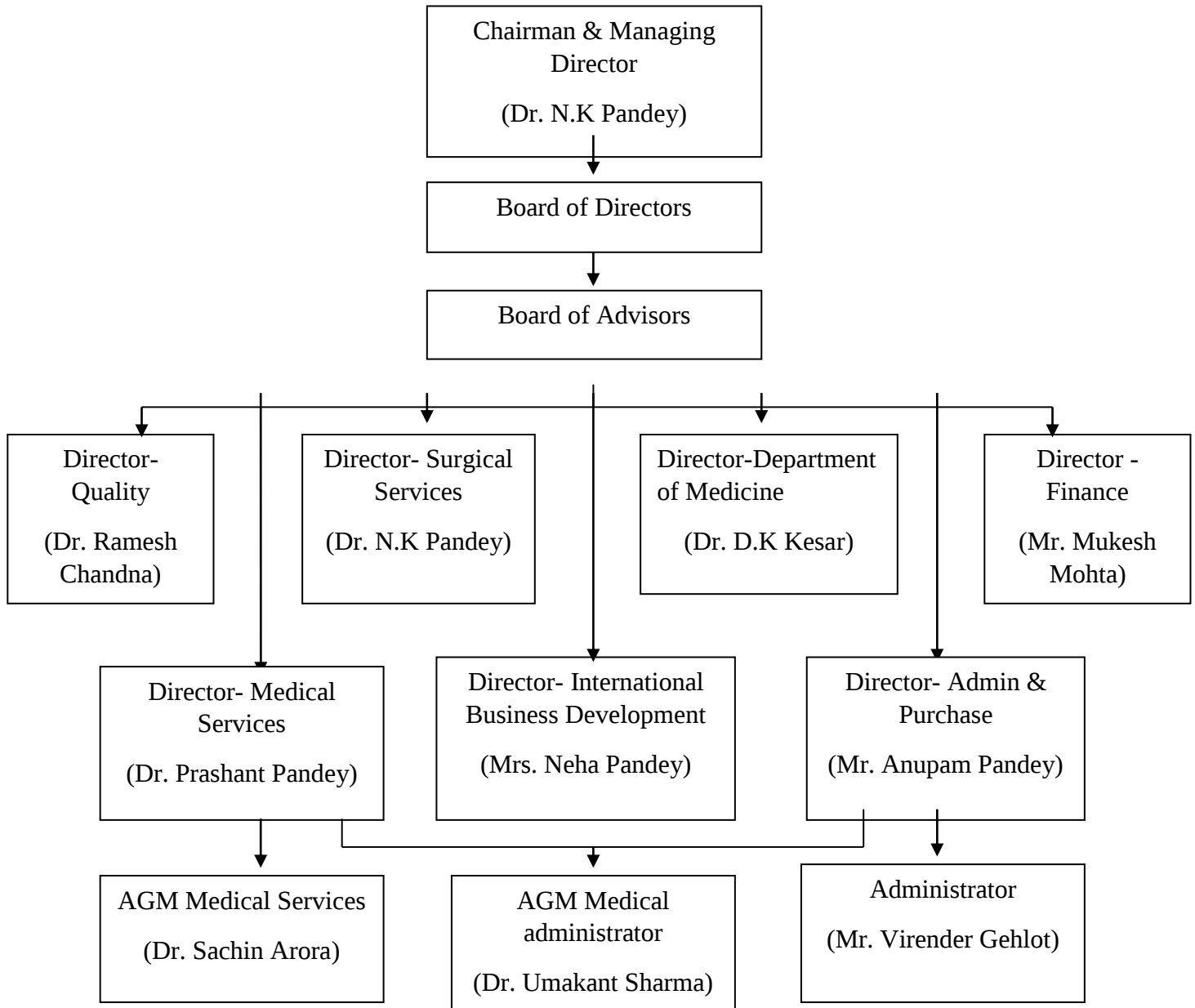
Will to Serve...

.... Skill to Cure

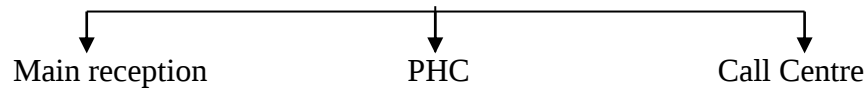
Punch Line

Caring for what matters most

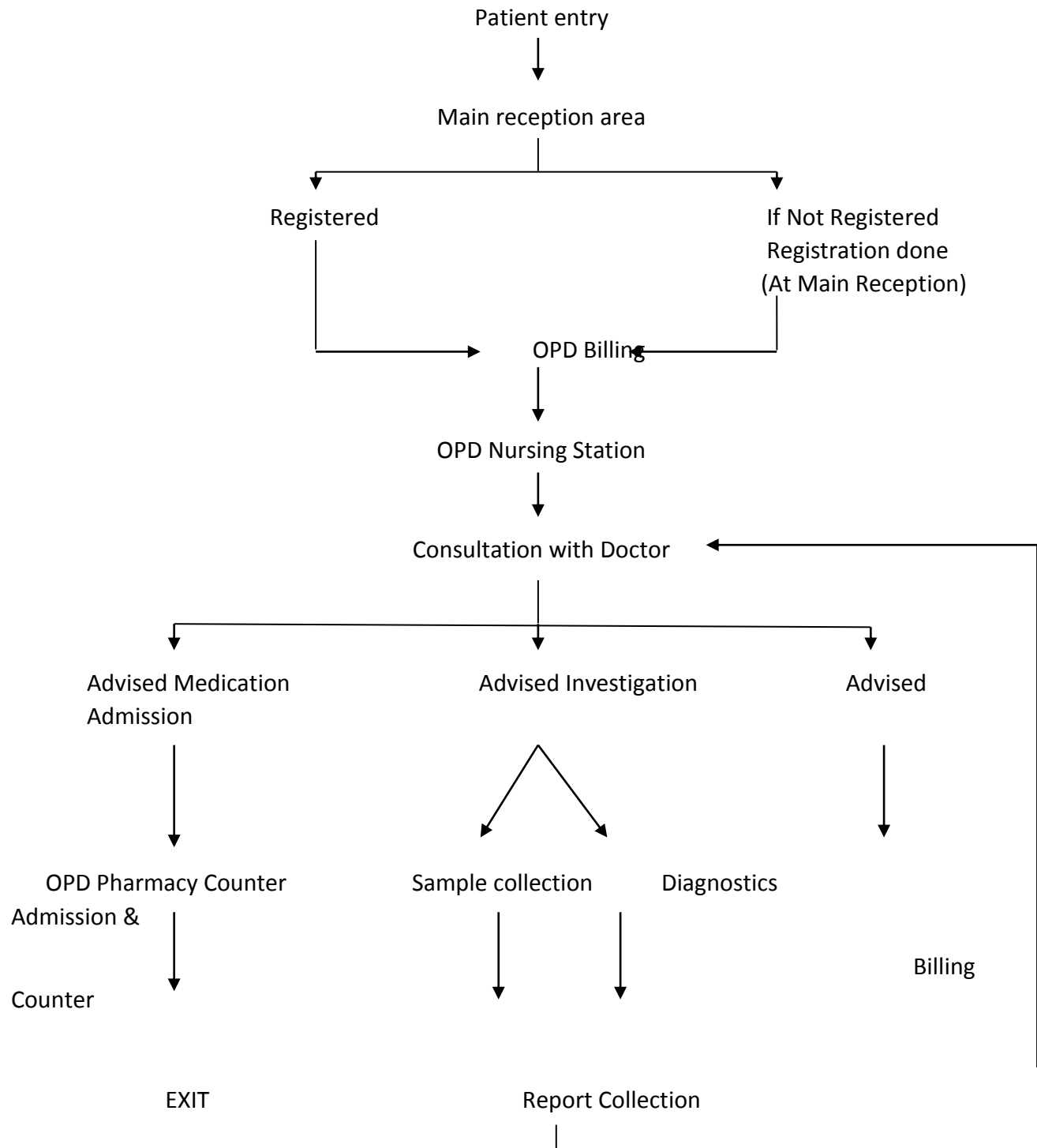
ORGANISATIONAL STRUCTURE



FRONT OFFICE



I) MAIN RECEPTION



Infrastructure:

Wheelchair : 4

Stretcher : 1

No. of OPD Billing Counters: 7

No. of Admission Billing Counters: 2

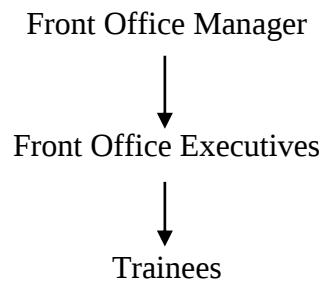
Sample Collection Room: 1

International Patient's Reception: 1

Staff:

- 1 Front Office Manager
- 4 Front Office Executives
- 1 Healthcare Executive
- 9 Trainees

Hierarchy:



Records Maintained:

- ✓ Current Inpatient reports.
- ✓ Appointment details.
- ✓ Daily patient's registration details.
- ✓ Doctors attendance details.

Responsibilities of Front Office Manager:

- Responsible for overall supervision of the front office staff.
- Formulation of department goals, policies, procedures and their implementation.
- Coordinates operations, assigns responsibilities and supports the staff in peak hrs.
- Coordinates events in hospitals like CME, VIP visits.
- Inventory control and budget forecasting w.r.t front office.
- Training of newly appointed front office executives and other staff under him/her.

Roles & Functions of Front Office Staff:

- Attending the patient, visitors & staff.
- Handling their queries.
- Patient coordination.
- Provide them necessary information according to the policy.
- Helping patients fill up their registration form.
- Making appointment with the doctors.
- Taking of the feedback in the feedback forms.

Roles & Function of Call Centre Executives:

- Receive and answer the various calls from outside and within the hospital
- Answering queries regarding the OPD appointments and charges, various tests availability and charges
- Connecting to various employees within the hospital by Star-Dialing.

OPD RECEPTION

OPD's are distributed amongst Ground, First & Second floor of the hospitals.

<u>Basement (-1) OPD</u>	<u>Ground Floor OPD's</u>	<u>First Floor OPD's</u>	<u>Second Floor OPD'S</u>
- Oncology	- Urology - Orthopedics - Neurology - Neurosciences - Surgery - Internal Medicine - Ophthalmology - ENT - Dietetics - Alternate Medicine - Psychiatry - Physiotherapy	- Cardiology - Gastroenterology - Dermatology - Respiratory Medicine - Dental - Psychology - Nephrology - Cardiac Surgery	- Gynecology - Pediatric

No. of OPD Counters: 7

- One for Orthopedics & Neurosciences
- One for E.N.T & Urology
- One for Eye & Surgery
- One for Cardiac Surgery, Nephrology, Respiratory Medicine, Gastroenterology & Dermatology
- One for Dental & Cardiology
- One for Gynecology & Pediatrics
- One for Oncology.

Total Manpower for OPD Counter: 15

Records Maintained:

- Patient's OPD Registration records.
- Daily visitor's report.

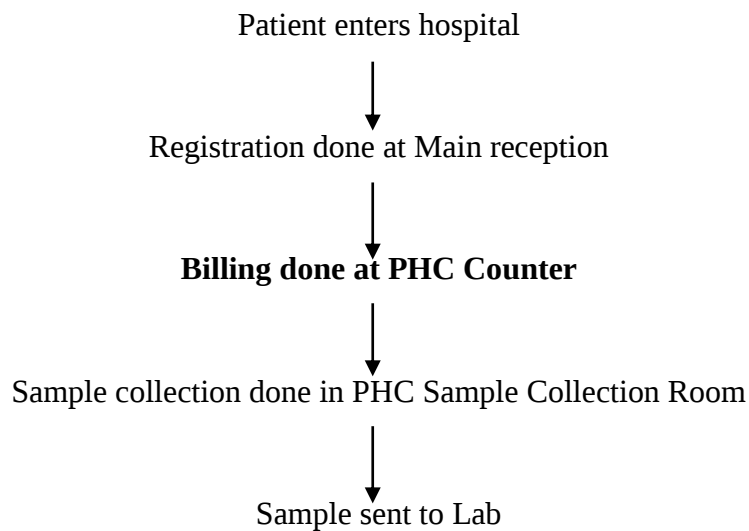
PHC

(PREVENTIVE HEALTH CHECKUP)

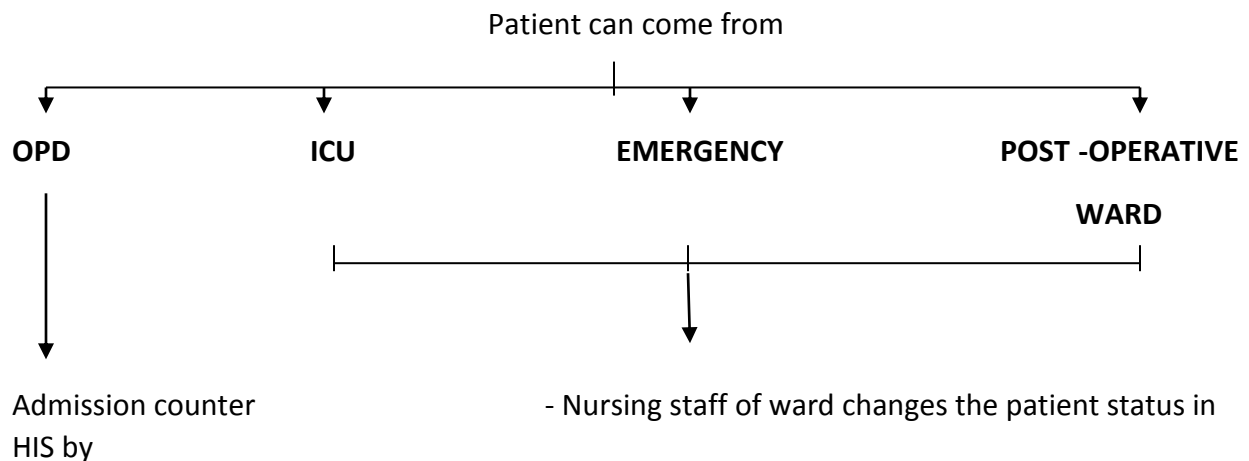
Layout: 1st Floor

Staff: 4

WORKFLOW:

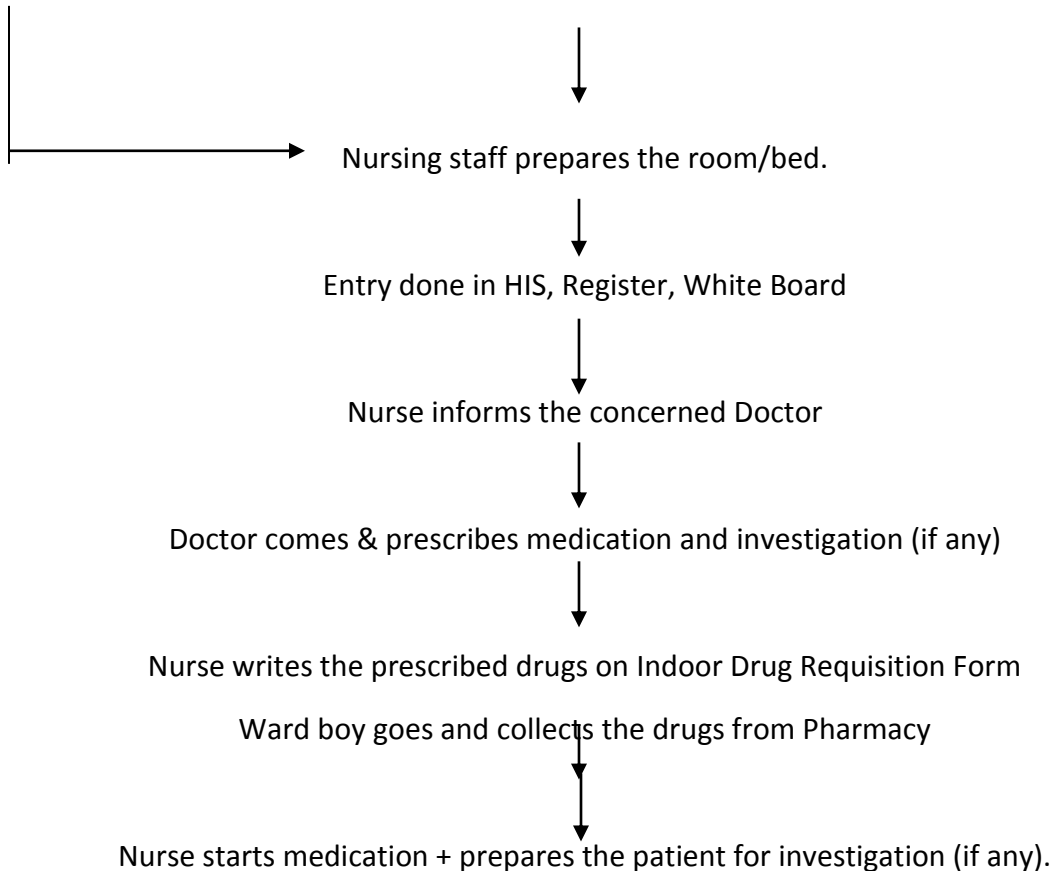


FLOWCHART FOR ADMISSION OF A CASH/NON TPA PATIENT

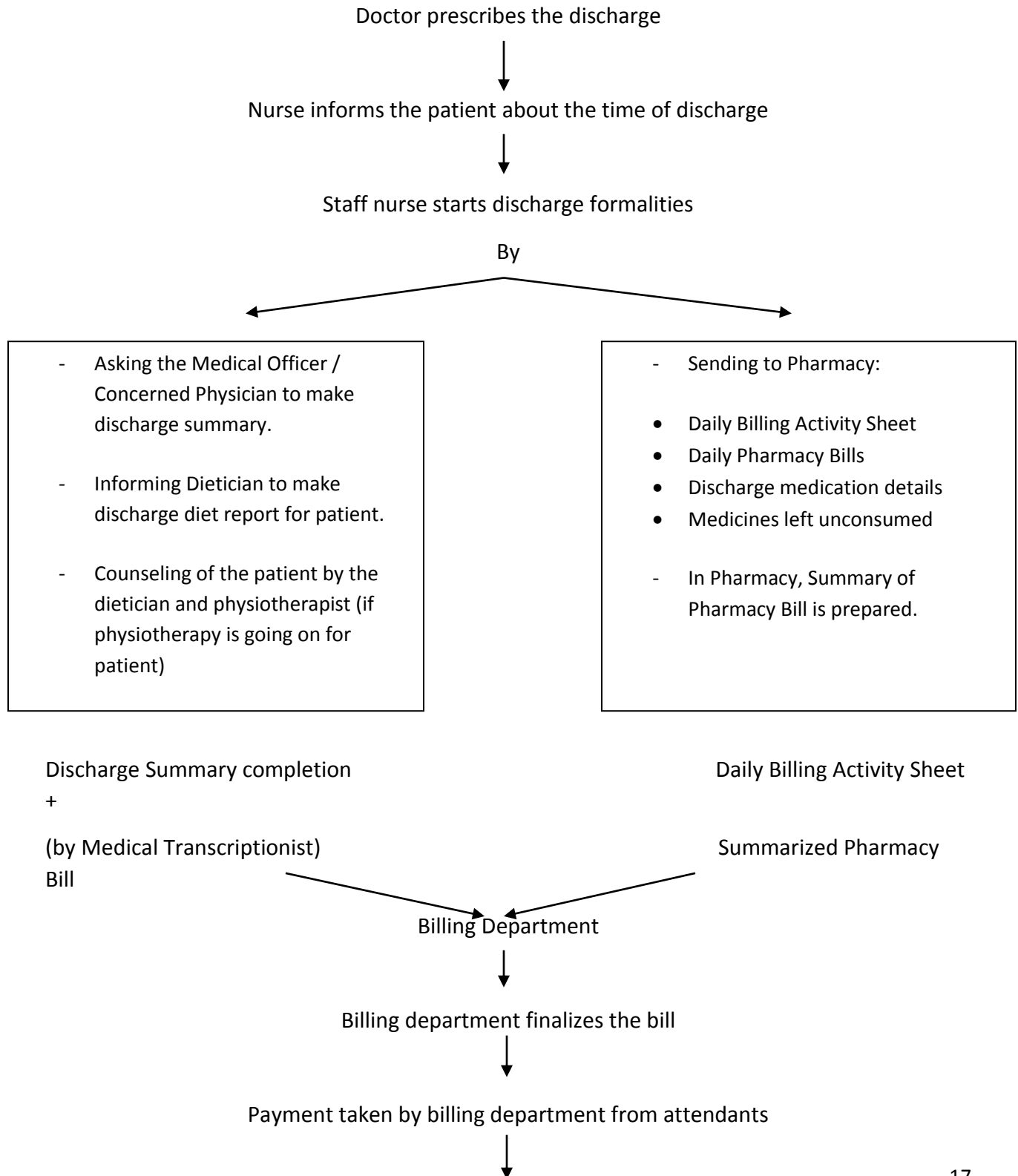


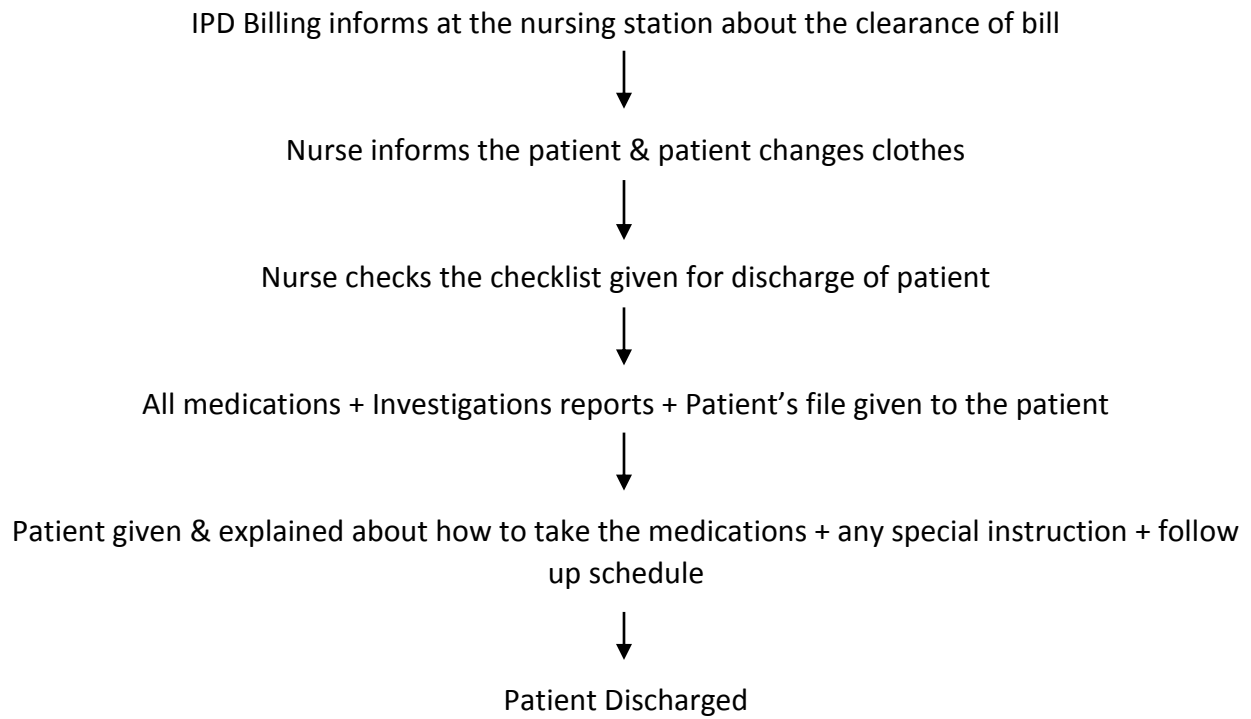
Assistant gives a call
to nursing station to
where
confirm for bed
their
availability.

doing "**CHECK-IN**" of the patient received.
- ICU/ EMERGENCY/ POST-OPERATIVE WARDS (from
the patient is coming) changes the patient status in
HIS by doing "**CHECK-OUT**" of the patient.



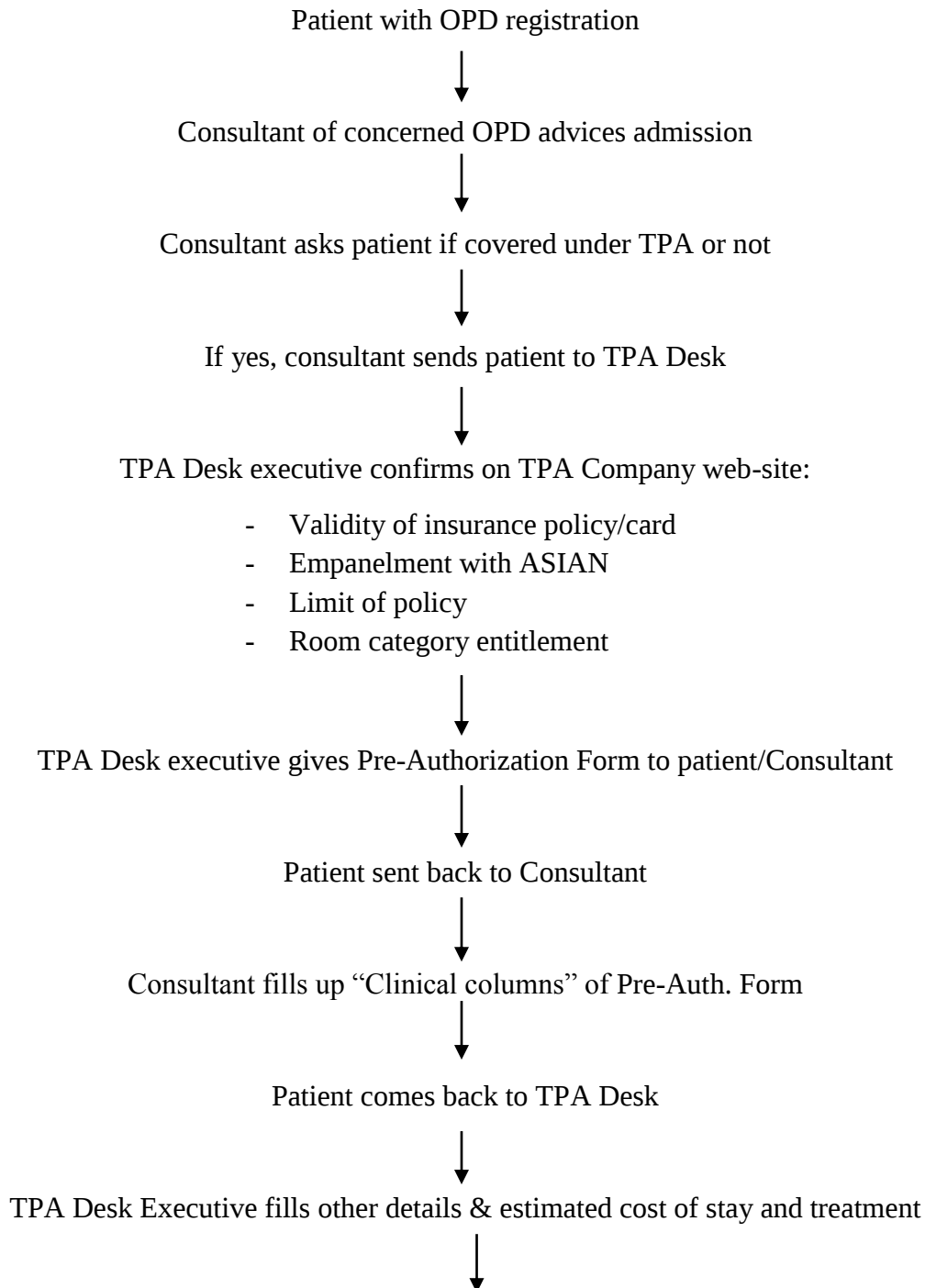
DISCHARGE PROCESS FOR NON-TPA PATIENT

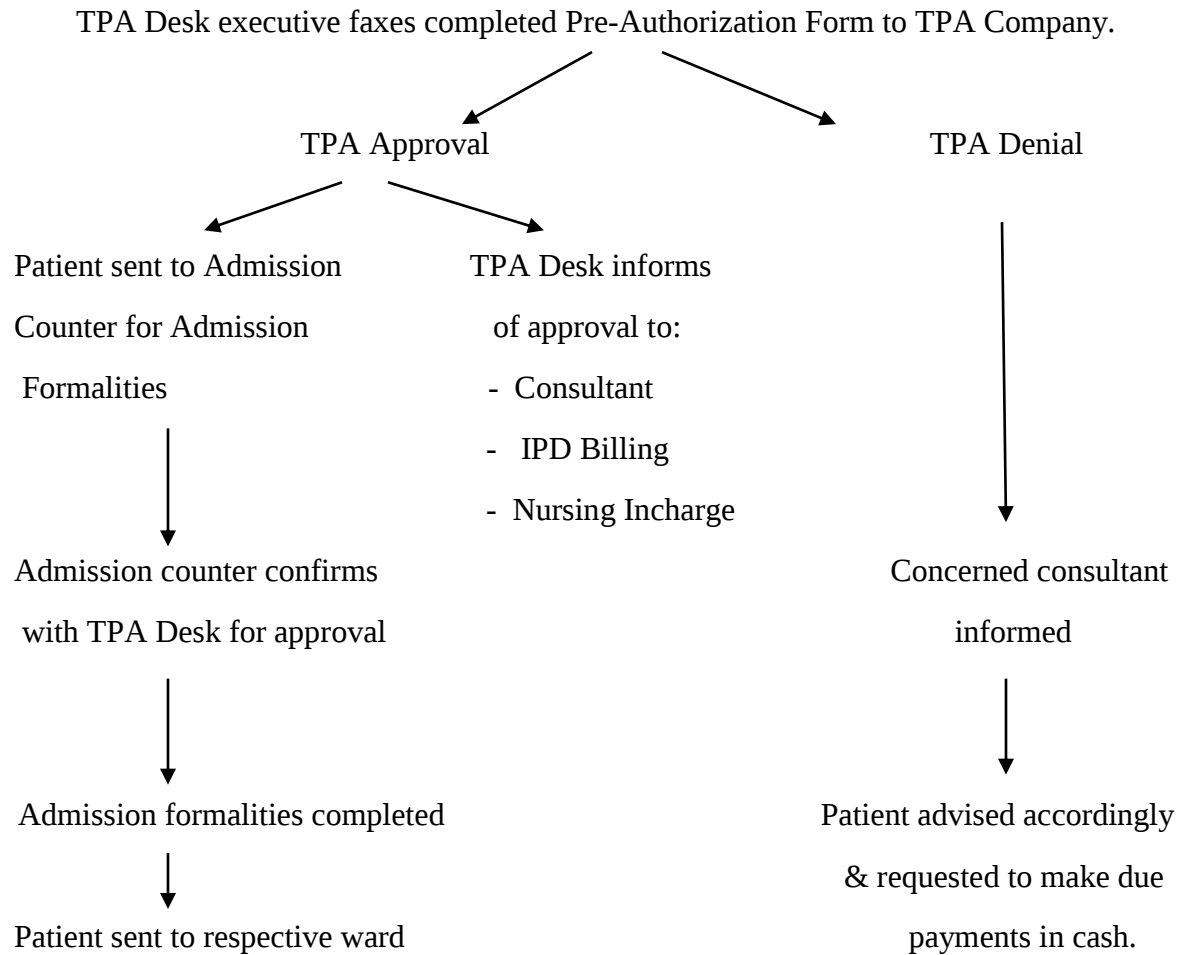




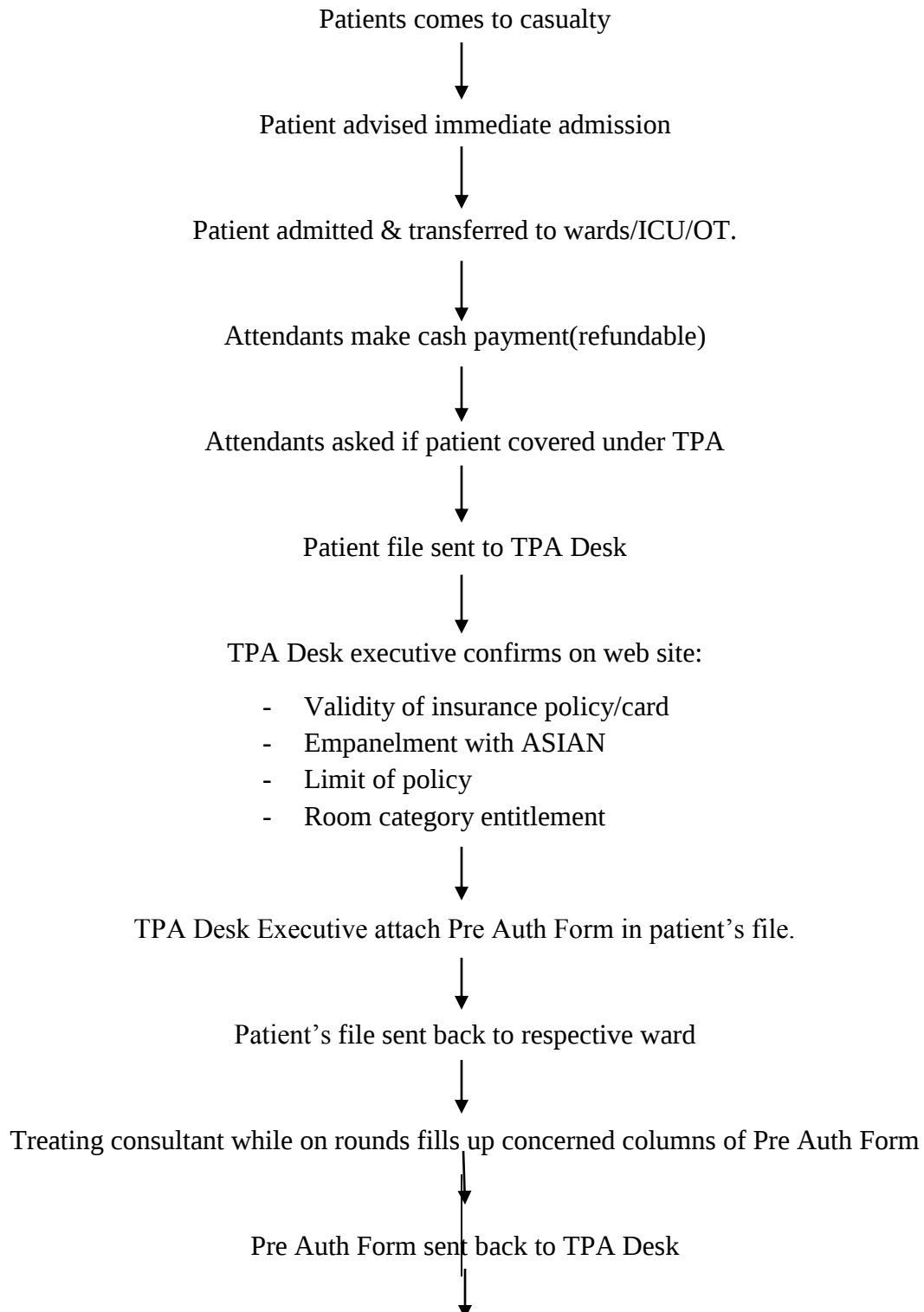
FLOW OF A TPA PATIENT

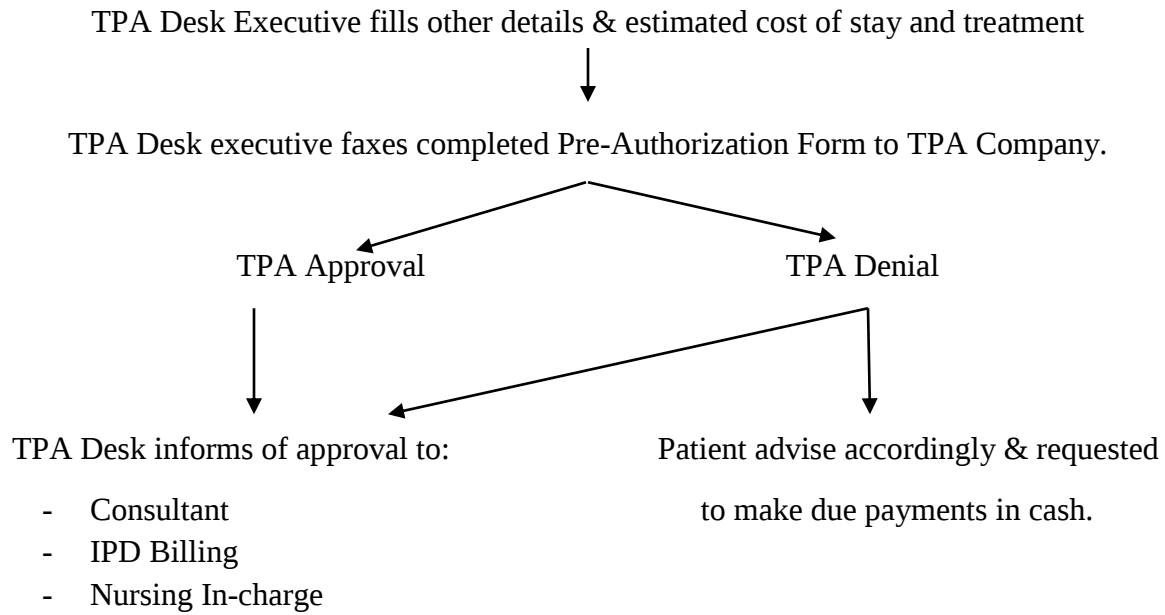
I) PRE-PLAN ADMISSION



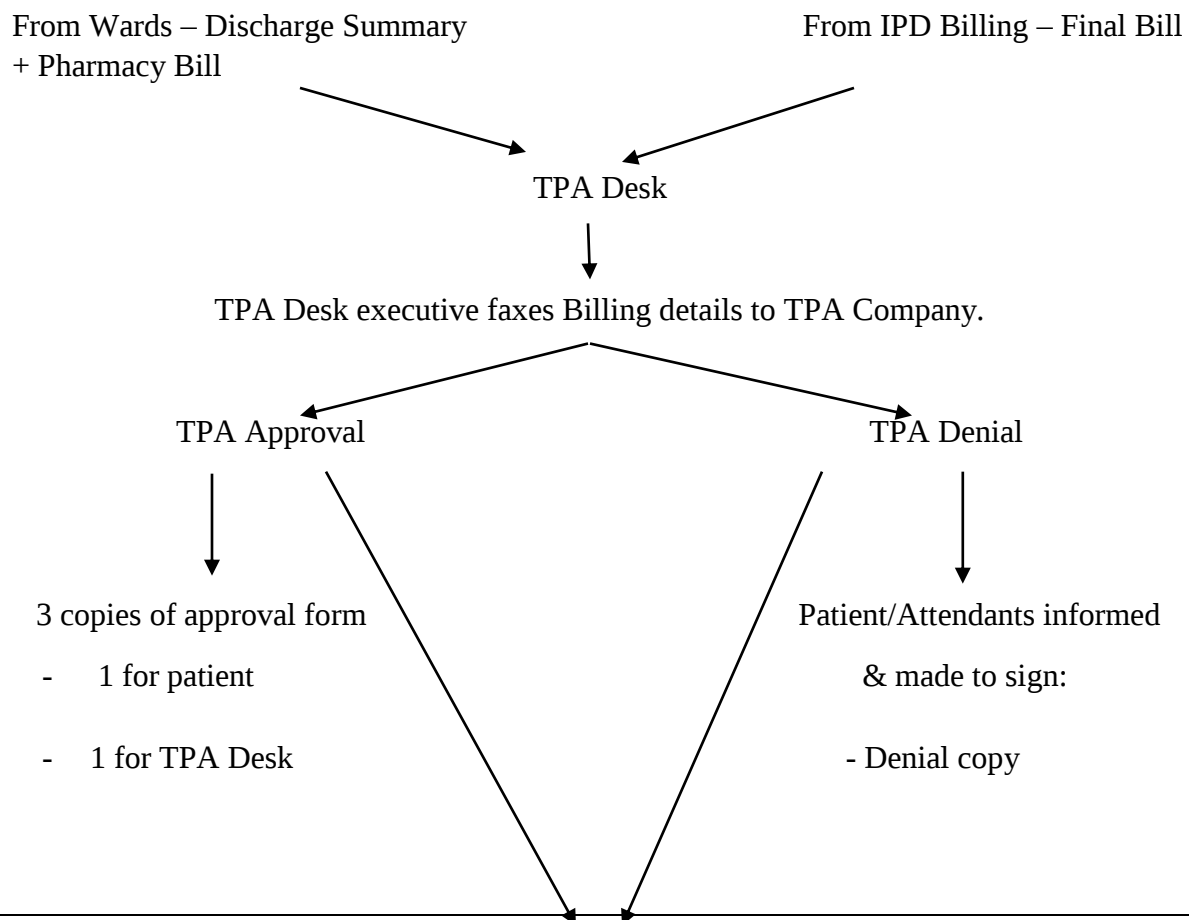


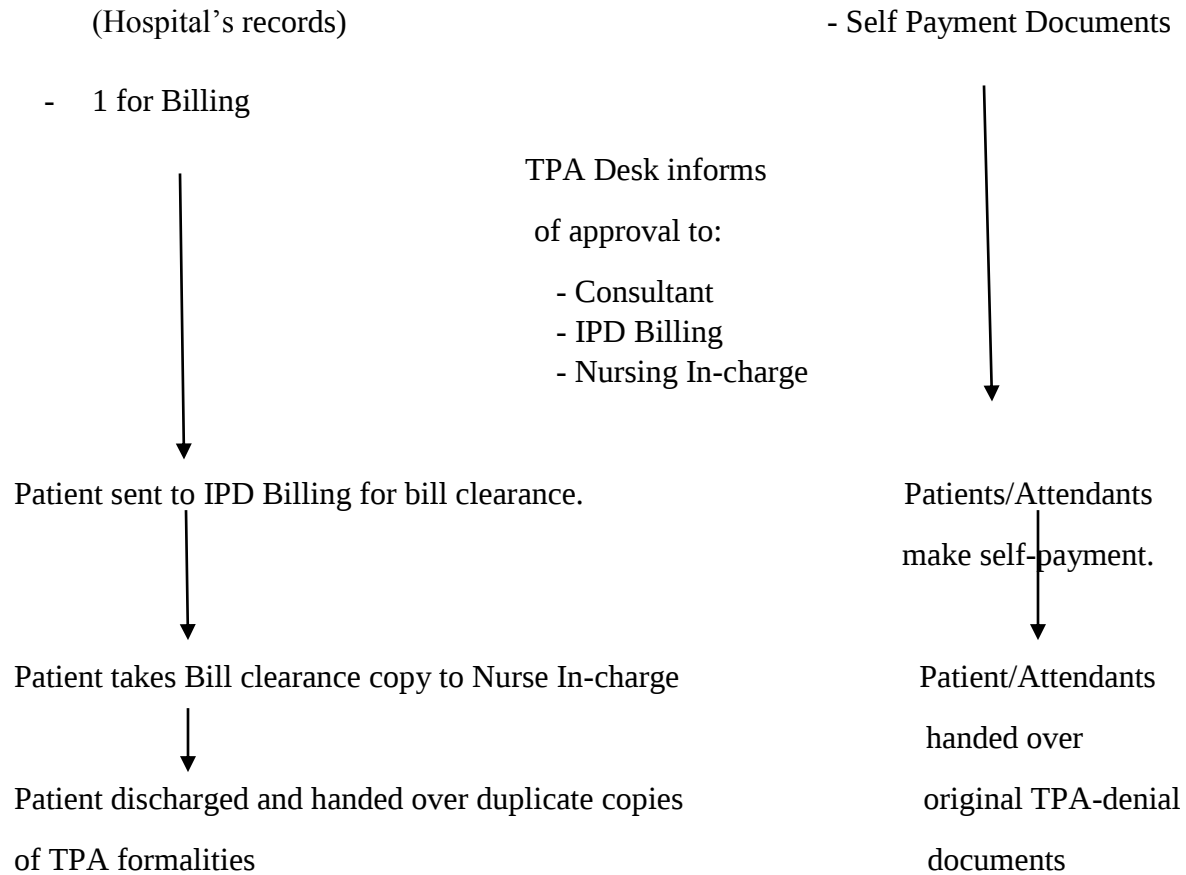
EMERGENCY ADMISSIONS FOR TPA PATIENTS





FLOW OF TPA PATIENT DISCHARGE





OT (OPERATION THEATRE)

❖ **Layout:** 3rd floor

❖ **No. of OT's:** 10

- General OT-8
- Cardiac OT-1
- Eye OT-1

No. of beds in Pre-operative ward: 7

❖ **No. of beds in post-operative ward: 8**

❖ **Utility room: 1**

❖ **Doctor's Lounge: 1**

❖ **Nurse and Technician Lounge: 1**

❖ **Pantry: 1**

❖ **Sterile room: 1**

❖ **Changing rooms: 4**

Doctor (male) changing room:	:1	<u>Department Head:</u> Dr. Divesh Arora (MD, Senior Consultant, HOD- Anesthesia)
Doctor (female) changing room	: 1	
Nurse (female) changing room	:1	
Technician + Nurse (male) changing room	:1	

AREA SPECIFICATIONS OF EACH OT

OT NUMBER	H X L X W	Cubic Feet
OT-1	10 X 21 X 19	3990
OT-2	10 X 20 X 19	3800
OT-3	10 X 21 X 18	3780
OT-4	10 X 21 X 17	3570
OT-5	10 X 22 X 18	3960
OT-6	10 X 21 X 18	3780
OT-7	10 X 26 X 18	4680
OT-8	10 X 20 X 18	3600
OT-9	10 X 26 X 18	4680
OT-10	10 X 26 X 18	4680

Records Maintained:

Forms Maintained	Registers maintained at OT Pre-holding area	Registers maintained in Sterile Room	Registers maintained with Nursing In-charge	Registers maintained with Manager Technician
1. Consent forms: - Informed - Anesthesia - Surgical/ Medical Treatment 2. Pre-anesthesia Checkup form 3. Surgical safety checklist form 4. Requisition form: - Histopath. - Blood bank - Laboratory - Indoor patient drug requisition form 5. Operation notes 6. Instrument checklist form	1. OT Patient Pre-Hold Register 2. Operation Record Register 3. OT Daily Charge Register 4. In-Out Register 5. CSSD Register	1. Instrument Set Register 2. OT Fridge Medicine Register 3. Cidex OPA Register 4. Formalin Register 5. Re-Autoclave Register 6. Autoclave Register 7. ETO Register 8. Plasma Register	1. Movement Register OT 2. Duty Roaster 3. OT Purchase Book 5. Emergency OT Register 4. Complaint OT Register 6. Consent form file 7. OT Checklist Register	1. OT Culture File 2. Daily OT Cleaning Register 3. Fumigation Record File

OT Washing & Fumigation Schedule:

OT - 1,2,3,8,9,10 and sterile room: Every Saturday

OT - 4,5,6,7: Every Sunday

Present Scenario:

9 functional OT's



Therefore, OT Washing and fumigation done every Saturday



In case, culture report (every 72 hrs. for each OT) shows more **than 10 types of isolates** then fumigation done on same day in OT.

INFECTION CONTROL SURVEILLANCE PROGRAMME FOR OT

Records maintained for OT Sterilization Check:

1. OT Culture File:

- Contains culture report of each OT
- Done every **72 hrs.**
- Swabs taken from OT Floor, walls, table locations.
- Method used: **Slit Air Method**
- FORMAT: Site (OT No.)
 - Method
 - Receiving date
 - Reporting date
 - Microbiology report

2. Daily OT Cleaning File:

- Daily OT cleaning record (compiled to get monthly record) with format as:
OT No./Item name /Qty./ Date /Morning, Evening, Night with (personnel sign & ID no.)
- OT Washing date record, OT Fumigation date record.

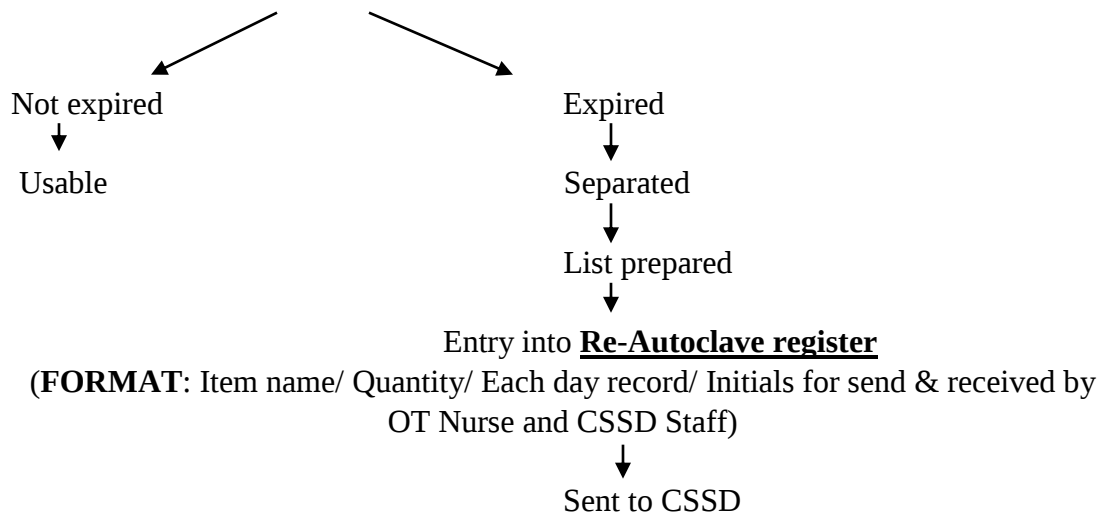
3. Fumigation Record File

- Separate record for each OT
- Fumigation done by ot guard 5ml per lt
- Weekly reporting
- FORMAT:
Date/ Fumigation done by/ Technician name/ Remarks

OT Inventory Management & Records:

1. INSTRUMENT SET REGISTER (In sterile room)

- For daily inventory management in sterile room
- Person on charge: nursing staff personnel (assigned duty everyday)
- Inventory maintained according to racks number
- Each rack assigned a specific number
- Daily expiry check of each item in racks



2. FRIDGE MEDICINE REGISTER OT (In Sterile Room)

- Each day inventory maintained by personnel in-charge of sterile room
- Daily expiry check

- INVENTORY OF OT
- Inventory is managed through HIS
- Medicine consumption form is filled for each patient and sent to OT stores for daily indentation

STRENGTHS:

1. State of art equipment's.
2. Wall mounted communication system in OT (Telephone + Intercom).
3. **Modular OT'S** fitted with state-of-the-art **LED Trilux Aurinio Lighting** and equipped with a **Trilux Media Bridge****.
4. OT's are designed with HEPA filters, Laminar airflow systems with **separate AHUs** for infection prevention.
5. Wall mounted digital temperature and humidity controller and medical gas alarm panel.
6. **AGSS** (Anesthesia Gas Scavenger System) in OT's: First in any North India Hospital.

** The **Trilux Media Bridge system** combines lighting, media supply and clean air equipment in a perfectly matched system. The possible combination with a laminar flow air supply ceiling for turbulence free displacement current that delivers extremely high air purity.

Department of Critical Care

Components: ICU, IMCU

Layout: 3rd Floor

- Doctor's Duty Room - 1
- Nurse Change Room-Female - 1

- Equipment Room - 1

ICU Beds: 12

IMCU Beds: 6

Department Head: Dr. Sandeep

ICU

Infrastructure:

Desktops: 2

Printers: 1

Intercom: 1

Nursing staff: 29

Housekeeping staff: 3

Working Shifts:

Morning: 8.00 AM to 2.00 PM

Evening: 2.00 PM to 8.00 PM

Night: 8.00 PM to 8.00 AM

EQUIPMENTS:

1. Ventilator
2. Patient monitor
3. Defibrillator
4. Syringe pump
5. ECG machine
6. Pace Maker
7. ICU bed

Records Maintained:

1. ICU consumable book
2. Replacement book/loan book
3. Handing over/transfer book
4. ICU Lab register
5. ICU MRD Register
6. Leave register
7. Store item receiving book
8. Assignment book
9. ICU Patient report book
10. Admission & Discharge Register
11. Procedure book for Doctor's & ventilation data

Records for inventory:

1. Crash trolley inventory register
2. Procedure trolley inventory register
3. Bed side inventory register
4. Narcotic drug inventory record
5. Fridge inventory register

Forms with ICU:

1. Daily Billing Activity
2. Consultation form
3. Discharge summary
4. History Sheet
5. Investigation Flow Chart
6. Daily Floor Census
7. Progress Sheet
8. Nursing Care
9. Blood Sugar Chart
10. Patient Registration Record
11. Pre Anesthesia Checklist
12. Pre operative Checklist
13. Pre & Post Operative Form
14. Nurse Record
15. MRI Investigation Form

16. Requisition forms: - Indoor Patient Drug Requisition Form
 - X-ray/ Ultrasound Requisition Form
 - Lab Requisition Form
 - Cytopathology Requisition Form
 - Histopathology Requisition Form
 - Blood Requisition Form
 - Requisition Form for Blood Transfusion
17. ICU Daily Notes
18. ICU Observation Chart
19. ICU Admission Consent form
20. Death certificate
21. List of Linen for Washing
22. Consent Forms: - Informed
 - High Risk Consent for Anesthesia
 - Anesthesia
 - Surgical & Medical Treatment
23. Valuable Handover Form
24. Discharge Checklist form.

- Nurse to patient ratio:** - Routinely: 2:1
- When the patient is on Ventilator: 1:1

Each Bed Space Contains:

1. Motorized Electric Bed
2. Multiparameter Modular Philips Monitor – mounted on wall behind the bed.
3. Chart/ Locker Trolley
4. Independent wall mounted panel housing 2 each of Oxygen, Air & Vacuum outlets (all connected to central manifold by concealed pipelines)
 - Each bedside monitor is hooked to CENTRAL NURSING STATION MONITOR.
 - Other Equipment's (common to all beds):
 - Mechanical ventilators
 - Syringe pumps
 - Feeding pumps
 - Nebulizer

- 2 beds have access to piped RO water & can be used for bed-side dialysis.

ICU ADMISSIONS

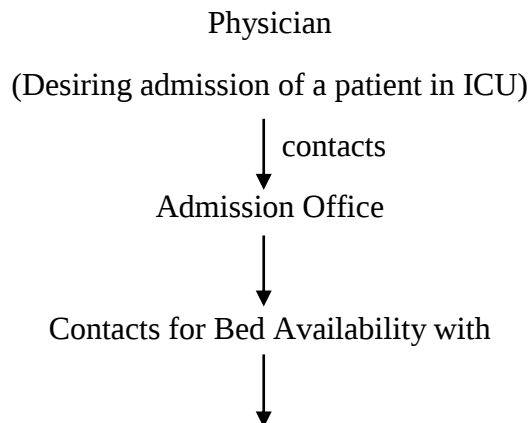
Admission in ICU can occur from:

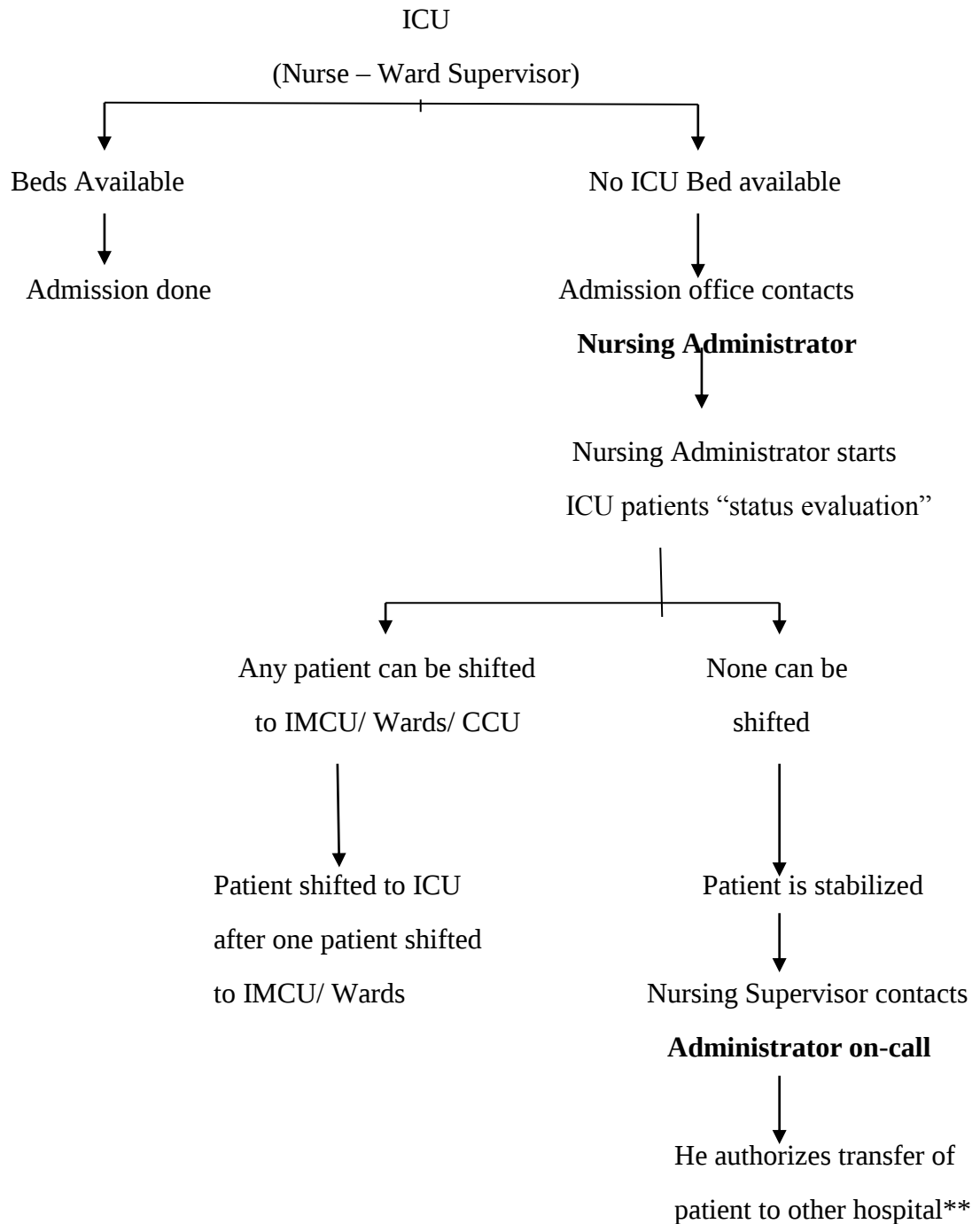
- Inpatient wing of the hospital
- OT
- Emergency complex
- From other hospitals
- Transfer from IMCU
- Sometimes directly from OPD
- Rarely from Bronchoscopy, Endoscopy, Dialysis unit

Ownership of patient care in ICU:

- ICU & IMCU are running under **“Semi-Open Model”**.
- Patients are admitted under consultants of various medical and surgical specialties.
- Thereafter, patients are managed jointly by: **ADMITTING TEAM & CCM TEAM**.
- All admissions must be notified by Duty Doctor to both the teams.

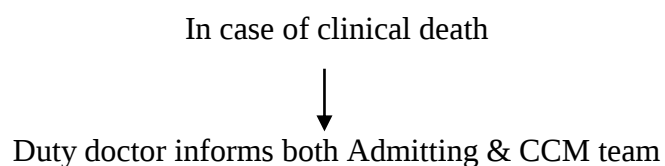
Patient admission procedure in ICU

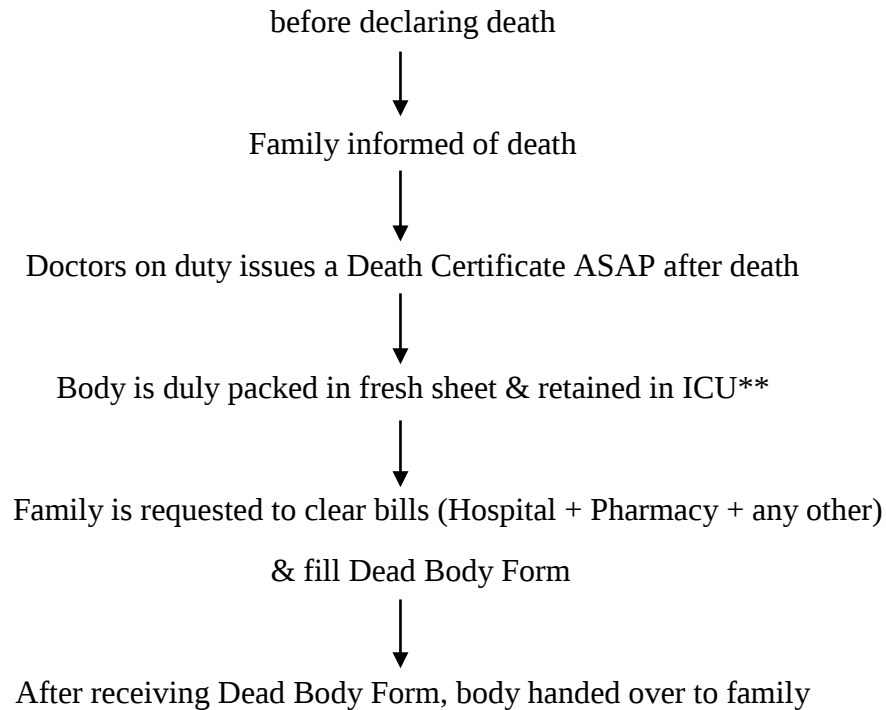




**AIMS Physician is responsible to locate a physician who will admit the patient to another hospital.

DEATH PROTOCOL



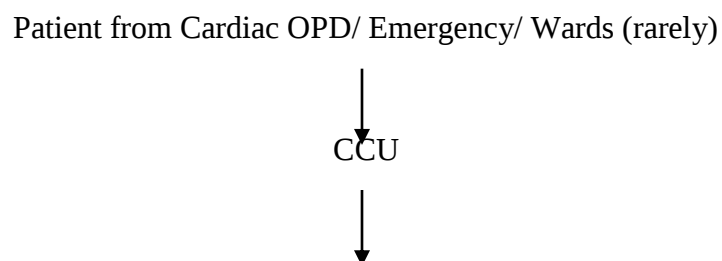


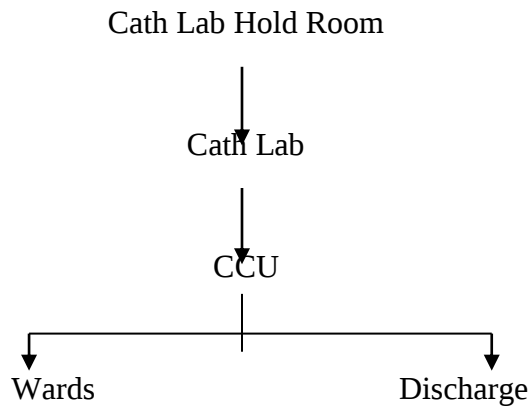
** Body retained in ICU for a maximum of 1 hr. after death and up to 4 hrs. in exceptional situation on orders of Duty Doctor & beyond that on orders of GM (Admin). Thereafter body is sent to Mortuary and security is informed.

If MLC case, packed body is sent to mortuary & handed over to police by security.

CATH LAB

- **Layout:** 6th floor
- **Department Head:** Dr. Rishi
- **Workflow:**





Common procedures in Cath Lab:

- Coronary Angiography (CAG)
- Coronary Angioplasty (PTCA)
- Balloon Mitral Valve Valvoplasty
- Permanent Pacemaker
 - Single chamber
 - Dual chamber
 - Bivent
 - Combo device
 - AICD
- Peripheral Angiography
- Peripheral Angioplasty
- Renal Angioplasty
- Electrophysiology study- Radiofrequency Ablation (EPS-RFA)

• **EQUIPMENT:**

PHILIPS FD-20 Flat panel (for coronary & vascular intervention)

- **Records Maintained:**

- CAG Register
- PTCA Register
- PTA Register
- PPI Register
- Cleaning records
- Fumigation records
- Inventory records.

CCU

Beds: 16

Store: 1

Clean utility room: 1

Dirty utility room: 1

Records Maintained

<u>Consent Forms</u>	<u>Investigation Forms</u>	<u>Patient Care Forms</u>	<u>Other Forms</u>	<u>Registers</u>
<u>Consent forms for:</u> - Surgical & Medical treatment - Anesthesia Consent - High Risk Consent for Anesthesia Surgery - Hemodialysis Consent - Informed Consent - Consent for Transfusion of blood & other blood products - Hand written consent form	<u>Requisition forms for:</u> - Histopathological Exam. - Cytopathological Exam. - Indoor Patient Drug Req. Form - Laboratory Req. Form - MRI Investigation Form - X-Ray/ Ultrasound Request Form	- Progress sheet - History sheet - Nurse record - Nursing care record - Drug Prescription & Administration Record - Investigation flow chart - Vital Parameter Chart - Pre-Anesthesia Check up - Intake Output Chart	- List of Linen for Washing - Daily Floor Census - Valuable Handover Form - Daily Billing Activity - Discharge Summary - Discharge checklist	- Daily Duty Register - Laundry Register - Duty Doctor Reg. - CSSD Register - Consumables Reg. - Communication Reg. - Maintenance Reg. - Annual Leave Plan Reg. - Loan Book - Complaint Register MRD Book - Handover Book - Housekeeping record - GRBS Register - Patient Shifting Register - Complaint Book - Stock Register CCU

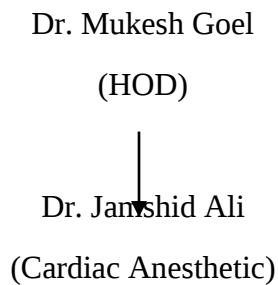
Daily Checks & Checklist:

- Inventory & Expiry Check Reg.
 - CCU Crash Cart Inventory
 - CCU Fridge Inventory
 - CCU Medicine Trolley I & II
 - CCU Capital Item
 - CCU Cup Board Inventory
 - CCU Laundry
- Equipment's daily working checks.

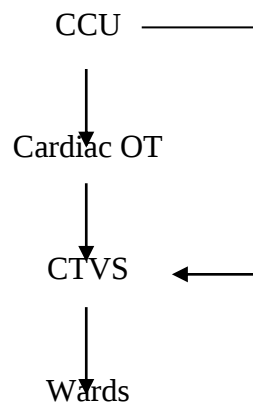
CTVS

- **Layout:** 3rd floor
- **Beds:** 6
- **Store room:** 1
- **Doctor's room:** 1
- **Clean utility room:** 1
- **Dirty utility room:** 1

Department Head:



Workflow:



Records Maintained

<u>Consent Forms</u>	<u>Investigation Forms</u>	<u>Patient Care Forms</u>	<u>Other Forms</u>	<u>Registers</u>
<u>Consent forms for:</u> - Surgical & Medical treatment - Anesthesia Consent - High Risk Consent for Anesthesia Surgery - Hemodialysis Consent - Informed Consent - Consent for Transfusion of blood & other blood products	<u>Requisition forms for:</u> - Histopathological Exam. - Cytopathological Exam. - Indoor Patient Drug Req. Form - Laboratory Req. Form - MRI Investigation Form - X-Ray/ Ultrasound Request Form	- Progress sheet - History sheet - Nurse record - Nursing care record - Drug Prescription & Administration Record - Investigation flow chart - Vital Parameter Chart - Pre-Anesthesia Check up - Intake Output Chart	- List of Linen for Washing - Daily Floor Census - Valuable Handover Form - Daily Billing Activity - Discharge Summary	- Daily Duty Register - Laundry Register Round Book - Duty Doctor Reg. - CSSD Register - Consumables Reg. - Loan Book - Complaint Register Air mattress Book - Equipment Breakdown Register - Handover Book - Housekeeping record Minutes of meeting - Incident Book - IPD Pharmacy Bills Record - Fumigation Record - Circular File

Daily Checks & Checklist:

- Defibrillator checking
- Daily Inventory & Expiry Check Reg.
 - CTVS-ICU Crash Cart Inventory
 - CTVS-ICU Line Trolley Inventory
 - CTVS-ICU Medicine Trolley
 - CTVS-ICU Capital Item I & II
 - CTVS-ICU Store Medicine in steel almirah
 - CTVS-ICU - CSSD & Fridge Inventory
- Other equipment's daily working checks.

EMERGENCY COMPLEX**Layout:** -1 Basement

- Nurse Station
- Emergency OT: 1
- Store room: 1
- Isolation Room: 1
- X-Ray Room: 1
- Ultrasound Room: 1
- Doctor's Duty Room: 2
- POP Room: 1
- Day Care Ward/ Casualty Ward

Infrastructure:

- Beds: Total: 22
 - In Day Care Ward: 11
 - For Casualty: 6
 - For Triage: 5
- Desktops: 2
- Intercoms: 2
- X-Ray Viewer: 3
- Printer: 1 (connected with Billing)
- Fridge: 1
- Fire extinguisher: 1
- Wheelchairs: 2

- Stretchers: 3
- Ambulances: 3 ALS Ambulances + 1 Van Ambulance

N: P Ratio: 1:1

Staff & Hierarchy:

Doctors: CMO – Dr. Hilal Ahmad & Dr. Satish Chaku

RMO'S – 5

Nursing and other staff: 24

Records Maintained

<u>Consent Forms</u>	<u>Investigation Forms</u>	<u>Patient Care Forms</u>	<u>Other Forms</u>	<u>Registers</u>
<u>Consent forms for:</u> - Surgical & Medical treatment - Anesthesia Consent - High Risk Consent for Anesthesia Surgery - Hemodialysis Consent - Informed Consent - Consent for Transfusion of blood & other blood products	<u>Requisition forms for:</u> - Histopathological Exam. - Cytopathological Exam. - Indoor Patient Drug Req. Form - Laboratory Req. Form - MRI Investigation Form - X-Ray/ Ultrasound Request Form	- Progress sheet - History sheet - Nurse record - Nursing care record - Drug Prescription & Administration Record - Investigation flow chart - Vital Parameter Chart - Pre Anesthesia Check up - Intake Output Chart	- List of Linen for Washing - Daily Floor Census - Valuable Handover Form - Daily Billing Activity - Discharge Summary Transfer Request for Ambulance - Discharge checklist	- Daily Duty Register - Laundry Register MLC Sample Reg. - Duty Doctor Reg. - CSSD Register - Consumables Reg. - Communication Reg. Ambulance Reg. - Annual Leave Plan Reg. - Loan Book - Complaint Register RBS Register - Equipment Breakdown Register

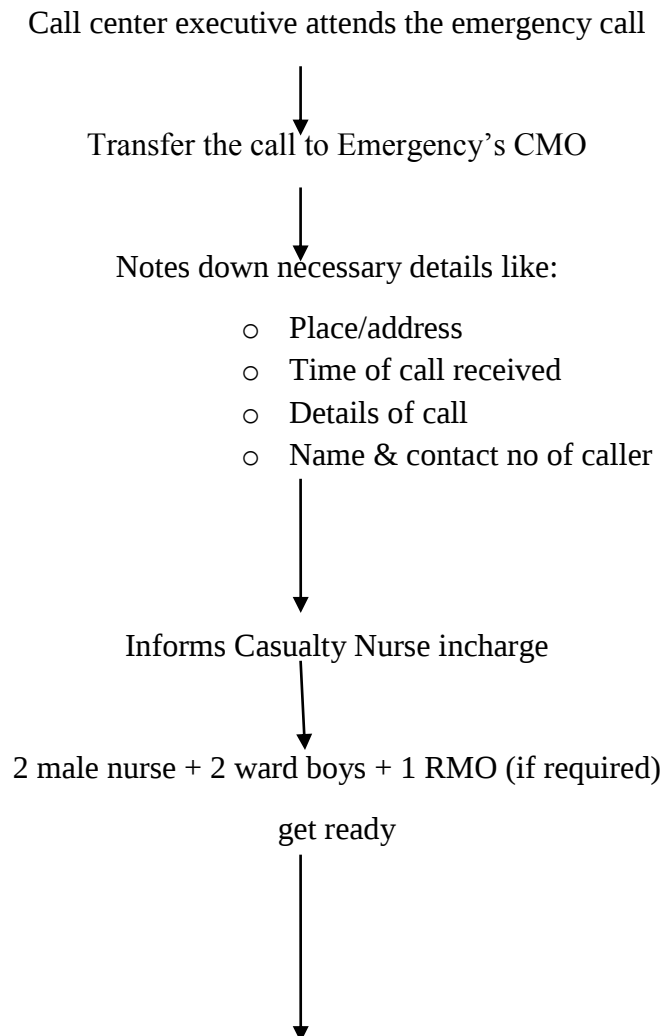
Inventory Management in ER:

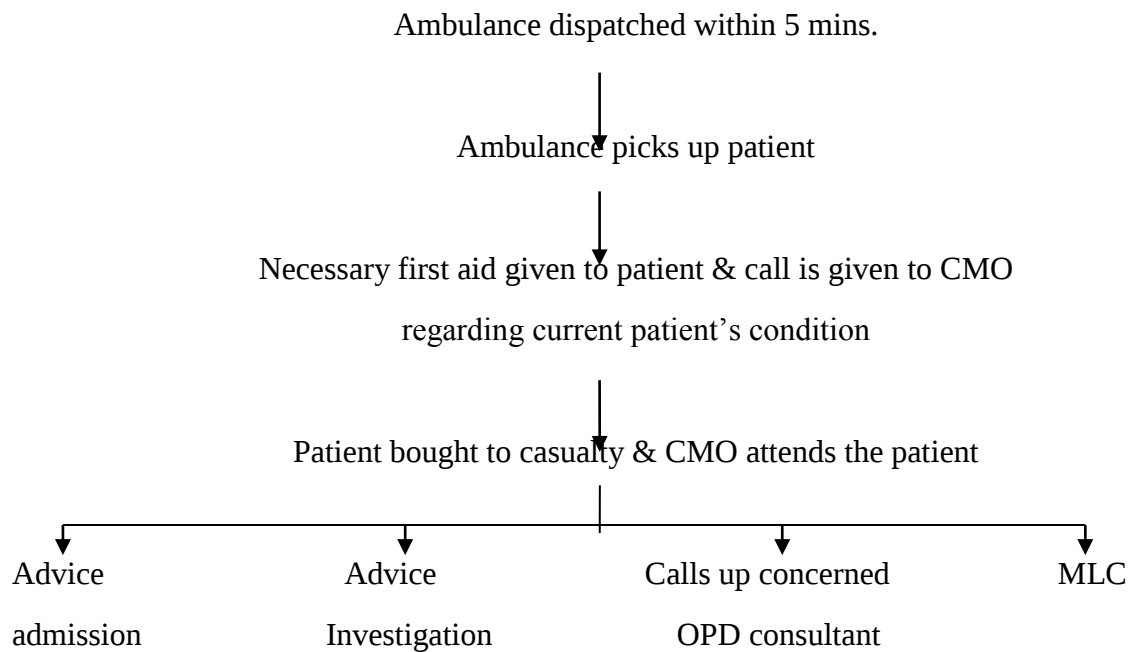
1. Inventory register:
 - Medicine trolley daily checklist
 - Dressing trolley daily checklist
 - POP Checklist
 - Crash cart checklist
2. Ambulance inventory Register

Maintenance Book:

- Oxygen pressure daily checklist
- ECG Checklist
- Biomedical Equipment Checklist.

AMBULANCE SERVICE FLOW





CSSD

(Central Sterile Supply Department)

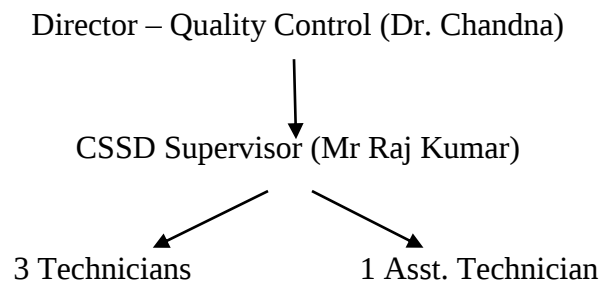
Layout: 4th floor (“U” shaped layout)

Staffing: 1 Supervisor

3 Technicians

1 Asst. technician

Organogram:



Infrastructure:

- Desktop -1
- Intercom -1
- Printer -1
- Autoclaves (Pulse vacuum type) -2
- ETO -1
- Plasma sterilizer -1
- Steam boiler -3
- Auto sealer -1
- Loader -2

METHODS OF STERILIZATION USED:

<u>AUTOCLAVE</u> <u>(Steam sterilization)</u>	<u>ETO</u>	<u>PLASMA</u>
• No. of autoclaves – 2 • Type – Pulse vacuum type • No of cycles per day – Acc. to load. • <u>Temp/time/pressure.</u> 121 deg C/ 15 mins/ 1.2 kg 134 deg C/ 4 mins/ 2.2 kg • STERILIZATION CHECK: a) <u>Bowie Dick Indicator</u> <u>(Chemical Indicator)</u> Once a day b) <u>Biological Indicator:</u> <u><i>G. Stereothermophilus</i></u> Once a week	• Number – 1 • No of cycles – usually 1 / day (But can vary acc. to load) • <u>Temp</u> – 54 deg C • 12-hour cycle • STERILIZATION CHECK: ✓ <u>Biological indicator</u> <u><i>Bacillus atrophaeus</i></u> : Each load.	• Number – 1. • Not regularly used. Used in case of emergency; when ETO not in use. • <u>Temp</u> – 45 deg C • 50 min cycle. • STERILIZATION CHECK: ✓ As such no biological indicator available. ✓ Therefore, its use is limited and only for emergency purpose. ✓ But <i>Bacillus atrophaeus</i> can be used.

MONITORING:

PHYSICAL MONITORING	CHEMICAL MONITORING	BIOLOGICAL MONITORING
• Gauges • Graphs • Process Logic Controller (PLC)	• Class I Indicator : Interlocking Tape applied on packs. • Class II Indicator : Bowie Dick + Batch Monitor • Class VI Indicator : To be put in packs.	• <i>G.stereothermophilus</i> • <i>B.atrophaeus</i>

Packing paper used :

1. Linen
2. Medical grade paper: - Used for ETO
- Lasts up to 6 months
3. Tyvec paper: - Used for plasma
Expensive
4. SMS paper: - Zig-zag concept
- Holes which seal themselves at a particular temperature
- Costly
- Not usable if any moisture present

Labeling:

Autoclave I/II, Process No/ Date of Sterilization/ Date of Expiry/ Indicator Slip/ Contents

Records Maintained:

1. Receivable item register
2. Items issued register
3. CSSD Sterilization Record Register:

It includes:

- Reports from microbiology
- Graphs generated from each sterilization
- Batch Monitoring Record

4. Record keeping register of each sterilization process:

It includes:

- Indicator used
- Temperature / pressure
- Time of start/end
- Initials of person doing sterilization
- Process number

DEPARTMENT REQUIREMENTS:

1. Ultrasonic Cleaner
2. Water Gun

STRENGTHS

- State of art equipment's.
- Experienced staff
- Dumb waiter (under construction) – for efficient and improved exchange of sterilized items.
- Strong focus on sterilization, its monitoring and thus quality through continuous physical, chemical, biological monitoring.
- Goal: To become Class 10,000 CSSD.

BLOOD BANK

Layout: 4th Floor

Total staff: 5

Department Head: Dr. Ramesh Chandna (Director-Quality)

Infrastructure of the blood bank

- Donor Registration Room
- Medical Examination Room

- **Donor room/Phlebotomy/Bleeding room-** Blood is collected in this room.
- **Apheresis Room**
- **Refreshment Room-** After donating the blood, refreshments are provided here.
- **Component Room:** Here collected blood is formed into different components.
- **TTI/ Infectious Markers Room-** Here Blood is checked to rule out any kind of infection in the collected blood.
- **Cross matching Room (Serology room) -** Here Blood is tested & cross matched.
- **Store Room/ Record Room-** All the records and inventories are stored here.
- **Wash & sterilization Room-** Here any blood tested +ve for any infection or unmatched blood is discarded.

EQUIPMENTS:

Equipment's In Apheresis Room:

- Multi Component Cell Separator

Equipment's in Phlebotomy Room:

- Blood collection monitor
- Blood Bank Refrigerator
- Electric Tube Sealer

Equipments in Component Room:

- Manual Plasma Expressor
- Donor Tube Stripper
- Refrigerated Centrifuge
- Platelet incubator & Agitator
- Cryoprecipitate Bath
- Revolutionary Microprocessor
- Plasma freezer Remi make (RPFV-240)
- Ultra-Low Deep Freezer
- Opti press- 2
- Ph meter

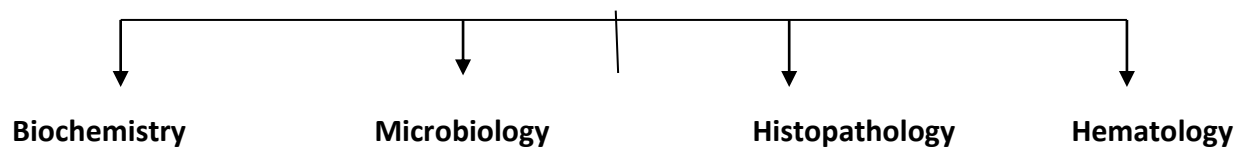
Equipment's in TTI Room:

- Revolutionary Microprocessor
- Rotary Shaker
- Architect i1000 SR (immunoassay system)

Equipments in Cross Matching Room

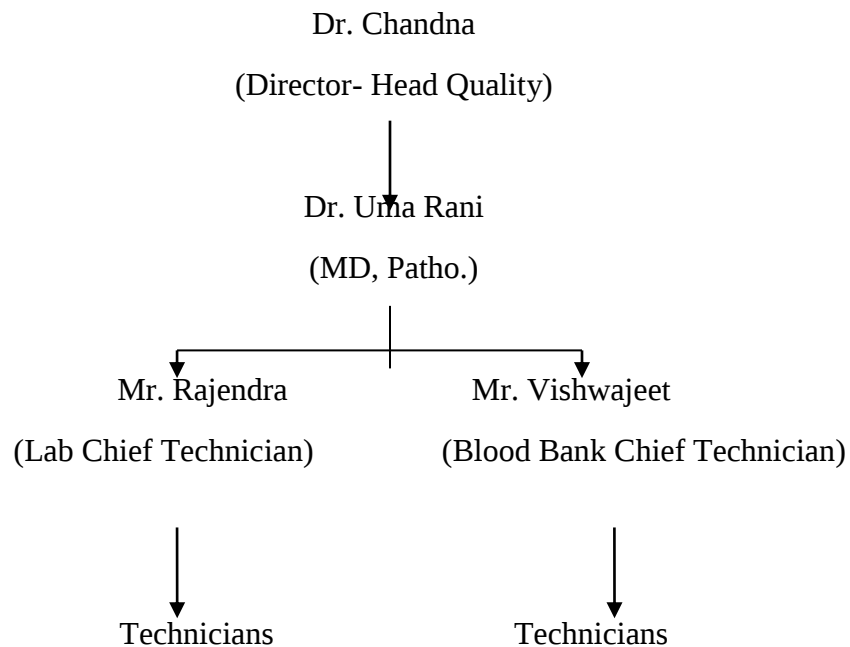
- Diamed's Grouping & X-Matching Gel System

LABORATORY SERVICES



Layout: 4th floor

Staff & Hierarchy:



Records Maintained:

- QC File
- Calibration Log
- Scheduled service log
- Instrument log
- Instrument service log
- Daily maintenance log
- Delivery file
- Purchase file
- Patient Record Reg.
- Quota File

Equipments:

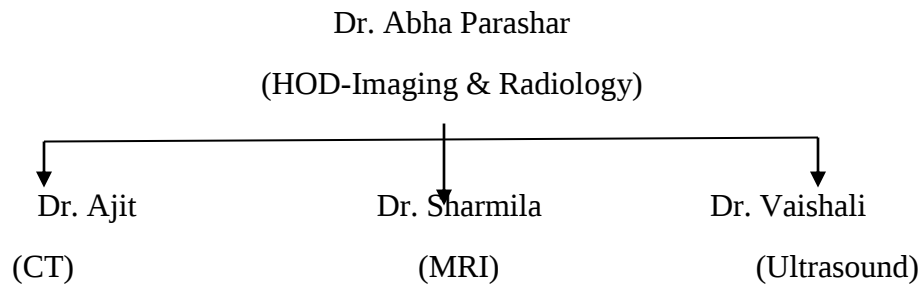
- Synchron CX 5- Pro (Beckman Coulter) – Fully Automatic Chemistry Analyzer with Random Axis
- Vitek 2 compact – For Automated identification & Sensitivity Testing
- Bact Alert 3D- Blood Culture Machine
- Sysmex XT- 2000i
- Sysmex KX- 21
- Cytocentrifuge.

IMAGING & RADIOLOGY**Services provided:**

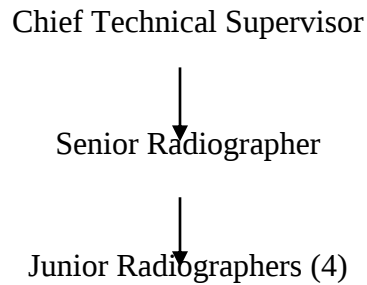
- CT
- ULTRASOUND
- X-RAY
- MRI
- MAMMOGRAPHY
- BONE DENSITOMETRY

Staff & Hierarchy:

Doctors: 4



Radiographers: 6



MRI Technician: 1

Typist: 1

GDA's: 3

Records Maintained:

- Patient Register
- MLC Register
- BARC Standard Records

Equipments:

- High End Digital X-Ray machine
- Mammography machine
- 1.5 T MRI Machine
- PET/CT Scan*
- 3D & 4D Ultrasound Machine
- Bone Densitometry Machine

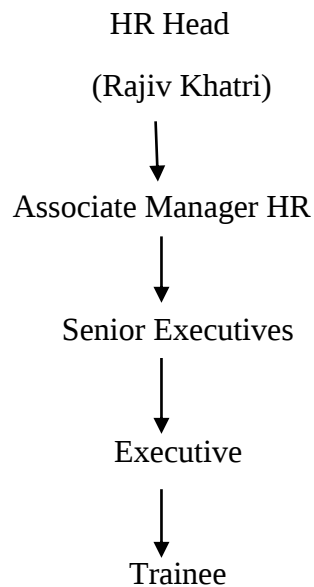
*AIMS is equipped with the first PET/CT in this region. The PET/CT is one of the most advanced diagnostic equipment's available today for early detection of cancer.

HUMAN RESOURCE DEPARTMENT

Layout: -2 Basement

Total Staff: 5

Organogram:



Jobs & Responsibilities:

- Manpower Planning
- Internal Job Posting Process
- CV Selection
- Credential Policy
- Confirmation and Appraisal
- Staff Queries
- Follow up with selected candidates
- Issuing of appointment letters

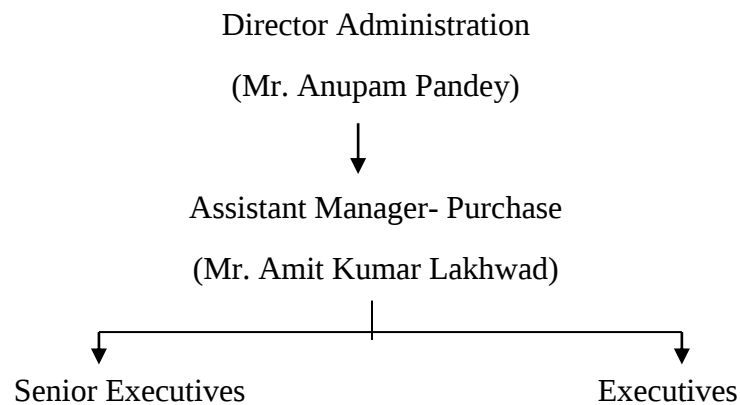
- Disciplinary Policy
- Leaves sanctioning
- Payroll
- Budgeting for departments
- Doctors payout
- Duty roster
- Issuing of Experience letters
- Investigation of staff grievances
- Issues of slow cause
- Salary statement
- Full n final settlement
- Outsource staff attendance
- Induction and orientation
- Finger print report checking
- Manpower planning
- Dispatch of salaries
- Pre-recruitment calls
- Organizing interviews
- Housekeeping of CV'S
- Preliminary interviews
- Joining formalities
- Leave record maintenance
- Issuing of I-Cards
- Conducting Employee Welfare Programme e.g. Nurse Day
- Issuing of Refreshment Coupons
- Conducting Exit Interviews.

PURCHASE DEPARTMENT

Layout: 1st Floor (Admin Block)

Total Staff: 4

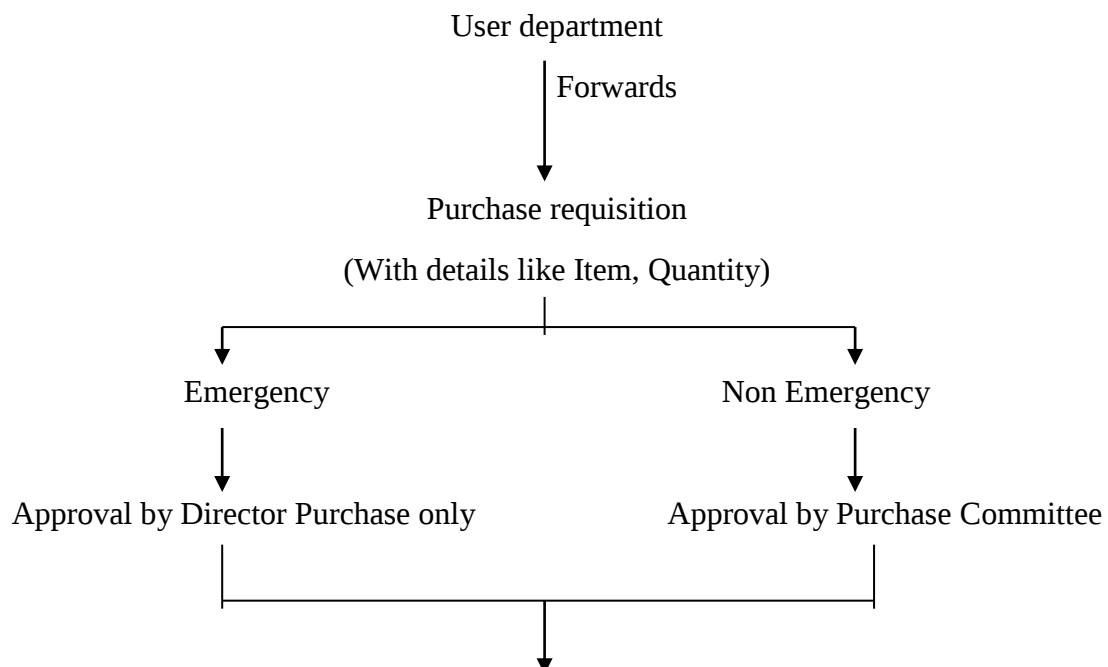
Organogram:



Records Maintained:

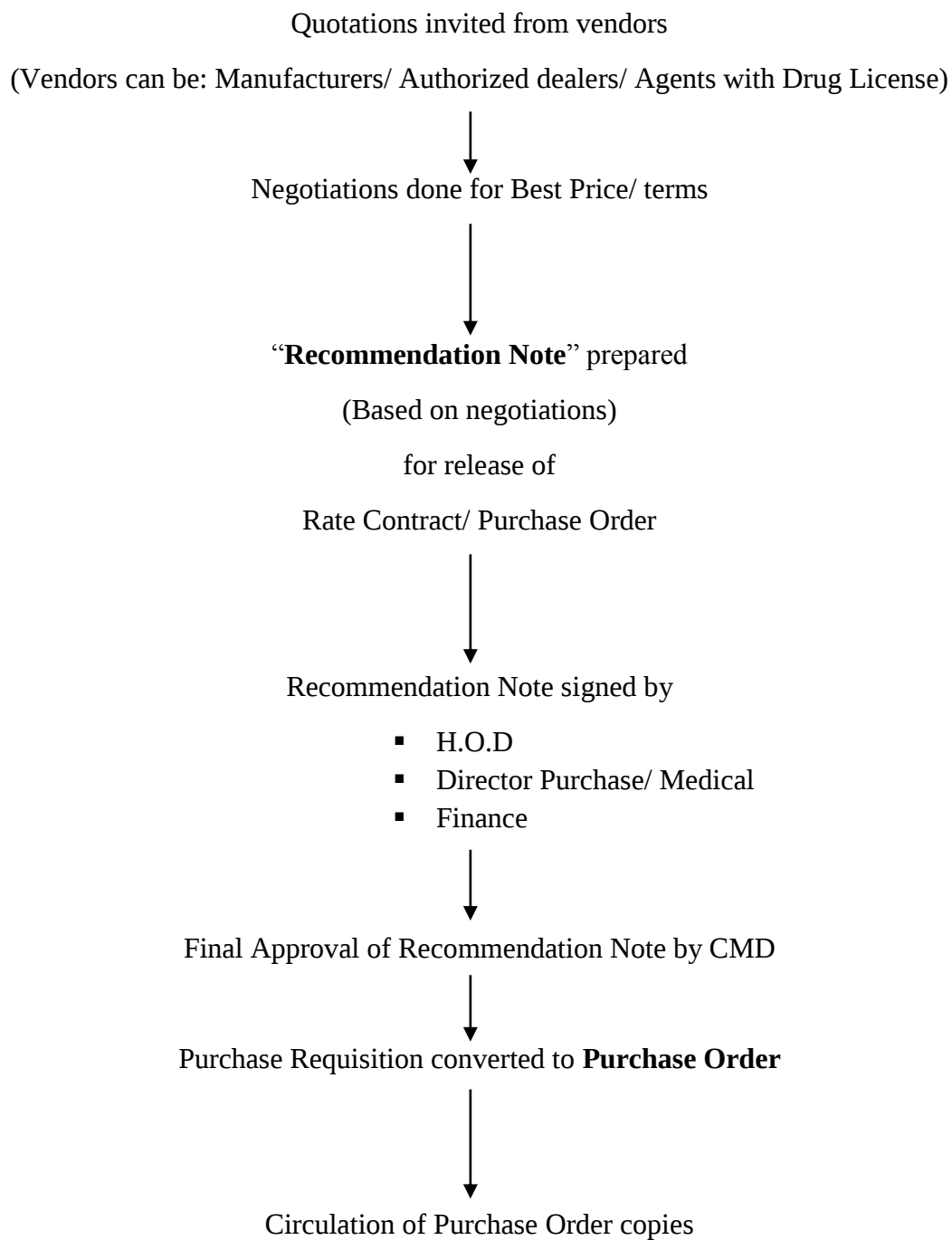
- Quotations
- Purchase Requests
- Capital Sanctioned Record
- Purchase Orders

Procurement of medical consumables and drugs

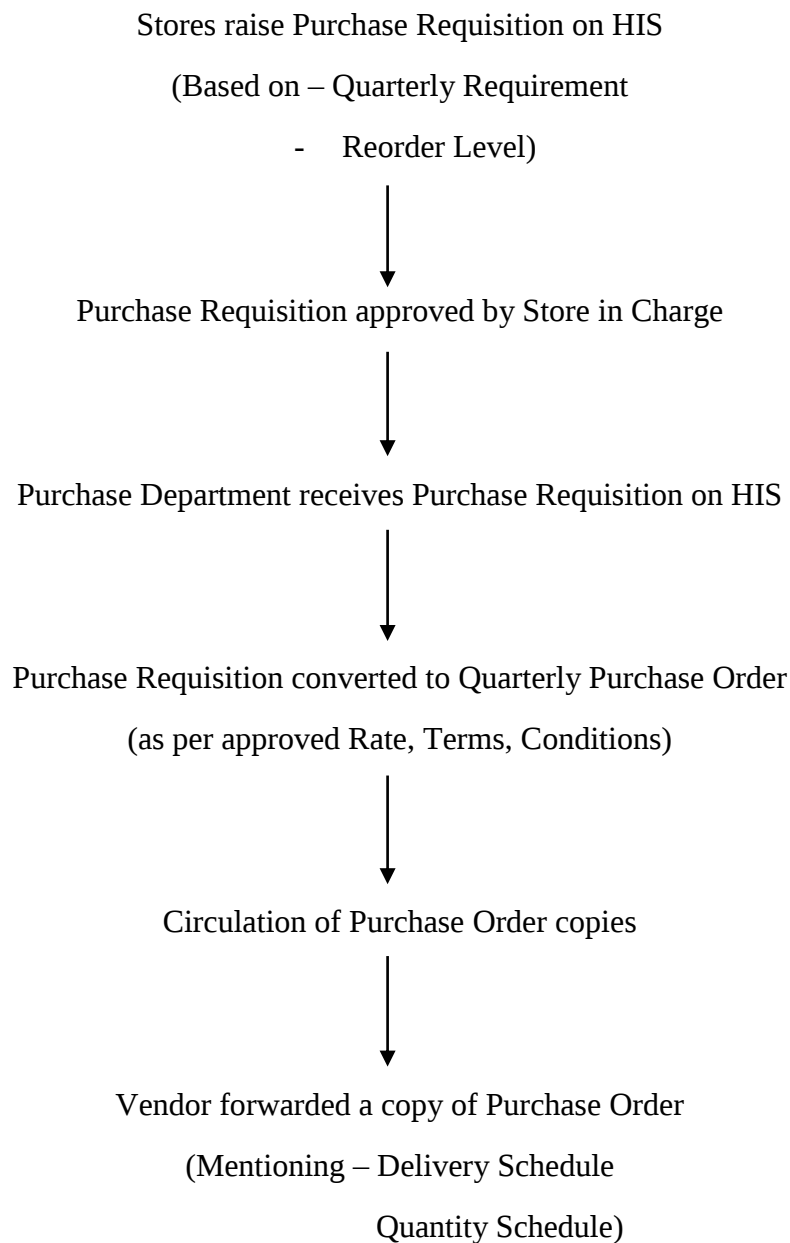


Procurement Process

Procurement Process



Procurement of Stocked (Regular) Medical Consumables & Drugs

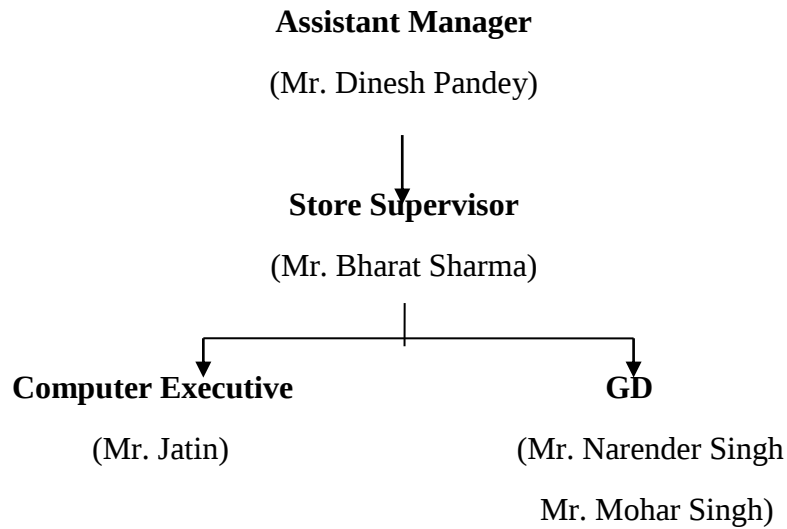


STORES

Layout: -2 Basement

Staff: 5

Hierarchy:



Records Maintained:

1. Goods Receipt Note
2. Issue Note
3. Return File
4. Returnable Gate Pass
5. Non-Returnable Gate Pass
6. Purchase Receipt

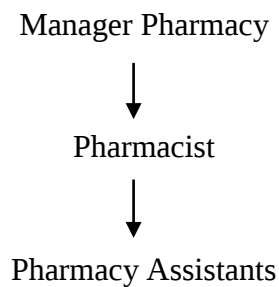
IPD PHARMACY

Layout: -2 Basement

Status: Outsourced

Staff: 13

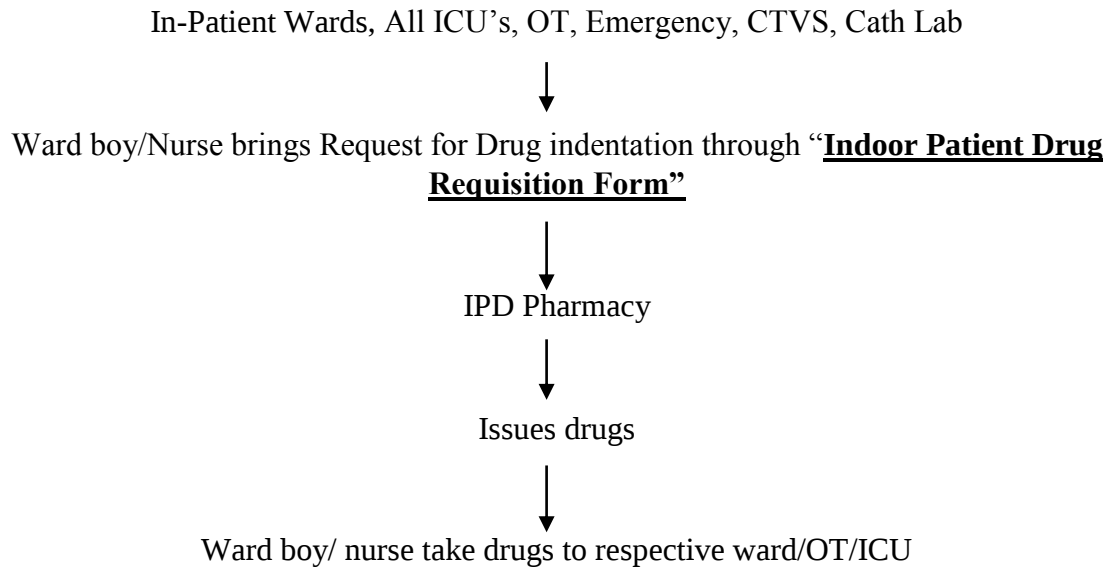
Hierarchy:



Infrastructure:

- Desktops: 4
- Printers: 3
- Refrigerator: 1

Work Flow:

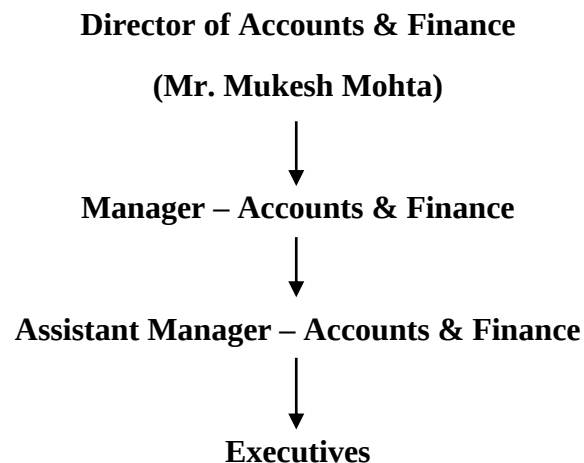


FINANCE & ACCOUNTS

Layout: -2 Basement

Total Staff: 9

Organogram:



Scope of Services:

The scope & complexity of service provided by this department (which includes billing aspect also) is:

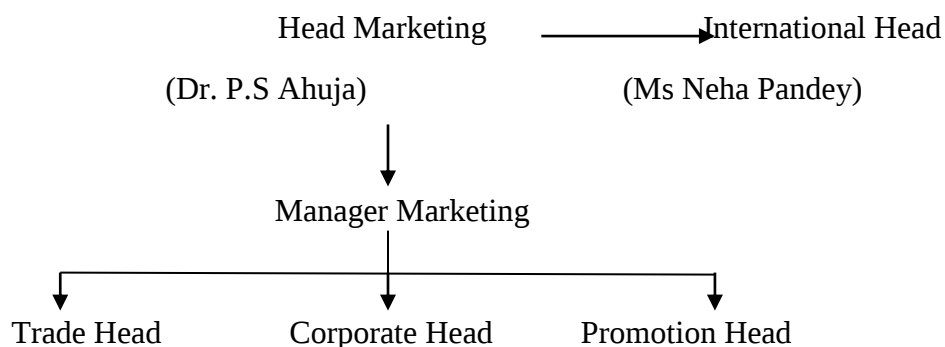
- Business building insights.
- Areas for lowering cost & improve profitability.
- Updating of bills on daily basis for IPD patients.
- Customer (Patient's Attendant) satisfaction for billing concern.
- The Billing staff has overall responsibility for coordination of various functions (Pharmacy, Wards etc.) and daily basis report for admission, Collection to higher management and Administration of the department, and they maintain a log of all the problems that arise on day to day basis and provide the necessary solution as deemed proper and reasonable.
- Daily collection of money from various sources in the hospital and its deposition in bank.
- Maintenance of petty cash.
- Budgeting.
- Department serves all departments for finance & billing aspect.
- Making Balance sheet, Profit & Loss Statement for the financial year.
- Maintenance of file of all employees, vendors, creditors & debtors.

MARKETING DEPARTMENT

Layout: -2 Basement

Total Staff: 8

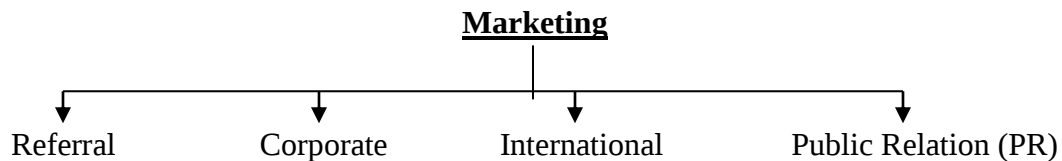
Organogram:



Marketing Pattern:

- **<150 Km Zone:** Marketing of Super specialty & all Specialties
- **150-300 Km Zone:** Marketing of 3 Specialties: Oncology, Cardiac & Orthopedics
- **>300 Km Zone:** Marketing of Super specialty: Oncology

Marketing Format:



1) Referral:

- Society Education Programmes
- General Practitioners
- Get together
- Free Community Checkup Camps
- Diagnostic centers
- Pharmacy stores
- School, College Camps: Debate Competitions, Drawing Competitions etc

2) Corporate

- Empanelment/ Corporate Tie ups
- Health Talks
- PSU's Tie-ups
- TPA Tie Ups

3) International

- Embassy

4) P.R

- Press Conferences
- Shoots/ Interviews
- Print Media: Newspapers, Magazines
- Branding: Events, Conferences, Trade shows.

LOCAL PUBLICITY

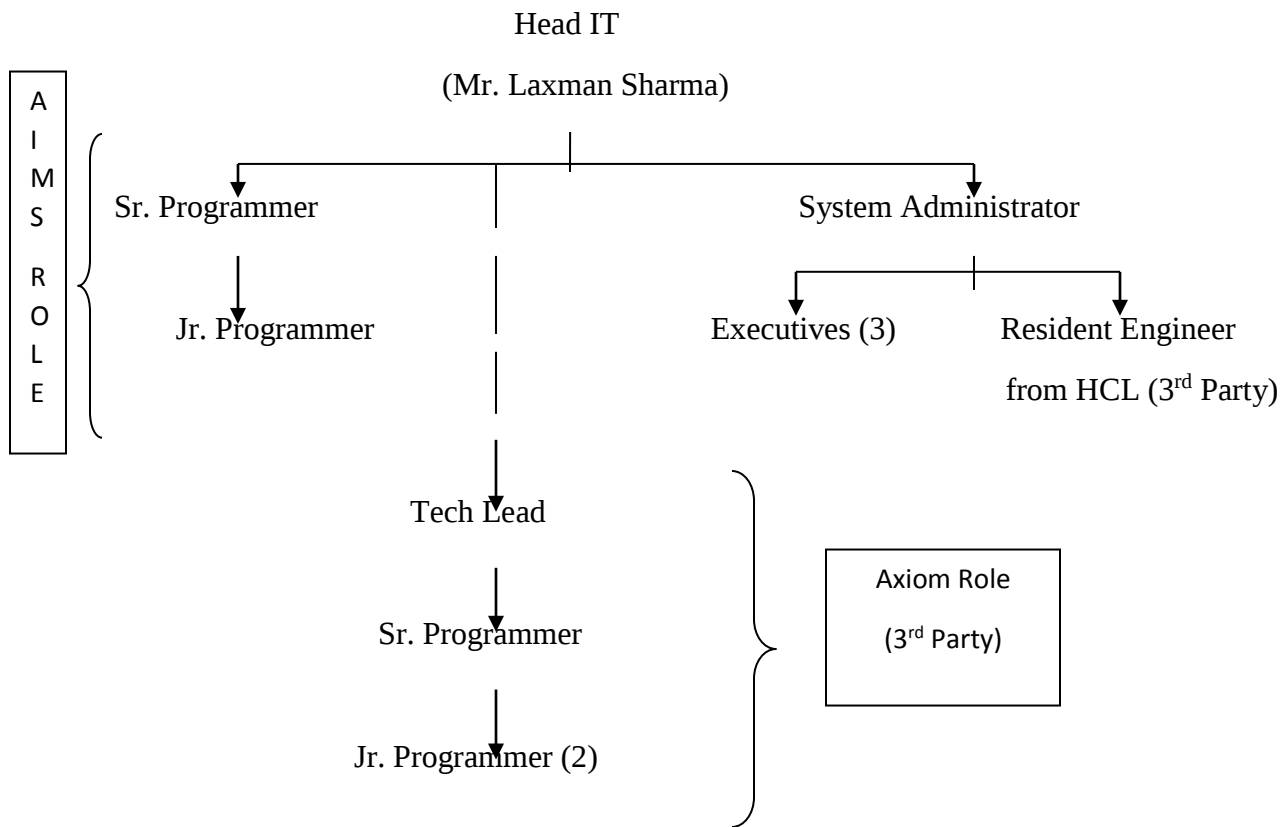
- Highway hoardings
- Newspaper Ads
- Ads in local magazines, supplements, directories
- Leaflets, Pamphlets and Flyers
- Direction Boards
- Kiosks
- Hoardings
- Hospital Board (Glow sign)
- SMS Health Tips & Discount schemes

INFORMATION TECHNOLOGY (IT) DEPARTMENT

Layout: -2 Basement

Staff: 7

Organogram:



Functions and responsibilities:

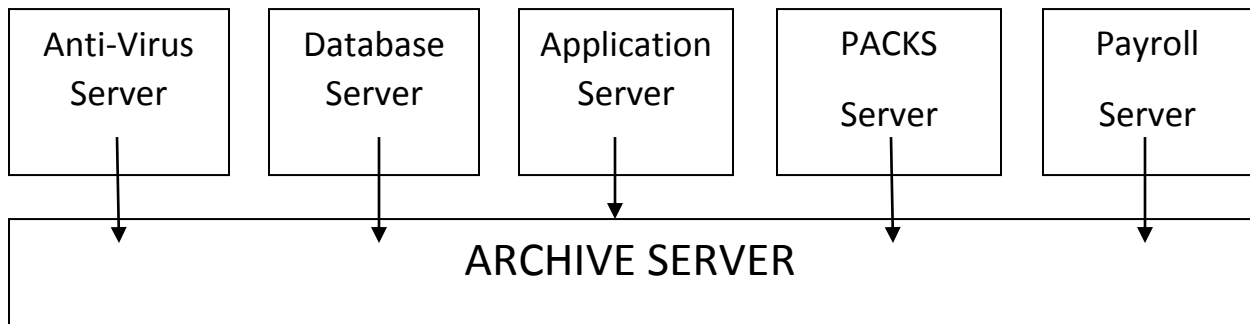
- To keep the servers alive
- To keep the network alive
- To keep internet connection alive
- To take care of all the desktops & laptops in the organization
- To track the records of all the desktops
- To keep an eye on the employee's desktops.
- To resolve the complaints of the employees
- Training of the other staff for the HIS

2 Major Work Areas: General Administration & HIS

I) General Administration:

Servers:

- Anti-virus server
- Database server
- Application server
- PACKS server
- Payroll server
- Archive server



Email Solutions: Google

- 500 Emails (FOC)
- Present Usage: 176 Clients

II) HIS (Hospital Information System)

Application by: Navision I : Product of Microsoft Dynamics

Manufacturing Products:

- Financial Management
- Fixed Assets
- Inventory Management

Taking Manufacturing Products as the core, other functional modules

have been built over them.

- Billing
- Ward management
- Laboratory services
- Discharges + Medical Records
- Housekeeping

These modules are also related to outsourced modules of:

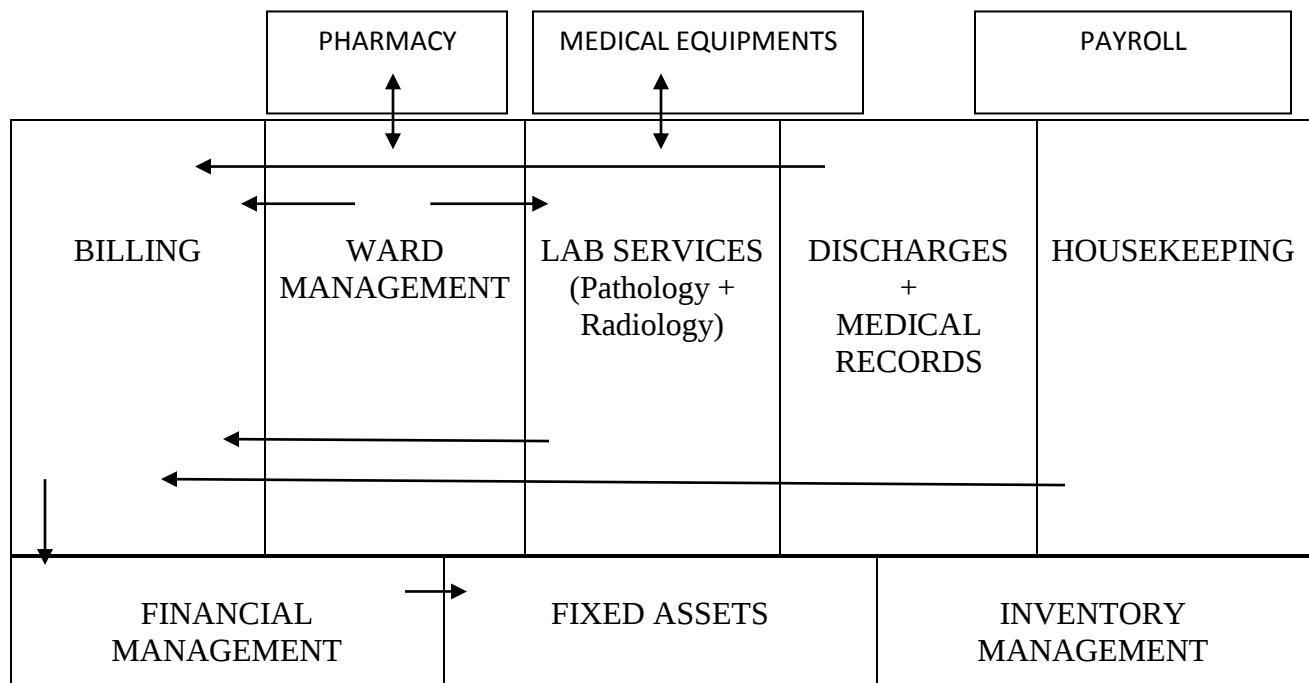
- Pharmacy
- Payroll
- Medical equipment

Access to Information:

Divided into 3 codes:

1. **Red:** Very restricted access to information e.g Wards
2. **Yellow:** Restricted but more than red. Access only after permission from higher authority.
3. **Green:** Large access to information. Available with higher authority.

HIS STRUCTURE:



HIS Backup:

- Done once a day
- 2 internal backups
- 1 backup outside the hospital.

MEDICAL RECORD DEPARTMENT

Layout: -1 Basement

Staff: 3

Infrastructure:

- Desktop: 1
- Printer: 1

Organogram: Mr. Amit Kumar_Jha

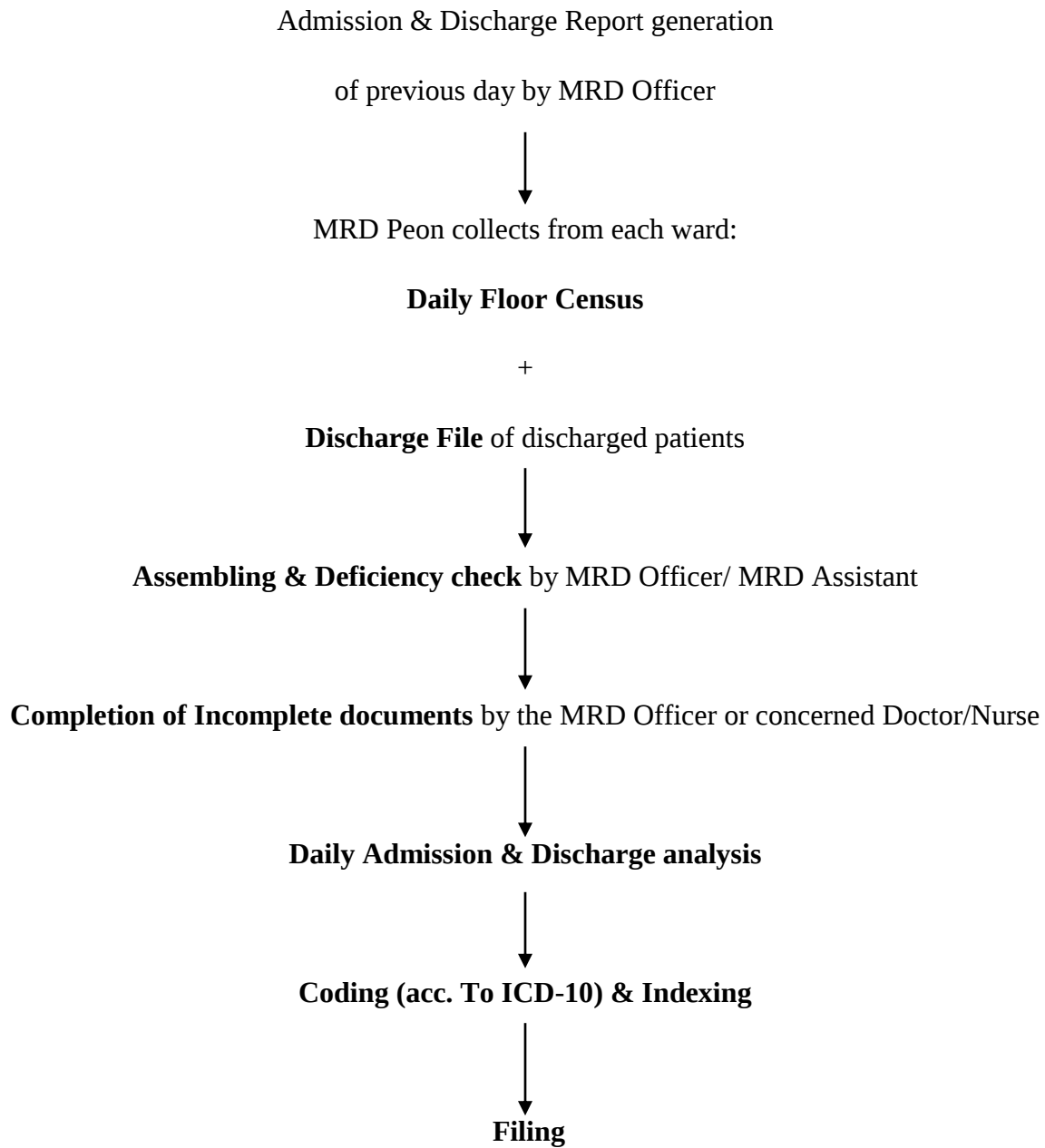
Functions of MRD

- To ensure that the AIMS Hospital has complete & accurate medical record for every patient.
- Public dealings wrt. to TPA **queries, Bill verification, MLC cases and dealing with Summons to the doctors, hospital.**
- To maintain high level of confidentiality as far as patient's records are concerned.
- To ensure that the records are Identified and stored safely to prevent unauthorized changes and easily retrieved whenever required.
- Issuing **Emergency, Medical, Birth & Death certificates.**
- To generate **Bed Occupancy reports** (daily & monthly), **P.N.D.T, M.T.P** reports (monthly).

Record Retention Periods:

- | | | |
|------------------------|---|----------------------------|
| • IP Record | : | 05 years |
| • Emergency Register | : | 02 years |
| • MLC Records | : | Not to be destroyed |
| • Birth/Death Register | : | Not to be destroyed |
| • OPD documents | : | Handed over to the patient |

WORKFLOW:



Filing Order:

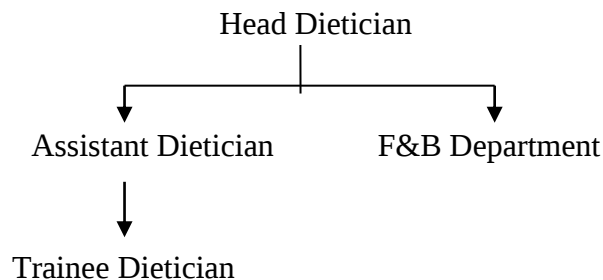
1. Face sheet
2. Patient's Discharge Records
3. Discharge sheet (Discharge, DOR, LAMA, Death)
4. Emergency & OPD card
5. History sheet
6. Investigation flow chart
7. Consultation form
8. Informed consent
9. Valuable handover form
10. Undertaking for payment Primary/ ADHOC PTCA
11. Angiography- Angioplasty Checklist
12. Cardiac Anesthetic Record
13. Consultation for surgical & medical treatment
14. Pre-operative instruction checklist
15. Anesthesia record
16. Surgical safety checklist
17. Operation note, Delivery note
18. Post-operative evaluation form
19. Labor chart
20. Progress note
21. Temperature chart
22. Intake output chart
23. Blood sugar
24. Diabetic Monitoring chart
25. Drug prescription & Administration Record
26. NICU Observation Chart
27. Nurses Record
28. ICU & CCU Observation chart
29. Medical Certificate cause of death
30. Release of dead body certificate
31. Final Bills (MLC case)
32. Any other relevant document concerning to patient

CLINICAL NUTRITION & DIETICS DEPARTMENT

Layout: -2 Basement

Head Dietician: Dr. Shilpa Thakur

Organogram:



Functions:

- Catering to Inpatients, Hospital staff, Patient attendants.
- Diet counseling
- Education
- Smooth provision of laid out 9 diets to the patients.
- To check the patient, Attendant & Staff food for quality, preparation, presentation and packing.
- Coordinating closely with the Nursing shift in charges for changes in the patient's diet or new admissions etc.

Areas in Kitchen

- **Receiving & Storage Area**
- **Preparation Area:** For peeling, cutting, chopping, slicing, mincing.
- **Cooking Area**
- **Tray Layout & Packing Area**
- **Service Area:** From here food is transferred to patients on trolleys.

Other Areas:

- Dish washing & pot washing area
- Dietician Room

Records Maintained:

- Diet order sheet
- Meal count register

- Food tasting register
- Store register
- Staff register.
- Diet Sheets
- Counseling Register
- Brand List

	<u>Diet Card Color</u>	<u>Tray Color</u>
Normal	White	Red
Diabetes Mellitus	Yellow	Yellow
Chronic Renal Failure	Green	Green
Renal Stone	Pink	

Flowchart of Dietician and Inpatient Interaction:

The Dietician takes details of new patients such as name, UHID, doctor's name, diagnosis and diet prescribed.



Then Dietician takes a detailed round wherein she meets every patient and determines patients' actual intake. Dietician then provides nutritional counseling and education, ensures patients' compliance to recommended diet. She also recognizes personal eating and food preferences.



Afterwards, the dietician does nutritional screening in order to know about patients' clinical condition, appetite and tolerance to food and acceptance to hospital diet, personal preferences, disliking and food allergies if any.



After the rounds, detailed food summary sheets are planned and prepared for every patient keeping in mind medical history and preferences of patient as well.

Flowchart of Dietician & Nursing staff interaction:

Dietician receives a daily diet requisition once a day from all nursing station.



Dietician cross-checks received diet requisition from time to time with nurse both during rounds and on phone constantly.



Dietician updates changes with respect to new admissions/ transfers/ discharges/ changes. in diet

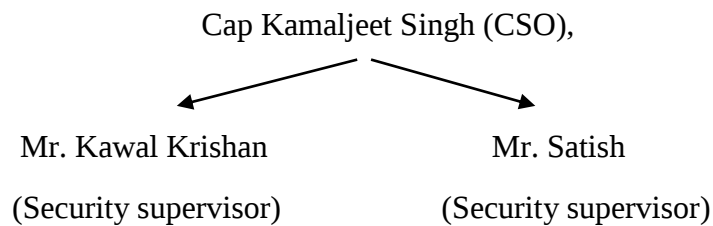
Future Plans:

To act on patient complains regarding below standards food service, the management has decided to set up satellite pantry on each floor to avoid delays in food service.

SECURITY SERVICES

Status: Outsourced to **APOLLO SECURITY SERVICES**

Headed by:



Total security personnel: 58

- 34: In morning shift
- 24: In night shift

Operational CCTV's : 23

Area of Operation (Present):

To deal with 3 “M”- Man, Material & Machinery

- Visitor's check
- Surveillance of hospital through CCTV's
- Theft, Burglary
- Violence
- Handling of MLC
- Material movements in & out of the hospital
- Handling visitor's pass
- In case of patient's death, handling emotional chaos of attendants
- Parking management and traffic control.

Additional Responsibilities in near future:

- Playing their role once different codes are brought into action.
 - Blue : Individual Disaster
 - Black : Bomb Threat
 - Red : External Disaster
 - Pink : Baby Disaster
 - Orange : Deterioration of patient's condition
 - White : Terrorist attack
 - Grey : Internal disaster
 - Purple : Fight likely
- Locker & key management.
- Conducting Mock Fire and Disaster Drills.

HOUSEKEEPING

Status: Outsourced

Components & Status:

<u>Component</u>	<u>Outsourced to:</u>	<u>Total personnel</u>	<u>Shift Timings</u>
1. Housekeeping	Sandha & Co.	101	Morning: 7A.M – 3. 30P.M Evening: 1P.M – 10 P.M Night: 10 P.M – 7 A.M
2. Ward boys (GDA's)	Indian Sanitation	105	Morning: 7A.M – 3. 30P.M Evening: 1P.M – 10 P.M Night: 10 P.M – 7 A.M
3. Glass Cleaners	Classic Appearance	5	8 A.M – 5.30 P.M
4. Pest controllers	Pest Control of India (PCI)	1	Morning: 7A.M – 11 A.M Evening: 5 P.M – 9 P.M

Department Manager: Mr. Dheeraj

Advantages of outsourcing:

- ✓ Reduce workload of management e.g. no salary, PF, Uniform headache.
- ✓ Manpower management is the responsibility of contractor
- ✓ Reduction in cost if services are contracted out.

FUNCTIONS:

- Clean Floor, Wall Ceiling
- Discharge Cleaning
- Remove Garbage
- Replace Supplies in Utility Rooms
- Clean Housekeeping Equipments
- Clean Room, Wards, Reception, OT, ICU Etc.
- Infection Control
- Pest & Rodent Control
- Odor Control
- Environment Hygiene
- Sanitation Hygiene
- Checking Cleanliness of All Areas
- Control & Reporting of All Maintenance Works
- Hospital Waste Disposal
- In-Service Training
- Cooperation with Other Depts.

Day	Weekly Assignment
Monday	Thorough Cleaning of all hospital doors
Tuesday	Thorough Cleaning of Ceilings & AC Ducts
Wednesday	Thorough Cleaning of corners & skirting

Thursday	Thorough Scrubbing of Toilets
Friday	Thorough Cleaning of AHU's & wooden beading cleaning
Saturday	Thorough Cleaning of Outer area + Parking Area
Sunday	Thorough Cleaning of all Administration Block + All Wards

LAUNDRY SERVICES

Layout: -2 Basement

Equipments:

- Dryers : 2
- Washing machine (each 50 kg) : 2
- Extractors (each 25 kg) : 2
- Hand presses : 2
- Steam Boilers : 1
- Calendar Machine : 1
- Trolleys : 6

Total Manpower: 11

Records Maintained:

- Department Register
- Items Received register
- Items issued register
- Detergent register
- Machine records

MAINTENANCE & ENGINEERING

Layout: -2 Basement

Total Staff: 41

Components:

- Electricals
- Sewage treatment plant
- Carpentry
- Pump House + Fire Fighting
- HVAC
- Plumbing

Supervisor: Mr. Sachin (Generator set), Mr. Jagdish (A/C, Lift, Water Pump, Firefighting)

Functions:

- Preparing the plan for equipment daily and preventive maintenance, spare parts and consumable for the department so that each facility works properly & there is minimum breakdown.
- Engineering is also responsible for controlling and ensuring for optimum use of power, water and diesel.

Records Maintained:

- Diesel Book
- Complaint Book
- Electricity Consumption Book
- AC Log Book
- Chiller Daily Parameter Log Book
- Pump Log Book
- Filter Cleaning Book
- DG Log Book
- Boiler Register
- Bore Well Register
- UPS Log Book
- Temperature Controller Register

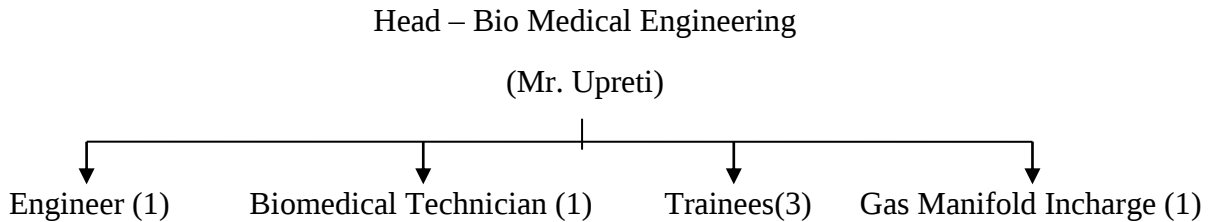
BIO MEDICAL ENGINEERING DEPARTMENT

Layout: 1st floor

Total Staff:

Supervisor: Mr. Upreti

Organogram:



Records Maintained:

With Biomedical Engineering:

- Complaint Register
- Daily Equipment Checklist
- Weekly Equipment Checklist
- AMC Records
- Preventive Maintenance Service (PMS) Record
- Calibration Records

With Gas Manifold:

- Gas Manifold Log Book for Oxygen, Nitrous Oxide
- Complaint Register
- Cylinder Issue Register
- Cylinder (Out Party) Register
- Shift Register

SPECIAL STUDIES:

- **ASSESSMENT OF GREEN OT PARAMETERS**

Asian institute of medical sciences is the first hospital in Faridabad to receive
GREEN OT certification

- **HAZARD IDENTIFICATION AND RISK ASSESSMENT IN OT**

INTRODUCTION

Worldwide, Accreditations is increasingly being utilized as a key driver for implementation of patient safety efforts. Accreditation demonstrate to the public that they have maintained compliance with a set of standards that provides the public at least some reassurance that quality and patient safety standards are being met. Patients, from both within the country and outside country feel confident about the hospitals, which are accredited.

Accreditations normally cover the entire hospitals and the process as whole, to integrate various management systems But, department wise accreditation is yet to catch up in ...thus limiting the “centre of excellence” positioning to physician’s expertise

The core messaging around impressive lists of doctors, state-of-the art infrastructure & accreditations, helps reinforces confidence in the target group

But, a “centre of excellence”, approach with department specific accreditation, will provide reassurance to the patients

E.g.: Radiotherapy department accreditation, Paediatric accreditation, Operation theatre & ICU accreditations

“Safety” is the key issues amongst surgical patients

According to results from a surgical -patient survey:

- Surgical patients told us they had no knowledge of operation theatres (84%) and they felt **anxious** (50%) and **fearful** (44%)

- While the surgeon’s expertise is key, surgical patients told us they would prefer a **certified & accredited operation theatre** (74%), as a plus

- **85%** of patients found **information** relating to operation theatre working and environment **very valuable**

- **92%** of relatives of surgical patients and more than **80%** of surgical patients expressed they would like to have more **information on safety** in operation theatre

- More than **80%** of surgical patients recognized that the lack of safety standards in OT was a potential **risk factor**

About the survey: Conducted by P/S/L Research and funded by Abbott to gain insights and data from patients undergoing surgery, parents, as well as relatives, on a variety of topics including anaesthesia awareness, OT knowledge & potential complications

“Environment friendly” can be the lever, in making Operation Theatres, best-in-class

- The anesthetics used by a busy hospital contribute as much to global warming as the emissions from 100 cars per year
- One Kilogram of anesthetic gas affects the climate as much as 1620 kilos of CO₂.
For e.g. Sevoflurane is the least damaging to ozone layer inhalation anesthetic

What does cGreen OT entails?

Green OT protocol is focused on various factors influencing the activities in the Operation theatre

- 1.Types of Anaesthetic agents
- 2.QA safety norms followed by Operation Theatre
- 3.Scavenging systems used
- 4.Ventilation systems
- 5.Anesthesia filling system
- 6.Other relevant factors.

Features:

- 1.cGreen OT promotes concept of practicing operation theatre activities in environmental friendly & safe manner
- 2.cGreen OT will be value addition to the Hospitals who are already following NABH & JCI requirements.
- 3.cGreen OT is based on the criteria based rating system covering key elements from pre-operation up to post operation activities.
- 4.cGreen OT certification approach is through self-assessment & through independent certification body Bureau Veritas.

Benefits:

- 1.Promotion of green & safe working practices by the Hospital Management to the stakeholders
2. The implementation of the standard will increase the overall utilization & optimization of the OT activities.
- 3.Green OT procedures & practices will improve the OT processes & evaluation of regulatory compliance can be monitored.
- 4.The green OT certification will enhance the reputation & commitment towards environment and safe practices related to anaesthetic agents use among the patients, staff & investor communities

cGreen OT Process

1.Self-assessment

A Hospital may perform Self-assessment effectively and efficiently to achieve “cGreen OT ” status by:

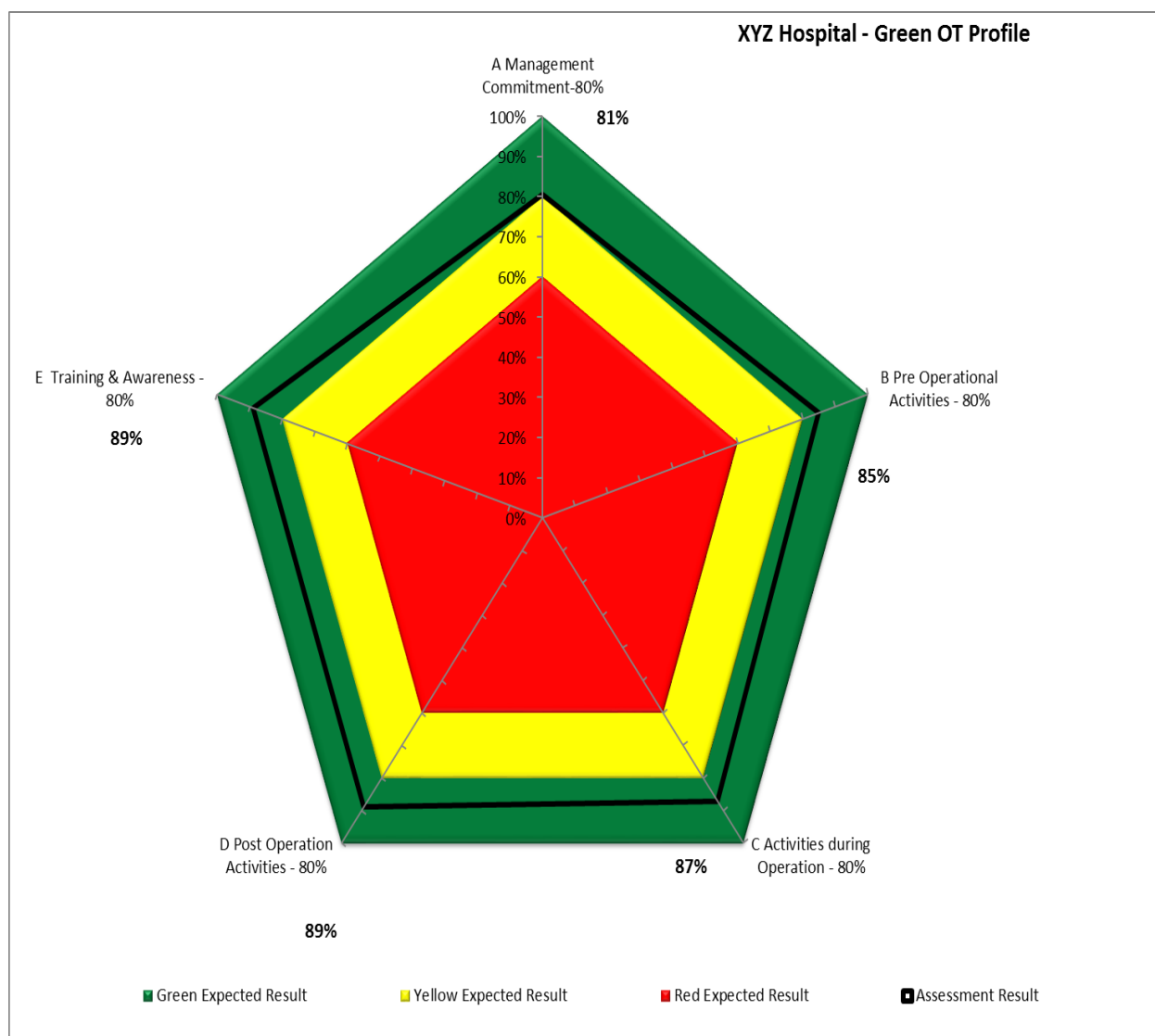
- Understanding and satisfying the requirements of the Green OT protocol
- Monitoring the changes in Operation Theatre environment
- Defining and deploying proper strategies
- Managing all required process and relevant resources
- Demonstrating confidence in its people, leading to increased motivation, commitment and involvement
- This assessment tool uses five maturity levels. Hospital should review its performance against specified criteria to identify current maturity levels and determine its strength and weaknesses.

NA	1	2	3	Assessment
Description NA	Requirement Not Defined	Requirement defined but not Implemented	Requirement Defined and Implemented	

2. Onsite audit and rating

- Based on the conditions defined in assessment tool the percentage of maturity will be calculated. Based on the calculations of the percentage (Qualifying score), Operation Theatre's "Green" Status will be confirmed
- Based on the assessment, the results will be published in the form of radar chart as given in the next figure.
- Hospital may use this tool for their internal assessment to identify the maturity level of their Operation Theatres.

Colour Code	Condition for Final Score
3	>=80%
2	60% to 79 %
1	<=59%



3. Certificate issuance

•The G.O.T: 2014 certificate will be issued to the Hospital management once all the criteria are compiled to the scoring requirements. Red score in any of the criteria will not entitle hospitals to get the certificate. The validity of the certificate is 1 year with 6 monthly surveillance.

RATING ELEMENTS OF CGREEN OT:

45 Parameters are assessed for accreditation of GREEN OT by bureau veritas

- 1.Management commitment
- 2.Pre-operation activities
- 3.Activities during operation
- 4.Post operation activities
- 5.Training and awareness

List of Abbreviations

GHG - Green House Gas

HSE - Health Safety & Environment

BMW - Bio Medical Waste

AMC- Annual Maintenance Contract

PPE - Personal Protective Equipment's

ODS - Ozone Depleting Substances

HVAC - Heating, Ventilation & Air Conditioning

OT - Operation Theaters

NABH- National Accreditation Board for Hospitals

PCB - Pollution Control Board

MAE- Maintenance & Engineering

GA- General Anesthesia

RA - Reginal Anesthesia

SALA - Sound Alike-Look alike

FGF-Fresh Gas Flow

CME- Continuous Medical Education

Management Commitment includes following parameters: -

1. The total quantity of different anesthetic gases used annually and measure the impact of CO₂ Equivalent of Global Warming using the table incorporated in the tool
2. Plan to phase out the ODS (R22) to be used as a refrigerant gas in Air-conditioning/VAC units for OT, Timeline of plan (If applicable)
3. Active/passive scavenging system to ensure prescribed Air handling, humidity, temperature & Air quantity requirements as per NABH guidelines
4. Identify & define the Environmental, GHG & Health related significant aspects arising from the OT activities control measures to minimize the potential impact on Health & safety of the OT users/environment
5. Define & implement safe working practices for Radiology, Laser, Chemical use, Electrical safety, Fire safety for OT Users
6. Reuse & Recycling Policy for reuse of Critical/Semi-critical devices covering
 - a) Policy on Disinfection & Transport of Soiled linen.
 - b) Policy on Home laundering of OT clothes.
 - c) Plumbing system is approved for discarding of small amounts of Blood & Body fluids.
 - d) Policy is in place for avoiding Inappropriate disposal of Antibiotics /Chemotherapeutic agents into the sewer system
 - e) In line filters from Wall suction units are appropriately discarded
 - f) There is a proper waste holding tank from OT, wherein the waste is treated before discarding into common sewer.
7. The hospital management shall have control on HVAC system including Critical Parameters are Measured & Documented
 - a) Air changes, Temperature, Humidity
 - b) Monitoring: Preventive filter & Duct Maintenance
 - ii) Pressure differentials across filters.
 - c) Microbiological Sampling for Air quality.
 - d) Availability of Backup ventilation equipment's
8. Monitoring Employee's Health, who are working in the OT by
 - a) an Implemented Staff health policy (Initial, Annual).
 - b) Pregnant & Vulnerable HCWs are addressed separately.
9. Scavenging system in the OT available. If yes - active/passive
10. Fire safety procedures for OT & evacuation area defined
11. Availability of adequate fire extinguishers/ training/mock drills for OT & OT Personnel

Pre-Operational Activities includes following parameters: -

1. Procedure for using anesthetic equipment's to ensure minimum exposure of Anesthesia gases to atmosphere & OT environment
2. Maintaining appropriate infrastructure for gas storage. The Infrastructure includes
 - a) Maintaining Temperature
 - b) Power backup

- c) Adequate Storage Container
- d) Anesthesia Transfer Mechanism (Pour Fill, Key Fill, Quick Fill) to prevent leakage/spillage
- 3. Procedure for Anesthesia workstation cleaning. The procedure may include
 - a) The description of cleaning agents used & its HSE impact
 - b) Methodology & frequency of cleaning (Use of PPEs)
- 4. Define the OT preparation procedures covering safety of the personnel, Good practices to reduce environmental impact of/by the Users other than Patients, Anesthetist & Doctors Before the start and after the operation activity.
- 5. Documented infection control programme which aims at preventing and reducing risk of healthcare associated infections.
- 6. Facility to administer Nitrous Oxide including administering low flow anesthesia
What is the % of GA cases with Nitrous oxide?
- 7. Description of Anesthesia circuits, open circuits (mapelson A / J-R) and a defined use nitrous oxide including the clinical requirements (Always/sometimes/when indicated/never)
- 8. Procedures are defined for vaporizer system & description series type mentioned
Do you have inhouse or external support for service or maintenance of vaporizers?
Do you have calibration process for vaporizers? If yes then how often you calibrate the vaporizers?
- 9. Gas Monitors availability & Whether the doctors practice low flow anesthesia &
What is the general mindset to use low anesthesia
- 10. The selection criteria for choosing anesthetic agents is defined(Halo/ISO/SEVO/DES)
- 11. The usual flow rates should be defined as per the anaesthsist comfortability with in adult patient population with close circuit system (1L/2L/4 L)
- 12. Look alike/sound alike drug list & periodic updation procedure in the OT & prominently displayed

Activities during Operation includes following parameters: -

- 1. Does your procurement policy consider the differences in the vaporizers of the inhalation anesthetic agent?
In case of use of Desflurane as anesthetic gas, the required temperature, vaporization pressure and the tubing material with defined operating procedures.
- 2. Procurement policy for selection of anesthetic agents
Procedure for using applicable anesthetic gases, type of anesthesia by the practitioners with respect to its carcinogenic impact on the OT Users (exception to this requirement is acceptable under discretion of respective doctor & anesthetist as per clinical requirements and records of these deviations with quantity shall be maintained)
- 3. The OT Maintenance & Engineering procedure is defined for the following
Emergency preparedness is Integrated into MAE operations

- Contingency plan in case of Water supply disruption for
- a) Patient care activities.
 - b) Staffs including Eye wash facilities.
 - c) Plan to prevent Backflow, Backlash, flooding from sewer lines + Water supply lines.
 - d) Construction & Renovation procedure for the OT complex
 - i) The Organization plans before any Minor/Major Construction/Renovation within the Complex.
 - ii) The Infection control permit/approval is taken for the same.
4. Availability of agent specific filling system in place & control of spillage of volatile anesthetic agents
 5. The general procedure (much % age) is defined for Regional Anesthesia requirements- < 25%/ 50%/ >75%
 6. Sterilization of OT by Fumigation or any other method & is available for guided air flow systems or laminar flow systems in place for air sampling for dust/microbiological contamination
Defined Procedure is available to achieve surface sterilization - using environmentally safe chemicals
 7. Procedure is defined (How many % age) for anesthetic induction by inhalation method - <25%/50%/>50%
At the end of anesthetic use accountability is defined with the personnel for putting vaporizer off (JMS/ consultant/OT attendant/Bio medical personnel)
 8. Accidental needle stick injury handling Sop in place & disposal procedures for sharps/needles - (Hard containers/special containers)
 9. Defined procedure for the personnel in OT for wearing radiological suits/led aprons when radiations are used & requirement for all personnel in OT wear radiation exposure meter
 10. Defined procedure for using laser beam during surgery in OT
 11. Defined procedures for capturing & reporting near miss event /fire/explosion/tissue injury & take corrective & preventive Actions
 12. SOP to prevent chemical burns to patients under anesthesia
 13. Procedure is defined for using hot air warmers- with blankets/without blankets

Post Operation Activities includes following parameters: -

1. Procedure to deal with waste generated during the cleaning of OT is available and safety practices followed (e.g. Cottons, cloths, gloves, drapes etc.)
2. Determination of the Environmental & GHG impact Biomedical waste handling of the OT
3. Maintaining the Cleanliness of the OT by ensuring
 - a) There is a documented schedule for cleaning the theatre.
 - b) The above is independently checked & monitored.

c) The use/purchase of cleaning agents is done by Consulting IC/Maintenance dept. & a policy exist for the same.

e.g. Use of EPA certified agents. To have a Vendor selection criteria based on the inputs for the same.

d) There is a Schedule for Pest control in the Complex, which is documented.

4. Clinical/Biomedical waste handling procedure & License/Written policy & Compliance with the applicable legal requirements
5. SOP for biomedical waste handling arising out of OT
The hospital should have high speed incineration facility for biological waste& for blood borne pathogens the procedure shall be defined for "universal precautions" to prevent microbiological contamination
6. Safety strategy to move anesthetized patients

Training & Awareness includes following parameters: -

1. Induction training module for the new users of OT covering various aspect HSE, GHG & Biomedical waste to increase general awareness

Note: New Users include Patients, Doctors, Nurse, OT Attendants, Cleaning Staff, Anesthetist, OT technicians, Microbiologist etc.

2. Involvement of the anesthesia practitioners to promote the practice of low-flow anesthesia by providing general guidelines/awareness training
3. Provision of effective training & awareness covering the Green OT requirements &
 - a) Training calendar for the staffs.
 - b) Training programme shall include all categories of staff (Housekeeping, Biomedical, Maintenance).
 - c) Appropriate PPEs are available with training given on how & when to

LITERATURE REVIEW

There is an increasing concern about pollution of the atmosphere due to human activities. Whether it is the traffic spewing exhaust fumes or the stench that emanates from once upon a time river along the city! It is either too hot or too cold. Experts call it global warming, owing to the greenhouse effect.

All the volatile anesthetics that are currently used (halothane, isoflurane, enflurane, sevoflurane, and desflurane) are halogenated compounds potentially destructive to the ozone layer. The widely used anesthetic gas nitrous oxide (N₂O) is an established greenhouse gas. A recent report suggests that N₂O is also an important ozone-depleting gas. Anesthesiologists are thus equal contributors, thanks to the widespread use of these gases.¹

During the last decade, world society has acknowledged the harmful effects on the environment of the greenhouse effect and of depletion of the ozone layer, caused by industrial emissions of man-made compounds. Ozone depletion is caused mainly by chlorine compounds or nitrogen oxides released by degradation in the stratosphere. The greenhouse effect is caused by increased trapping of terrestrial heat radiation. Degradation of the anaesthetic vapours halothane, enflurane and isoflurane releases chlorine, and nitrous oxide degradation produces reactive nitrogen oxides. Nitrous oxide in particular, but also the vapours, absorb terrestrial radiation. The total discharge of anaesthetic vapours contributes to less than 0.01% of the total atmospheric chlorine load, and the annual Norwegian release of approximately two tons accounts for 0.2% of the world total. It is estimated that the total amount of nitrous oxide released from anaesthetics accounts for 0.05% of the greenhouse effect, while annual Norwegian emissions of nitrous oxide (less than 160 tons) comprise 0.2-0.4% of world total. Because of their favourable clinical properties and their modest contribution to ozone depletion and the greenhouse effect, medical use of inhalational anaesthetic agents should not be banned. However, low flow anaesthetic techniques should be employed, in order to reduce their negative impacts on the atmosphere.²

For several decades, anesthetic gases have greatly enhanced the comfort and outcome for patients during surgery. The benefits of these agents have heavily outweighed the risks. In recent years, the attention towards their overall contribution to global climate change and the environment has increased. Anesthesia providers have a responsibility to minimize unnecessary atmospheric pollution by utilizing techniques that can lessen any adverse effects of these gases on the environment. Moreover, health care facilities that use anesthetic gases are accountable for ensuring that all anesthesia equipment, including the scavenging system, is effective and routinely maintained. Implementing preventive practices and simple strategies can promote the safest and most healthy environment.³

General anesthetics are administered to approximately 50 million patients each year in the United States. Anesthetic vapors and gases are also widely used in dentists' offices, veterinary clinics, and laboratories for animal research. All the volatile anesthetics that are currently used are halogenated compounds destructive to the ozone layer. These halogenated anesthetics could have potential significant impact on global warming. The widely used anesthetic gas nitrous oxide is a known greenhouse gas as well as an important ozone-depleting gas. These anesthetic gases and vapors are primarily eliminated through exhalation without being metabolized in the body, and most anesthesia systems transfer these gases as waste directly and unchanged into the atmosphere. Little consideration has been given to the ecotoxicological properties of gaseous general anesthetics. Our estimation using the most recent consumption data indicates that the

anesthetic use of nitrous oxide contributes 3.0% of the total emissions in the United States. Studies suggest that the influence of halogenated anesthetics on global warming will be of increasing relative importance given the decreasing level of chlorofluorocarbons globally. Despite these nonnegligible pollutant effects of the anesthetics, no data on the production or emission of these gases and vapors are publicly available. The primary goal of this article is to critically review the current data on the potential effects of general anesthetics on the global environment and to describe possible alternatives and new technologies that may prevent these gases from being discharged into the atmosphere.⁴

Global warming refers to an average increase in the earth's temperature, which in turn causes changes in climate. A warmer earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans. Greenhouse gases make the earth warmer by trapping energy inside the atmosphere. Greenhouse gases are any gas that absorbs infrared radiation in the atmosphere and include: water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated fluorocarbons (HCFCs), ozone (O₃), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs). Hazardous chemicals enter the air we breathe as a result of dozens of activities carried out during a typical day at a healthcare facility like processing lab samples, burning fossil fuels etc. We sometimes forget that anesthetic agents are also greenhouse gases (GHGs). Anesthetic agents used today are volatile halogenated ethers and the common carrier gas nitrous oxide known to be aggressive GHGs. With less than 5% of the total delivered halogenated anesthetic being metabolized by the patient, the vast majority of the anesthetic is routinely vented to the atmosphere through the operating room scavenging system. The global warming potential (GWP) of a halogenated anesthetic is up to 2,000 times greater than CO₂. Global warming potentials are used to compare the strength of different GHGs to trap heat in the atmosphere relative to that of CO₂. Here we discuss about the GWP of anesthetic gases, preventive measures to decrease the global warming effects of anesthetic gases and Xenon, a newer anesthetic gas for the future of anesthesia.⁵

AIM: To Describe the parameters of Green OT Certification in Asian Institute of Medical Sciences, Faridabad.

OBJECTIVE:

- To assess the parameters adopted for accreditation of GREEN OT by Bureau Veritas and ABBOTT
- To check the extent of compliance of the parameters given by bureau veritas for Green OT

RATIONALE: This report is intended to find out the extent of compliance with respect to parameters set by Bureau Veritas for Green OT. Green OT is known to differ from regular OTs in ways which are environment friendly as well as promotes stringent infection control thereby improving post-operative recovery outcome of patient.

RESEARCH METHODOLOGY:

Study location: Asian institute of medical sciences, Faridabad

Type of study- Descriptive study

Study area- OT complex

Duration of study- 3 weeks

Study instruments:

Primary data:

- Quantitative data obtained by scoring the bureau veritas 2014 Cgreen OT standards
- Direct observation of infrastructure and facilities

Secondary data:

- Qualitative data was obtained from hospital policies, manuals and SOPs
- Review of records and register of the various department of the hospital

DATA ANALYSIS AND INTERPRETATION:

	NA	1	2	3	
Green OT self-assessment score	Descripti on NA	Requirem ent Not Defined	Requirem ent defined but not Implemen ted	Requirem ent Defined and Implemen ted	Assessm ent
A Management Commitment-80%					80.6%
The total quantity of different anaesthetic gases used annually and measure the impact of CO2 Equivalent of Global Warming using the table incorporated in the tool				Complied	3
Plan to phase out the ODS (R22) to be used as a refrigerant gas in Air-conditioning/VAC units for OT, Timeline of plan (If applicable)				Complied	3
Active/passive scavenging system to ensure prescribed Air handling, humidity, temperature & Air quantity requirements as per NABH guidelines			Complied		2
Identify & define the Environmental, GHG & Health related significant aspects arising from the OT activities control measures to minimise the potential impact on Health & safety of the OT users/environment			Complied		2

Define & implement safe working practices for Radiology, Laser, Chemical use, Electrical safety, Fire safety for OT Users			Complied		2
Reuse & Recycling Policy for reuse of Critical/Semi-critical devices covering a) Policy on Disinfection & Transport of Soiled linen. b) Policy on Home laundering of OT clothes. c) Plumbing system is approved for discarding of small amounts of Blood & Body fluids. d) Policy is in place for avoiding Inappropriate disposal of Antibiotics /Chemotherapeutic agents into the sewer system e) In line filters from Wall suction units are appropriately discarded f) There is a proper waste holding tank from OT, wherein the waste is treated before discarding into common sewer.			Complied		2
The hospital management shall have control on HVAC system including Critical Parameters are Measured & Documented a) Air changes, Temperature, Humidity b) Monitoring : Preventive filter & Duct Maintenance ii) Pressure differentials across filters. c) Microbiological Sampling for Air quality. d) Availability of Backup ventilation equipment's			Complied		2

Monitoring Employee's Health, who are working in the OT by a) an Implemented Staff health policy (Initial, Annual). b) Pregnant & Vulnerable HCWs are addressed separately.				Complied	3
Scavenging system in the OT available. If yes - active/passive			Complied		2
The OT shall be electrically safe certified				Complied	3
Fire safety procedures for OT & evacuation area defined				Complied	3
Availability of adequate fire extinguishers/ training/mock drills for OT & OT Personnel			Complied		2
B Pre-Operational Activities - 80%					84.8%
Procedure for using anaesthetic equipment's to ensure minimum exposure of Anaesthesia gases to atmosphere & OT environment					2

Maintaining appropriate infrastructure for gas storage. The Infrastructure includes 1. Maintaining Temperature 2. Power backup 3. Adequate Storage Container 4. Anaesthesia Transfer Mechanism (Pour Fill, Key Fill, Quick Fill) to prevent leakage/spillage					3
Procedure for Anaesthesia workstation cleaning. The procedure may includes 1. The description of cleaning agents used & its HSE impact 2. Methodology & frequency of cleaning (Use of PPEs)			Complied		2
Define the OT preparation procedures covering safety of the personnel, Good practices to reduce environmental impact of/by the Users other than Patients, Anaesthetist & Doctors Before the start and after the operation activity.				Complied	3
Documented infection control programme which aims at preventing and reducing risk of healthcare associated infections.			Complied		2
Facility to administer Nitrous Oxide including administering low flow anaesthesia What is the % of GA cases with Nitrous oxide?				Complied	3
Description of Anaesthesia circuits, open circuits (mapelson A / J-R) and a defined use nitrous oxide including the clinical requirements (Always/sometimes/when indicated/never)				Complied	3

Procedures are defined for vaporizer system & description series type mentioned Do you have inhouse or external support for service or maintenance of vaporizers? Do you have calibration process for vaporizers? If yes then how often you calibrate the vaporizers?				Complied	3
Gas Monitors availability & Whether the doctors practice low flow anaesthesia & What is the general mindset to use low anaesthesia			Complied		2
The selection criteria for choosing anaesthetic agents is defined(Halo/ISO/SEVO/DES) The usual flow rates should be defined as per the anesthsist comfortability with in adult patient population with close circuit system (1L/2L/4 L)				Complied	3
Look alike/sound alike drug list & periodic updation procedure in the OT & prominently displayed			Complied		2
C Activities during Operation - 80%					87.2%
Does your procurement policy consider the differences in the vaporizers of the inhalation anesthetic agent? In case of use of Desflurane as anaesthetic gas, the required temperature, vaporisation pressure and the tubing material with defined operating procedures.			Complied		2

Procurement policy for selection of anaesthetic agents Procedure for using applicable anaesthetic gases, type of anaesthesia by the practitioners with respect to its carcinogenic impact on the OT Users (exception to this requirement is acceptable under discretion of respective doctor & anaesthetist as per clinical requirements and records of these deviations with quantity shall be maintained)				Complied	3
The OT Maintenance & Engineering procedure is defined for the following Emergency preparedness is Integrated into MAE operations Contingency plan in case of Water supply disruption for a) Patient care activities. b) Staffs including Eye wash facilities. c) Plan to prevent Backflow, Backlash, flooding from sewer lines + Water supply lines. d) Construction & Renovation procedure for the OT complex i) The Organisation plans ahead before any Minor/Major Construction/Renovation within the Complex. ii) The Infection control permit/approval is taken for the same.			Complied		2
Availability of agent specific filling system in place & control of spillage of volatile anaesthetic agents				Complied	3
The general procedure (much % age) is defined for Regional Anaesthesia requirements- < 25%/ 50%/ >75%				Complied	3

Sterilization of OT by Fumigation or any other method & is available for guided air flow systems or laminar flow systems in place for air sampling for dust/microbiological contamination Defined Procedure is available to achieve surface sterilization - using environmentally safe chemicals				Complied	3
Procedure is defined (How many % age) for anaesthetic induction by inhalation method - <25%/50%/>50% At the end of anaesthetic use accountability is defined with the personnel for putting vaporizer off (JMS/consultant/OT attendant/Bio medical personnel)				Complied	3
Accidental needle stick injury handling Sop in place & disposal procedures for sharps/needles -(Hard containers/special containers)			Complied		2
Defined procedure for the personnel in OT for wearing radiological suits/led aprons when radiations are used & requirement for all personnel in OT wear radiation exposure meter			Complied		2
Defined procedure for using laser beam during surgery in OT				Complied	3
Defined procedures for capturing & reporting near miss event /fire/explosion/tissue injury & take corrective & preventive Actions				complied	3

SOP to prevent chemical burns to patients under anaesthesia			Complied		2
Procedure is defined for using hot air warmers- with blankets/without blankets				Complied	3
D Post Operation Activities - 80%					88.9%
Procedure to deal with waste generated during the cleaning of OT is available and safety practices followed (e.g. Cottons, cloths, gloves, drapes etc.)				Complied	3
Determination of the Environmental & GHG impact Biomedical waste handling of the OT			Complied		2
Maintaining the Cleanliness of the OT by ensuring a) There is a documented schedule for cleaning the theatre. b) The above is independently checked & monitored. c) The use/purchase of cleaning agents is done by Consulting IC/Maintenance dept & a policy exist for the same. e.g Use of EPA certified agents.To have a Vendor selection criteria based on the inputs for the same. d) There is a Schedule for Pest control in the Complex, which is documented.				Complied	3

Clinical/Biomedical waste handling procedure & License/Written policy & Compliance with the applicable legal requirements			Complied		2
SOP for biomedical waste handling arising out of OT The hospital should have high speed incineration facility for biological waste & for blood borne pathogens the procedure shall be defined for "universal precautions" to prevent microbiological contamination				Complied	3
Safety strategy to move anesthetized patients				Complied	3
E Training & Awareness - 80%					88.9%
Induction training module for the new users of OT covering various aspect HSE, GHG & Biomedical waste to increase general awareness Note: New Users include Patients, Doctors, Nurse, OT Attendants, Cleaning Staff, Anaesthesist, OT technicians, Microbiologist etc.				Complied	3
Involvement of the anaesthesia practitioners to promote the practice of low-flow anaesthesia by providing general guidelines/awareness training			Complied		2

provision of effective training & awareness covering the Green OT requirements & a) Training calendar for the staffs. b) Training programme shall include all categories of staff (Housekeeping,Biomedical,Maintenance). c) Appropriate PPEs are available with training given on how & when to use it.				Complied	3
					86.1%

	N2O							
	2014		2015		2016		2017	
	D Type (30 kg)	A Type (3.5 kg)	D Type (30 kg)	A Type (3.5 kg)	D Type (30 kg)	A Type (3.5 kg)	D Type (30 kg)	A Type (3.5 kg)
Jan	7		7	1	2		4	
Feb	5	1	4		4		3	
Mar	7		6		2	1	3	2
Apr	6		6		3		3	
May	7		7		2	1		
Jun	6		5		3			
Jul	7	1	6		3			
Aug	8	1	6		3			
Sep	8		5		3			
Oct	6		5		2			
Nov	7		5		3			
Dec	6		3		3			
	80	3	65	1	33	2	13	2
TO TAL (No s.)	83		66		35		15	
	2400	10.5	1950	3.5	990	7	390	7
Con s. In kg	2410.5		1953.5		997		397	
Con s. In ml	2410500		1953500		997000		397000	

	CO2 (A Type cylinder of 3.5 kg)			
	2014	2015	2016	2017
Jan	8	14	13	20
Feb	12	9	24	18
Mar	16	10	16	12
Apr	21	15	20	17
May	17	28	32	
Jun	13	20	19	
Jul	18	34	18	
Aug	19	31	24	
Sep	15	32	22	
Oct	8	27	17	
Nov	25	19	14	
Dec	18	28	22	
TOTAL	190	267	241	67
Cons. In kg	665	934.5	843.5	234.5
Cons. In ml	665000	934500	843500	234500

CONSUMPTION IN BOTTLES			
	2014	2015	2016
ISOFLURANE		19 (250 ml bottle) 25 (100 ml bottle)	75 (100 ml bottle)
DESFLURANE (240 ml bottle)	240	392	395
SEVOFLURANE (250 ml bottle)	606	366	215

CONSUMPTION IN ML			
	2014	2015	2016
ISOFLURANE		7250	7500
DESFLURANE (240 ml bottle)	57600	94080	94800
SEVOFLURANE (250 ml bottle)	151500	91500	53750

Carbon Footprint Impact Profile from the use of various Inhalation Anaesthetic Agents (2016) for Asian Hospital, Faridabad

Anaesthetic Agents Use	Annual Quantity (Verified during audit for year 2016) in Kg	Annual Quantity consumption (in tonne) #	Global Warming Potential (20 years) *	Equivalent Carbon Emission (tCO ₂ e) in 2016	Percentage (%) of Total Carbon Emission in 2016	Equivalent Carbon Emission (tCO ₂ e) in 15	% increase in emissions
Nitrous Oxide	997000	1.04	289	300.14	35.06	588.08	-48.96%
Carbon-di-oxide	843500	0.84	1	0.84	0.10	0.93	-9.74%
Isoflurane	7500	0.01	1401	15.76	1.84	13.13	20.04%
Desflurane	94800	0.14	3714	510.50	59.64	506.65	0.77%
Sevoflurane	53750	0.08	349	28.70	3.35	48.86	-41.26%
Total Annual Equivalent Carbon Emission due to use of Anaesthetic Gases (in Tonne-CO₂equivalent) for the period 2016				855.97	100.00	1159.76255	
* As per International Society for Anaesthetic Pharmacology the GWP in 20-year time horizon # As per http://www.anesthesia2000.com/physics/Chemistry_Physics/physics6.htm Density of Sevoflurane - 1.52gm/ml Density of Desflurane - 1.45gm/ml Density of Isoflurane - 1.5 gm/ml							

CARBON FOOTPRINT IMPACT PROFILE OF VARIOUS ANESTHETIC AGENTS IN THE YEAR 2015 AND 2016

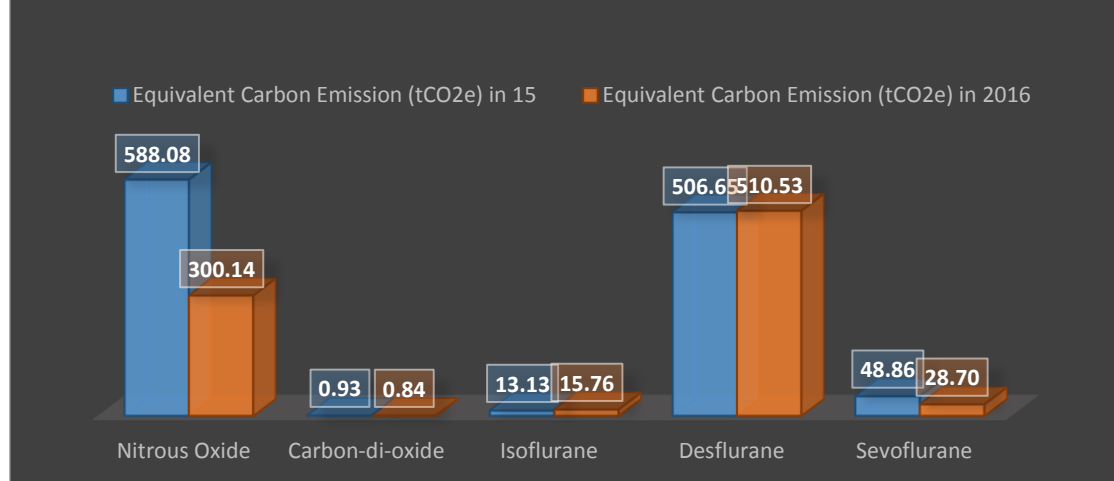


Fig no.1: Figure depicts the Equivalent Carbon Emissions of various inhalational anesthetic agents in the year 2015 and 2016. In the year 2016 the equivalent carbon emission for N₂O is 300.14, CO₂ is 0.84, Isoflurane is 15.76, Desflurane is 510.53, Sevoflurane is 28.7

Carbon Footprint Impact Profile from the use of various Inhalation Anaesthetic Agents (2015) for Asian Hospital, Faridabad

Anesthetic Agents Use	Annual Quantity (Verified during audit for year 2015) in Kg	Annual Quantity consumption (in tonne) #	Global Warming Potential (20 years) *	Equivalent Carbon Emission (tCO ₂ e) in 2015	Percentage (%) of Total Carbon Emission in 2015	Equivalent Carbon Emission (tCO ₂ e) in 14	% increase in emissions
Nitrous Oxide	D' type of cylinder- 0 Nos (30 kg of N ₂ O/cylinder) A' type cylinder - 0 Nos. (3.5 kg of N ₂ O/cylinder)	2.19	289	633.78	48.92	696.2	-8.97%
Carbon-di-oxide	801 Kg	0.80	1	0.80	0.06	0.64	25.16%
Isoflurane	6250	0.01	1401	13.13	1.01	9.25	41.99%
Desflurane	111000	0.16	3714	597.77	46.15	298.88	100.00 %
Sevoflurane	93500	0.14	349	49.93	3.85	88.64	-43.68%
Total Annual Equivalent Carbon Emission due to use of Anaesthetic Gases (in Tonne-CO₂equivalent) for the period 2015				1295.41	100.00		

* As per International Society for Anaesthetic Pharmacology the GWP in 20-year time horizon # As per http://www.anesthesia2000.com/physics/Chemistry_Physics/physics6.htm Density of Sevoflurane - 1.52gm/ml Density of Desflurane - 1.45gm/ml Density of Isoflurane - 1.5 gm/ml		

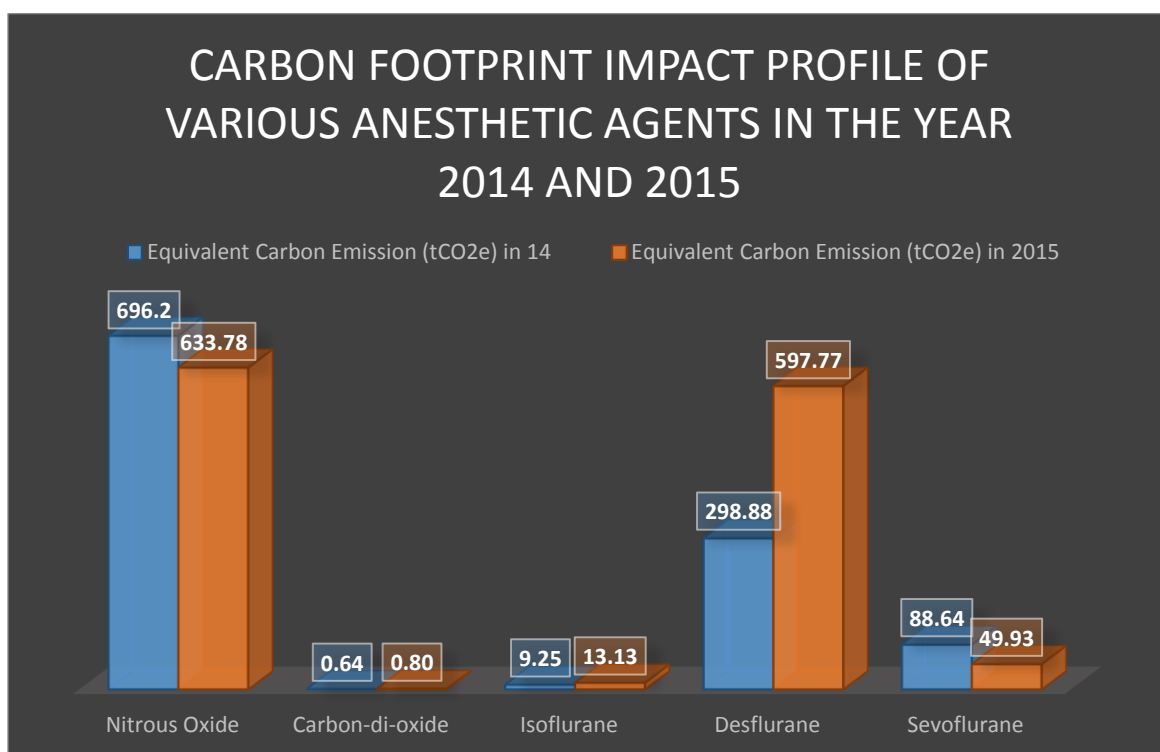


Fig no 2: Figure depicts the Equivalent Carbon Emissions of various inhalational anesthetic agents in the year 2014 and 2015. In the year 2015 the equivalent carbon emission for N₂O is 633.78, CO₂ is 0.8, Isoflurane is 13.13, Desflurane is 597.77, Sevoflurane is 49.93

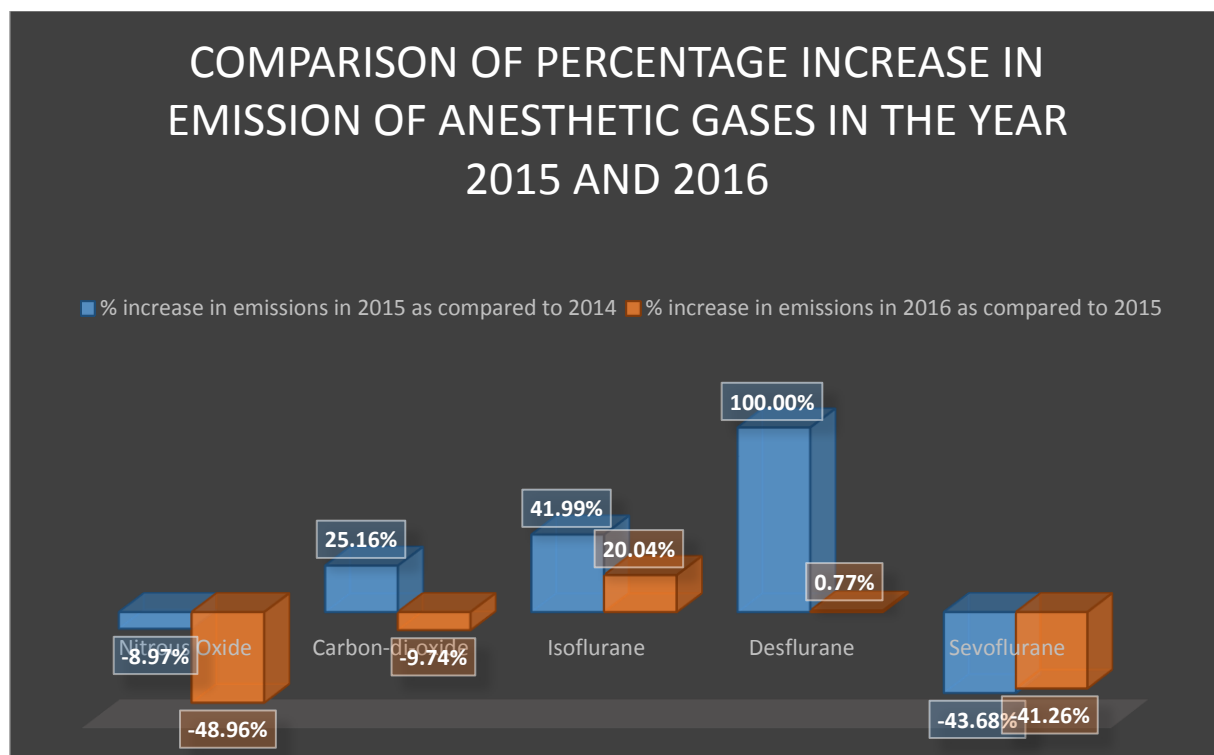


Fig 3: Figure depicts the comparison of percentage increase in emission of anesthetic gases in the year 2015 and 2016. for nitrous oxide in year 2015 had decreased by 8.97 as compared to 2014 whereas in year 2016 it decreased to 48.96 as compared to 2015. Similarly for carbon dioxide the emission increased by 25.67 as compared to 2014 whereas in year 2016 it decreased by 9.74 as compared to 2015. for isoflurane in year 2015 the emission increased by 41.9 as compared to 2014 whereas in year 2016 it decreases by 20.04 as compared to 2015. for desflurane the emission increases by 100 as compared to 2014 whereas in year 2016 it increases by 0.77 as compared to 2015. for sevoflurane in year 2015 the emission decreases from 43.68 as compared to 2014 whereas in year 2016 it decreases by 41.26 as compared to 2015

COMPARISON OF EQUIVALENT CARBON EMISSION OF VARIOUS ANESTHETIC GASES IN THE YEAR 2014,15 AND 16

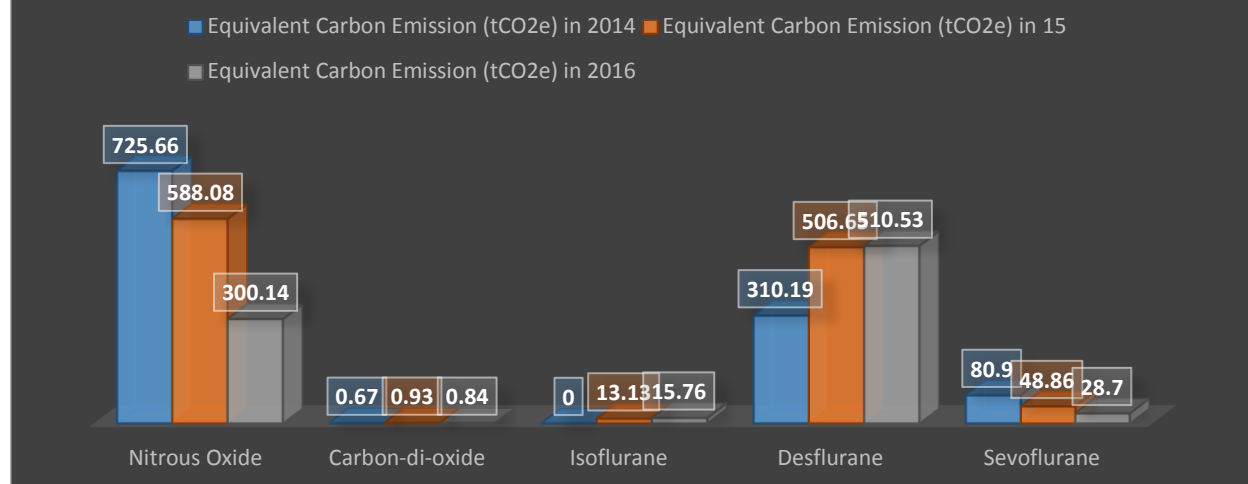


Fig no 4: Figure depicts the comparison of equivalent carbon emission of various anesthetic gases in the year 2014,2015 and 2016.the carbon emission for nitrous oxide is continuously decreasing from 2014 to 2016.for carbon dioxide it is almost same in all three years. for isoflurane it is almost equal. for desflurane the emission is increasing every year and for sevoflurane the pattern for carbon emission is also decreasing

OBSERVATIONS AND FINDINGS:

1. Hospital has well maintained documentation in terms of SOPs, policies and manuals which are needed for Green OT certification
2. The consumption pattern of various inhalational anesthetic agents used in the hospital in last 3 years has shown changes
3. Even though the global warming potential of desflurane is maximum (3714) still in the year 2016 the consumption of desflurane is more (94800ml)as compared to (94080ml) in 2015
4. Even though the global warming potential of sevoflurane is low (349) still in the year 2016 the consumption of sevoflurane is less (53750ml) as compared to (91500ml) in 2015

5. Percentage of nitrous oxide emission of anesthetic gases in the year 2015 as compared to 2014 is 8.97% which has drastically reduce to 48.96% in the year 2016 as compared to 2015.
6. Percentage of isoflurane emission of anesthetic gases in the year 2015 as compared to 2014 is 41.9% which has drastically reduce to 20.04% in the year 2016 as compared to 2015.
7. Percentage of desflurane emission of anesthetic gases in the year 2015 as compared to 2014 is 100% which as drastically reduce to 0.77% in the year 2016 as compared to 2015.
8. The equivalent carbon emission of various anesthetic gases in the year 2014,2015 and 2016 has been continuously changing. For nitrous oxide, it is continuously decreasing but for all other gases it is almost equal in all three years
9. Although desflurane has a high global warming potential but still it is used in high amounts because of it its better post recovery effects and sevoflurane is used in less amount beside it has low global warming potential because of its limitations.
10. Scavenging system is attached with the anesthetic machines in order to reduce the exposure of anesthetic gases in the environment
11. The hospital staff particularly OT staff is vigilant and aware about benefits of Green OT in relation to become environment friendly and how the environment is affected by anesthetic gases

RECOMMENDATIONS:

1. The use of anesthetic gases which has low global warming potential should be encouraged thereby sevoflurane which has lowest global warming potential of 349 must be used in maximum amount
2. Low flow anesthesia practice should be encouraged among anesthetists in order to reduce the consumption of anesthetic agents
3. Training should be inducted by HOD anesthetist to encourage the practice of low flow anesthesia among anesthetists.
4. Regular fire mock drills should be arranged for OT staff in order to check the compliance
5. Records should be maintained in order to know the amount of Biomedical waste generated inside the OT
6. There is a need to generate a software application which contains all the hospitals policies, manuals, SOPs and other data needed for Green OT assessment and this application can even help the hospital staff to know the functioning of different areas inside the hospital.

CONCLUSION:

Green OT certification in hospitals OT helps in reassuring the quality and patient safety standards are maintained. The need of accreditations is rapidly increasing because it defines the

hospital commitment regarding quality and patient safety and thereby it increases patient satisfaction. The application of this study is to check the compliance of parameters issued by bureau veritas for green OT certification.

This study illustrates what all parameters needed for certification of green OT . How the hospital is functioning to comply all the needed parameters.

The staffs of the OT is aware about environmental implications of anesthetic gases used in the OT. Staff is competent in order to answer the question related to safe environment at the time of audit.

Therefore, Green OT certification is a quality parameter needed in hospitals to ensure both environment and patient safety

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Annexure

Requirement Sr. No. (RSN)	Requirements of cGREEN OT:2014 Standard (Reference for Self-Assessment)	A. Management Commitment B. Pre-Operation Activities C. Operation D. Post-Operation Activities E. Training and Awareness	Expected Documentation & Guidelines for Checking Conformity during Audit (For Reference only but not limited to the mentioned documents)	Auditee Point of Contact (To be confirmed by the Hospital among Anaesthetist, Microbiologist, OT Technician, Purchase dept. Admin etc..)
1	The Hospital Management shall establish the procedure for using anaesthetic equipment's to ensure minimum exposure of Anaesthesia gases to atmosphere & OT environment	B	List of equipment's including workstation types and vaporizer filling system, Manual of General Anaesthesia &	Anaesthesia team

			Pain Management, Policy on Lo-flow anaesthesia, N2O usage, volatile anaesthesia usage, Bio Medical policy on maintenance of pumps for scavenging	
2	Hospital management shall maintain appropriate infrastructure for gas storage. The Infrastructure includes 1. Maintaining Temperature 2. Power backup 3. Adequate Storage Container 4. Anaesthesia Transfer Mechanism (Pour Fill, Key Fill, Quick Fill) to prevent leakage/spillage	B	Anaesthesia policy, AMC, Maintenance Schedule, Safety Manual incorporating the requirements	Maintenance Team + Quality team
3	The Hospital Management shall establish & maintain the procedure for Anaesthesia workstation cleaning. The procedure may include 1. The description of cleaning agents used & its HSE impact 2. Methodology & frequency of cleaning (Use of PPEs)	B	Cleaning, disinfection & sterilization of equipment & guidelines	ICN

4	The hospital management shall determine the total quantity of different anaesthetic gases used annually and measure the impact of CO2 Equivalent of Global Warming	A	Actual procured quantities of volatile anaesthetic agents, nitrous oxide, CO2 in last 2 years to be provided. Quantities should be converted into Litres	Anaesthesia team
5	The Hospital Management shall develop an Induction training module for the new users of OT covering various aspect HSE, GHG & Biomedical waste to increase general awareness Note: New Users include Patients, Doctors, Nurse, OT Attendants, Cleaning Staff, Anaesthetist, OT technicians, Microbiologist etc.	E	Display of information/slides in the OT complex for awareness about GHG, BMW, HSE, Surgical safety	Quality + Training team
6	The hospital management shall analyse the differences in the vaporizers of the inhalation anaesthetic agent during procurement. The vaporizer should be user friendly & provide controls to minimise environmental impact.	C	Vendor Management/selection policy or Procurement medical equipment policy with the emphasis on closed	Anaesthesia team

			filling system of vaporizers	
7	The hospital shall plan to phase out the ODS to be used as a refrigerant gas in Air-conditioning/VAC units for OT	A	ODS policy or document slowing purchase of non ODS	Anaesthesia + Quality Team+Maintenance
8	The hospital should have active/passive scavenging system to ensure prescribed Air handling, humidity, temperature & Air quantity requirements as per NABH guidelines	A	Air quality, temp, humidity, pressure differential log sheet	BME+Maintenance
9	The hospital management shall define the policy for procurement & procedure for using applicable anaesthetic gases, type of anaesthesia by the practitioners with respect to its hazardous (carcinogenic) impact on the OT Users (exception to this requirement is acceptable under discretion of respective doctor & anaesthetist as per clinical requirements and records of these deviations with quantity shall be maintained)	C	Vendor/Management selection, N2O oxide policy, volatile agent uses policy/guidelines that considers the occupational hazards of different volatiles	Anaesthesia team + Quality Team + Purchase

10	The hospital management shall promote the practice of low-flow anaesthesia by providing general guidelines/awareness training to anaesthesia practitioners	E	Avg FGF practice of the hospital based on the Survey report of FGF practice of all anesthesiologists. Any Workshop/CME conducted on low flow anaesthesia in the hospital	Anaesthesia team
11	The hospital management shall identify & define the Environmental, GHG & Health related significant aspects arising from the OT activities and take adequate control measures to minimise the potential impact on Health & safety of the OT users/environment	A	Scavenging policy, Manual of General Anaesthesia & Pain Management² electrical safety manual (List of all hazards & its controls to be listed)	Anaesthesia team
12	The hospital management shall define the procedure to deal with waste generated during the cleaning of OT and safety practices followed (e.g. Cottons, cloths, gloves, drapes etc.)	D	BMW Policy & guidelines	Quality & ICN Team

13	The Hospital management shall determine & define the Environmental & GHG impact Biomedical waste handling of the OT	D	Disposal procedure & physical verification	Quality Team + ICN Team
14	The hospital shall define & implement safe working practices for Radiology, Laser, Chemical use, Electrical safety, Fire safety for OT Users	A	Safety Manual/SOP	Quality Team
15	The hospital management shall define the OT preparation procedures covering safety of the personnel, Good practices to reduce environmental impact of/by the Users other than Patients, Anaesthetist & Doctors Before the start and after the operation activity.	B	Manual of General Anaesthesia & Pain Management, Surgical safety	Safety Manual + Anaesthesia + Nursing + Quality
16	The Hospital management shall define a documented infection control programme which aims at preventing and reducing risk of healthcare associated infections.	B	Infection Control Policy	ICN Team and Quality team
17	The Hospital management shall maintain the Cleanliness of the OT by ensuring a) There is a documented schedule for cleaning the theatre. b) The above is independently checked & monitored. c) The use/purchase of cleaning agents is done by Consulting IC/Maintenance dept. & a policy exist for the same. e.g. Use of EPA certified agents. To have a Vendor selection criteria based on the inputs for the same. d) There is a Schedule for Pest control in the Complex, which is documented.	D	Cleaning Schedule & its independently checked,	Quality team+Purchase
18	The hospital management shall have Clinical/Biomedical waste handling procedure & License/Written policy	D	BMW Policy, Env Consents & manifest, annual returns to	Quality team + Administrator

			PCB	
19	The Hospital management shall have Reuse & Recycling Policy for reuse of Critical/Semi-critical devices covering a) Policy on Disinfection & Transport of Soiled linen. b) Policy on Home laundering of OT clothes. c) Plumbing system is approved for discarding of small amounts of Blood & Body fluids. d) Policy is in place for avoiding Inappropriate disposal of Antibiotics /Chemotherapeutic agents into the sewer system e) In line filters from Wall suction units are appropriately discarded f) There is a proper waste holding tank from OT, wherein the waste is treated before discarding into common sewer.	A	Reuse & recycling policy of critical & semi critical devices, policy on disinfection & transport of soiled linen, Spill Kits readily available	Housekeeping + Quality+Nursing
20	The OT Maintenance & Engineering shall have an procedure defined for the following Emergency preparedness is Integrated into MAE operations Contingency plan in case of Water supply disruption for a) Patient care activities. b) Staffs including Eye wash facilities. c) Plan to prevent Backflow,Backlash,flooding from sewer lines + Water supply lines. d) Construction & Renovation procedure for the OT complex i) The Organisation plans ahead before any Minor/Major Construction/Renovation within the Complex. ii) The Infection control permit/approval is taken for the same.	C	Safety Manual/ Disaster control Manual	Quality + Maintenance+Security

21	The hospital management shall have control on HVAC system including Critical Parameters are Measured & Documented a) Air changes, Temperature, Humidity b) Monitoring: Preventive filter & Duct Maintenance ii) Pressure differentials across filters. c) Microbiological Sampling for Air quality. d) Availability of Backup ventilation equipment's	A	HVAC & Bio Medical Engineering manual	Maintenance Team + BME + Quality
22	The hospital management shall provide effective training & awareness covering the Green OT requirements & a) Training calendar for the staffs. b) Training programme shall include all categories of staff (Housekeeping, Biomedical, Maintenance). c) Appropriate PPEs are available with training given on how & when to use it.	E	Annual Training Calendar for all OT users incorporating green ot requirements	Quality + Training
23	The hospital management shall monitor Employee's Health, who are working in the OT by a) an Implemented Staff health policy (Initial, Annual). b) Pregnant & Vulnerable HCWs are addressed separately.	A	Pre-engagement medical check-up data, guidelines for vulnerable stuffs to limit exposure to anaesthesia environment	Quality team + HR
24	The anaesthesia workstation shall have the facility to administer Nitrous Oxide including administering low flow anaesthesia	B	Manual of General Anaesthesia & Pain Management	Anaesthesia team

25	The OT shall describe the type of Anaesthesia circuits, open circuits (Mapleson A / J-R) and a defined use nitrous oxide including the clinical requirements (Always/sometimes/when indicated/never)	B	Breathing circuit policy	Anaesthesia team
26	The calibration procedures are defined for vaporizer system & description series type mentioned	B	Vaporiser calibration records or Contract of Service, Maintenance & Calibration contract by vaporiser supplier/anaesthetic agent's manufacturer	Anaesthesia team
27	The hospital management shall have the procurement policy for different volatiles based on the specific filling system that ensures control of spillage of volatile anaesthetic agents OT pollution and exposure of inhalation agent to OT staff	C	Vendor policy, Manufacture policy	Anaesthesia team+Purchase
28	The hospital should have scavenging system in the OT If yes - active/passive (Yes/No)	A	If no, A management plan to install scavenging system	BME
29	The procedure shall be defined for using Gas Monitors regularly & Whether the doctors practice low flow anaesthesia & What is the general mindset to use low anaesthesia	B	Questionnaire survey to analyse Mind set of practitioners, Low-flow policy	Anaesthesia team

30	The general procedures (much % age) shall be defined for Regional Anaesthesia requirements- < 25%/ 50%/ >75%	C	GA% RA% LMA% for all surgeries in last two years	Anaesthesia team
31	The procedures shall be defined to achieve sterilization of OT - 1) Fumigation or any other method The described methodology shall be available for guided air flow systems or laminar flow systems in place for air sampling for dust/microbiological contamination Defined Procedures shall be available to achieve surface sterilization - using environmentally safe chemicals	C	Cleaning / Disinfection Procedures	ICN+Maintenance
32	The procedures shall be defined (How many % age) for anaesthetic induction by inhalation method - <25%/50%/>50% At the end of anaesthetic use accountability is defined with the personnel for putting vaporizer off (JMS/ consultant/OT attendant/Bio medical personnel)	C	Workstation SOP, %GA cases where volatile used only as induction	Anaesthesia team
33	The hospital management shall have a SOP for biomedical waste handling arising out of OT The hospital should have high speed incineration facility for biological waste & for blood borne pathogens the procedure shall be defined for "universal precautions" to prevent microbiological contamination	D	Universal precaution, SOP of waste handling	Quality Team + ICN Team
34	The selection criteria for choosing anaesthetic agents shall be defined(Halo/ISO/SEVO/DES) The usual flow rates should be defined as per the anaesthetist comfortability with in adult patient population with close circuit system (1L/2L/4 L)	B	Low-flow with environment friendly anaesthetic agent policy, volatile agent policy	Anaesthesia team

35	The OT shall have accidental needle stick injury handling Sop in place & disposal procedures for sharps/needles - (Hard containers/special containers)	C	Needle Stick Injury policy & guidelines	ICN Team
36	The OT shall have a defined procedure for the personnel in OT for wearing radiological suits/led aprons when radiations are used & requirement for all personnel in OT wear radiation exposure meter	C	Radiation policy-op room standard, safety manual, TLD batches compliance	RSO + Quality
37	The procedures shall be defined for using laser beam during surgical procedure in OT	C	Laser Policy-op room std, safety manual	Quality
38	The procedures shall be defined for capturing & reporting near miss event /fire/explosion/tissue injury & take corrective & preventive Actions	C	near miss adverse event analysis (Incident reporting) safety manual	Quality team
39	The SOP shall be defined to prevent chemical burns to patients under anaesthesia	C	OT Safety guideline s	Anaesthesia team + Quality Team
40	The procedure shall be defined for using hot air warmers- with blankets/without blankets	C	warm air blanket policy	Anaesthesia team
41	The OT shall be electrically safe certified	A	electric safety SOP, safety manual	Maintenance Team + Quality team
42	The Hospital management shall defined a fire safety procedures for OT & evacuation area defined	A	Emergency evacuation	Security + Quality Team

			plan/sign age, fire safety drill records	
43	The OT shall have the safety strategy to move anesthetized patients	D	Guideline to transport anaesthetised patient safely	Anaesthesia team
44	The hospital shall make available of adequate fire extinguishers/ training/mock drills for OT & OT Personnel	A	Fire safety, record of training	Quality Team & Fire Safety Officer
45	The hospital management shall have look alike/sound alike drug list & periodic updation procedure in the OT & prominently displayed	B	SALA policy & OT specific SALA drug list	Nursing educator + Quality team

HAZARD IDENTIFICATION AND RISK ASSESSMENT IN OT

ABSTRACT

Workplace hazard identification, assessment and control are an on-going process. It is often more effective and easy to eliminate hazards if risk management approaches used at the planning and design stages for process and place of work.

Risk Management is a part of decision making processes and an integral part of all organizational processes as it addresses uncertainty and facilitates continual improvement of organization. There should be proactive risk management across the organization including clinical as well as non-clinical. Risks management includes risk identification, prioritization, and risk alleviation. It shall be monitored and reviewed for continued effectiveness. For risk assessment,

The objective of the study was to eliminate and assess the risk of inside and outside OT in the hospital and to suggest various changes that can be carried out in the existing system to increase the safety of the patients and of the handlers for which a qualitative risk assessment has been prepared.

This document summarizes the risk associated to the patient and hospital staff in and outside OT, the possible control existing in the system and recommendations for improvement in existing structure.

INTRODUCTION

RISK: The effect of uncertainty on objectives (ISO 31000)

Risk is often characterized by reference to potential events and consequences, or a combination of these.

Hazard: A condition or set of circumstances that present a potential for harm.

Risk Identification: Risk identification involves the identification of risk sources, events, their causes and their potential consequence.

Risk Assessment: It is an Overall process of risk identification, risk analysis and risk evaluation

Consequence: Outcome of an event affecting objectives

Likelihood: Chance of something happening.

Risk Management: Coordinated activities to direct and control an organization with regard to risk.

Hazards are the main cause of occupational health and safety problems. Therefore, finding ways of eliminating hazards or controlling the risks is the best way to reduce workplace injury and illness.

Hazards are identified on past incidents to be examined to know what had happened and whether it could occur again. Staff can be interviewed for this purpose for considering safety issues. Workflow should be observed and brainstorming is to be done as what can go wrong here.

Identification of hazards is followed by **Risk Assessment**. It considers the possible result of someone being exposed to a hazard and likelihood of this occurring. It determines how severe a risk is, whether controlling measures are effective and what action should be taken to control risk and how urgently actions need to be taken. Factors are identified that may contribute to the risk, the risk is relevant or not, duration and of risk, how severe the harm is, determining its likelihood. Actions are recognized that will help in controlling the risk.

Risk Assessment Matrix is used to assess the likelihood and severity or consequence of each hazard and a risk rating is assigned.

		PROBABILITY				
		Frequent (5)	Likely (4)	Occasional (3)	Seldom (2)	Unlikely (1)
SEVERITY	Catastrophic (4)	E (20)	E (16)	H (12)	M (8)	L (4)
	Critical (3)	H (15)	H (12)	M (9)	M (6)	L (3)
	Marginal (2)	H (10)	M (8)	M (6)	L (4)	L (2)
	Negligible (1)	M (5)	L (4)	L (3)	L (2)	L (1)

RISK RATING = Probability/Likelihood*Severity/Consequence

PROBABILITY:

FREQUENT - Occurs often, continuously experienced

LIKELY - Occurs several times

OCCASIONALLY - Occurs sporadically

SELDOM - Unlikely, but could occur at some time

UNLIKELY - Can assume will not occur

SEVERITY:

CATASTROPHIC - Death or permanent total disability, system loss, major property damage.

CRITICAL - Permanent partial disability, temporary total disability more than 3 months, major system damage, significant property damage.

MARGINAL - Minor injury, lost workday accident, compensable injury or illness, minor property damage

NEGLIGIBLE - First aid minor supportive medical treatment, minor system impairment

Having identified the hazards, assessed their risks and reviewed the existing controls, as all hazards must be managed before people are hurt, become ill or there is damage to plant, property

or the environment, if not then additional controls are required. Hazards should be deal within order of priority and most effective control need to be selected to eliminate or minimize risks.

Control is a measure taken to modify risks. It includes any process, policy, device, practice or other actions which modify risk

Risk treatments deal with negative consequences are sometimes referred to as “risk mitigation”, “risk elimination”, “risk prevention” and “risk reduction”. It can create new risk or modify existing risk.

REVIEW OF LITERATURE

Risk assessment is a structured and systematic procedure that is dependent upon identification of the hazards and an appropriate estimation of risks in a workplace with a view to making inter-risk comparisons for purposes of their control or avoidance. In terms of occupational health, risk assessment aims to facilitate valid decision making in taking all necessary measures that will control the exposure to health hazards in any working environment. It permits employers to attest that all relative measures to work hazards are taken into account and that their evaluation is legitimate. Occupational hazards refer to workplace factors with a potential for harm in terms of injury or ill health. Hazards are classified in four categories: physical (noise, vibration, radiation, extremes of temperature, ergonomic), chemical (solid, liquid, vapour), biological (bacteria, fungi, viruses), and psychosocial (psychological and social stressful factors). Exposure to these hazards can cause occupational diseases and work accidents. Hospital workers are exposed to various occupational hazards that may threaten their health and safety.

Risk assessment is identification of hazards and the analysis and evaluation of risk related to with exposure to those hazards. As an aid to clearly defining the risk for risk assessment few fundamental are often useful, such as what might go wrong? What is the probability and consequence of wrong occurrence? The methods include Preliminary Hazard or Risk Analysis (PHA/PRA), Failure Modes and Effects Analysis (FMEA) Hazards and Operability Study (HAZOPs), Fault Tree Analysis (FTA) and others are used to identify, quantify, and mitigate risk. 2 Ensuring about the patient’s safety is the first vital step in improving the quality of care and the emergency ward is known as a high-risk area in treatment health care. Health care brings benefits to patients basically, but it can put patients at risk of adverse events and medical errors at the same time. Thus, maintaining patient safety is proposed as the main concern in providing

treatment and health care. Also, emergency ward is known as a complex, dynamic and prone to medical errors in health care systems. In the emergency conditions, time is short for the critical thinking and it leads to delay in decision-making and consequently an increase in adverse events.³ While the hospital setting is one of healing and comfort, it also includes certain dangers. Hospitals contain hazardous chemicals, chemotherapeutic drugs, radioactive material and infectious matter, among other threatening items. For this reason, the Occupational Safety and Health Administration enforces laws and regulations to ensure protection against these exposures. In addition, there are also dangers from fire and smoke that can be particularly perilous for vulnerable hospital patients. Life Safety Codes have been promulgated to address these problems and are enforced by the Environmental Protection Agency, and reviewed every three years by The Joint Commission. Some states and municipalities also have laws and regulations concerning hazardous material and fire safety. In order to remediate the risks of Environmental Health and Safety, hazard identification and risk assessment should be done in order to know the possible hazards and risk associated with it and thus control measures should be taken to avoid the same. ⁴ In recent years, Hazard Identification, Risk Assessment and Risk Control (HIRARC) has become fundamental to the practice of planning, management and the operation of a business as a basic of risk management. The organizations that have carried out risk assessment at the work place have noted numerous changes in their working practice. Those who have already carried out risk assessment in their work, have reported positive changes in their working practice, they recognize substandard act and working condition as they develop and take necessary corrective action. Legislation requires that this process should be systematic and be recorded so that the results are reliable and the analysis complete. The risk assessment process should be continuous and should not be regarded as a one-off exercise. In line with the Department approach of PREVENTIVE MEASURES as a way of enforcing the law on Occupational Safety and Health (OSH), it seems that HIRARC has become extremely important. With HIRARC, one will be able to identify hazard, analyses and assess its associated risk and then apply the suitable control measures

AIM:

The purpose of the study was to increase the safety of the patient and staff by identifying all the hazards associated in each step, evaluating the risk score and prioritizing the control measures

OBJECTIVE:

- Identify the hazards
- Identify all affected by the hazard and how
- Evaluate the risk
- Identify and prioritize appropriate control measures

METHODOLOGY:

- **Study design:** - Observation study
- **Study duration:** - 1st April to 31st May 2017
- **Location:** - Operation theatre in Asian Hospital, Faridabad
- **Study Tool:** - Risk Matrix
- **Type of data collected:** -

- Primary data collected by visiting the department and by communicating with the staff.
- Secondary data from the various Hospital policies, documents in various departments and

internet

Most of the information was collected through observations. Participative observation is used in learning the function and working of the department

HAZARD IDENTIFICATION AND RISK ASSESSMENT IN OT

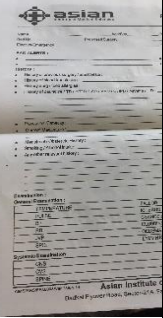
PROCES S		POTENTI AL HAZARD	SEVER ITY	PROB AB- ILITY	RISK SCOR E	RISK RATI NG	CONTROLS	RECOMME N-DATIONS
Doctor order		Illegible writing of doctor	2	3	6	M	1)Training to doctors to write in legible writing preferably in capital letters 2)Regular audits are being done 3)Regular mails sent to doctors to inform about documentation gaps	CPOE can be implemented.
Financial counselin g		Wrong surgery code entered by the executive	1	2	2	L	1)Appointment of trained staff 2)Induction training done for new employee and regular trainings for updating them	
		Incomplete information shared with patient	1	2	2	L	1)Training is done 2)Audits being done to measure compliance	
		Wrong estimation in case of implants	1	2	2	L	Cross checking with surgeon at the time of estimation and price of implant being mentioned in the break up	Any change in implant cost should be informed to the patient and financial counselors before final

								bill is generated
		Patient dissatisfaction (if he/she doesn't get desired room preference)	1	2	2	L	Preferred room is booked for the slot but 100% guarantee is not assured.	
TPA (Approval issues)		Delay in surgery Stress on patient and his family to arrange funds if insurance company denies	2	3	6	M	1) Training is given to the Staff to handle the cases on urgent basis. 2) Adequate papers are collected from patient at the time of pre auth request. 3) Patient is informed through telephonic call when TPA approval comes from the insurance company.	
Patient admission		Incorrect details of patient entered	1	3	3	L	Cross check details with patient's ID	Visual screens facing patients can be used on the counters during admission
EMERGENCY								
If admission is before 6am and after 6pm in case of		Delay in admission	1	2	2	L	1) Trained nursing staff is present 2) All the required documents are collected from patient	

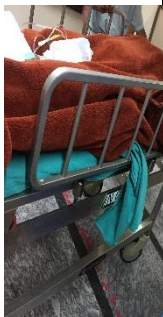
planned surgeries							including OPD card where advice of admission is written by the doctor. Admission form is filled by the patient/attendant	
		Delay in initial assessment and sample collection	1	2	2	L	1)Initial assessment is done by CMO and all the required investigations are documented 2)Sample is collected by the trained staff in emergency only without delay	
		Desired room is not available	1	2	2	L	Sufficient beds are present in emergency, initial assessment starts there and patient is shifted to respected ward only when desired room category is available	
IPD								
Patient identification		Wrong identification may lead to time delay for procedure Wrong identification and wrong specification of surgical site may lead to wrong	2	2	4	L	1)Identification tags are given to patient 2)Training on IPSPG for nurses done	IPSPG training should be done for other clinical and non-clinical staff

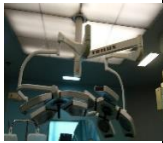
		procedure Approval issues						
Initial assessment of patient		Delay in doctor's visit leads to delay in investigations and procedure Vulnerability of patient if not assessed	1	3	3	L	1)Trained nursing staff informs the doctor at the earliest 2)Vigilant doctors are present	Vulnerability assessment tool should be implemented
Investigations		Delay in investigations (Specimens not marked with urgent sign in case of emergency)	2	2	4	L	Requisition forms filled with urgent marking sign on it	
		Increased risk of infected cases not identified (e.g. HIV, Hep B) if investigations not done Increased risk of	3	2	6	M	1)All the viral marker is done prior to surgery 2)Vaccination given to staff based on their titre value 3)Training to resident doctors	

		nosocomial infections						
Preparation of patient		PAC form not carried by patient on the day of surgery	1	2	2	L	1)Previous history is taken by the resident doctor 2)Complete instructions are given by doctor to bring the copy of PAC on the day of admission	
		In-availability of Blood	3	2	6	M	Blood is arranged prior to the surgery, consent is taken from patient /attendant with all the risk and benefits explained	
		Site marking not done	3	2	6	M	1)Pre-operative instruction checklist is used 2)Trained nursing staff informs the doctor on time for site marking of patient	
		Incomplete instructions may lead to delay in surgery e.g. (foreign objects, NBM)	2	2	4	L	Complete instructions given by doctor prior to surgery	Telephonic call to the patient one day prior to surgery to give preoperative instructions
Prophylactic antibiotics		Not prescribed (increase chance of post-operative	3	2	6		1)Pre-operative checklist is used. 2)Regularly being monitored Quality indicator is	Prophylactic antibiotic dose should be given to patient in the pre-hold area

		complications) Not administered timely				M	mapped by the quality team 3)Trained doctors are present	for its maximum effectiveness (dose given in ward may do not follow 60 minutes criteria)
		Allergy to patient	3	2	6	M	Patch test is done before administering antibiotics	Warning bracelets e.g. MEDIC ALERT could be given to patients having known allergy
Consent for surgery		Any medico legal issue can arise	1	2	2	L	1)Risk, benefits and alternatives explained to patient through consent form 2)Sign of patient or attendant is taken on the consent form with date and time	
Clinical assessment of patient during PAC		Adverse anesthesia events	3	2	6	M	1)PAC done for every patient 2)Pre-operative instruction checklist is used	
Patient handover		Incomplete nursing and doctor notes may lead to delay/ incorrect procedure Communic	4	2	8	M	1)Nursing and doctor's handover documented on regular basis 2)Any pending investigation will be documented	

		ation gaps						
Shifting to prehold area		Risk of falls Injury to staff	3	2	6	M	1)Safety belts provided on wheel chairs 2)Rails provided on stretchers 3)Training to staff on safe transportation of patients	
PREHOLD AREA								
Vital parameter s checked		Increase chances of intra and post-operative complications	4	2	8	M	1)Clinical assessment is done with utmost care 2)PAC reevaluation done 3)Regularly being monitored quality indicator mapped by quality team	
OT RECEPTION								
Case booking register		If complete name with UHID is not written on the register with time and duration of surgery than it can lead to delay in procedure or even	1	3	3	L	Complete details with UHID is filled in case booking register along with time of surgery and duration	

		rescheduling of other cases					
		If the name of surgery and any special requirements is not mentioned than it can lead to time delay for procedure or even postponement	1	2	2	L	1)Trained staff on OT reception 2)Communication with doctor in case any special requirement is needed
		Shift to wrong OT if type of case(infected) is not written and can lead to nosocomial infections for other patients	3	2	6	M	1)Briefing of case by doctor at the time of booking
Shifting of patient from pre-hold to OT reception		Patient fall	2	2	4	L	1)Stair case is used to adjust the height when patient is transferred from wheel chair to the OT bed and the bed is hold by the assisted staff. 2)Locking trolleys are used when patient is shifted from ward bed to OT bed at a call of 3

		Wrong patient identification	2	2	4	L	Patient identification done through dual identifiers	All entries in case booking register should be properly filled including UHID
INSIDE OT								
Accidental hazards								
Surgical LED lights		Head injury	2	2	4	L	Lights kept up, out of the way until needed.	
OT floor		Slip, trips and fall on floor Static electricity from floor	3	3	9	M	1)Slip resistant footwear 2)"CAUTION WET FLOOR" sign on floor until cleaned 3) vinyl OT flooring is done to reduce the risk of falls.	
Surgical instruments		cuts from sharp objects (needle stick injury) Non-reporting of cases	3	3	9	M	1)Account for all sharps 2)Dispose of sharp in sharp containers 3)Training to the staff to increase the sensitivity 4)Vaccination given to the staff	
Electrical hazards								

Cables and wires		Electric shock	4	2	8	M	1)Unplug power cords by holding the plugs; never pull the cord when it is on. 2)Repair of damaged equipment. Equipment breakdown register is maintained by OT staff 3)Residual circuit breaker used while using portable hand tool 4)All instruments are grounded	
		Fall due to entangling in wires	2	2	4	L	Staff is trained and remain cautious while walking in OT	
		Breakdown of electricity	4	2	8	L	Electrical safety checks done on daily basis UPS and DG backups. 4 generators each with capacity of 625KVA	
Physical hazard								
		Fire	4	2	8	M	1)fire safety devices are installed in OT complex 2) Mock drills are done at regular intervals to test the preparedness 3)Code red is generated for fire safety	

		Excessive Noise	2	2	4	L	1)Limited conversations in OT 2)Equipment in good working condition	
		X-ray radiation	2	2	4	L	1)Lead aprons and thyroid collars are provided. 2)Compliance to PPE is monitored by RSO on regular intervals 3)Sign boards are placed outside OT when in use	
		Lasers	2	2	4	L	1)Laser eye protection goggles are provided 2)Laser signage are placed outside OT when in use	
		Awkward posture and back pain	2	2	4	L	Trained professional	
		Temperature	3	2	6	M	1)Limit the amount of skin exposed during surgical procedure 2)Use of warm air blanket 3)Use of warmed irrigation and infusion fluids or solutions	

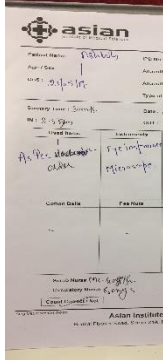
Chemical hazards								
		Exposure to anesthetic gases General health at stake (headache, fatigue, nausea, depression and irritability)	2	2	4	L	1)Scavenging system is being used 2)Room ventilation system with 25 air changes per hour 3)Air quality maintained through HEPA filters	
		Spillage	2	2	4	L	1)Spillage policy for biological and chemical spillage 2)Regular mock drills for HAZMAT team 3)Spill kit is available in the department	
Biological hazards								

		infections due to exposure to blood, body fluid	2	2	4	L	1)When emptying suction canisters, always pour carefully and wear eye and face protection as required 2)eye splashers are placed in OT washing area for cleaning if something accidentally enters in eye 3)Use of PPE	
		Risk of needle stick injuries	3	2	6	M	Regular training is given to staff for proper segregation of BMW and the hazards associated to it.	
Ergonomic, psychosocial and organizational factors								
		Psychological stress Problems of interpersonal relationship with colleagues Post-traumatic stress syndrome	3	4	12	H		Motivational seminars for surgeons and other OT staff Yoga session
Medicational hazards								

		Wrong dilution, wrong label, and old date of preparation of pre-filled syringes in OT can harm the patient	2	3	6	M	loading of syringes done at the time of surgery inside the OT in front of treating doctor	
		Usage of expired drugs	4	2	8	M	1)Medicine expiry checklist is provided 2)Regular audits has been done to look for the same.	
		Misuse of narcotic drugs	2	2	4	L	It is stored in Double locks with proper labeling on them.	
		Wrong drug administration (incorrect route and time)	2	2	4	L	1)Training to the doctors to write the prescription with correct route and time of administration in capitals. 2)List of LASA drugs has been displayed in OT	
Work flow in OT								
Shifting of instrument trolley from sterilized room to OT		Wrong trolley taken to the OT Time delay	1	2	2	L	Vigilant OT staff is present	

Counting of instruments, sponges and gauze pieces		Inconsistent or extra number of instruments and gauze pieces	4	3	12	H	Baseline count done by two nurses	
Count mentioned on white board		Circulating nurse forgets to mention it which leads to increased risk of foreign object retention	4	3	12	H	Count mentioned by circulating nurse	
Preparation of patient								
		Pooling of potentially inflammable solution which can cause chemical burns	2	2	4	L		Use incontinence pads around preparation site
		Prolonged surgeries and exchange of instrument during surgery may lead to increased risk of eye injuries	3	3	9	M	Eye covers are used	

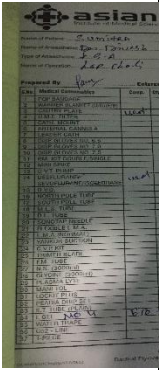
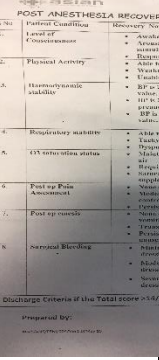
Anesthesia given		Allergy to given anesthetic agent Modification of anesthesia plan may lead to increased consumption of anesthetic agent adding to hospital's expenditure	4 2	2 2	8 4	M M	1)PAC done 2)Proper clinical assessment of patient at the time of PAC	Patch test should be done.
During surgery		Added instruments not documented	4	2	8	M	Count is mentioned on patient's operative sheet	
		Breakdown of anesthesia equipment's in OT	4	2	8	M	1)Regular calibration is done 2)CMC is signed for maintenance 3)PM is done half yearly	

		Breakdown of medical gases	4	2	8	M	Backup cylinders are present in OT complex	
		Change in intraoperative procedure can lead to patient dissatisfaction	1	2	2	L	1)Informed to patient's attendant at the time of surgery 2)Register is maintained by nursing incharge to count the number at the end of month 3)Regularly mapped by quality team as quality indicator	
Counting done and acknowledged by surgeon before completion of surgery		Improper count increases the risk of retention	4	2	8	M	OT operation chart is filled	
Instrument fall		Chances of infection Decrease in efficiency of the doctor	3	2	6	M	1)New instrument is opened. 2)For backup a flash sterilizer is present in OT complex in case of emergency sterilization of any instrument	
Operation notes		Operation notes if not documented or incomplete can lead to	3	2	6	M	Complete documentation of OT notes by the treating doctor	

		delay in post-operative care or incomplete care or any medico legal case can arise						
Consent for amputation of body parts and histopathologic examination and its preservation		Improper storage	1	2	2	L	Specimen is collected and labelled properly with all details	
		Improper documentation	1	2	2	L	Histo path requisition form is filled completely with all patient details and sent to lab with the specimen	
		Patient dissatisfaction if consent is not taken by patient/ attendant	1	2	2	L	Written Consent is taken by patient/ attendant. Amputated body part release form is signed by patient family if they wish to take the body part if not than it is kept in yellow bag and sent for incineration	
Cleaning of OT		Increase chance of infection Post-operative complications	3	2	6	M	1)Regular training is done on BMW 2)Separate Mops and dusters are used for specific OTs 3)OT washing and Fumigation is done	

		Increase chance of needle stick injury during sorting of waste in OT					on every Saturday and Sunday 4)OT culture is taken and if more than 10 colonies come in the report than same day fumigation is done	
		Increase chances of infection and injuries during sorting of linen	3	2	6	M	1)Use of PPE while sorting of linen 2)Regular training on Waste segregation 3)Infected linen is stored in yellow bags for clear identification	
Infection control		Post-operative complications Increase chances of infection to the patient	3	2	6	M	1)Sterilized instruments are used to reduce the risk of infection 2)Hand cleaning of doctors and other OT staff should be emphasized before starting of any procedure 3)HEPA filters are used 4)Room temperature is maintained 5)Pressure differential will be checked to maintain positive pressure	

							6) Humidity is maintained between 40% to 60%	
Sterile room		Improper labelling on racks lead to discrepancy in count	1	2	2	L	Checklist is labelled on every rack to keep a count of instruments	
		Incorrect Refrigerant temperature may affect the medicines	2	2	4	L	Regular check of refrigerators is done to maintain the temperature and a register is maintained for the same	
Cleaning of used instruments		Injuries Increased risk of infection	3	2	6	M	1) Proper sorting of instruments by trained professional 2) Good quality of disinfectant is used in appropriate quantity 3) Flash sterilizer is there for sterilization in case of shortage of sterilized instruments	
Billing		Financial loss to hospital in case of incomplete documentation of used consumables Patient dissatisfaction due to extra charged	3	3	9	M	1) Complete documentation of consumables on OT charge slip and medicines on anesthesia consumption list by the OT staff 2) countersigned by anesthetist 3) random audits is done for same	

		consumables						
Patient shifted to recovery room		Incomplete documentation lead to delay in post-operative care	2	2	4	L	1)Complete documentation in nursing process chart by nurses 2)Complete documentation of OT notes by doctor	
		Improper handling leads to fall	2	2	4	L	PAT slide is used to transfer the patient on recovery room bed	
IN RECOVERY ROOM								
Vitals checked on regular interval		Life threatening to patient	4	2	8	M	1)Clinical assessment is done with utmost care 2)VAS scale used for pain assessment 3)post anesthesia recovery score is assessed before shifting the patient into ward	
Patient shifted to respective ward		May lead to injury to patient due to improper handling Staff injury	3	2	6	M	1)Shifting assisted by staff 2)Training to staff on safe transportation	

Discharge of patient		Delay in procedure	2	2	4	L	Discharge is documented by doctor with proper medications and dos and don'ts to be followed by patient	Follow up telephonic call within 24 hrs. after discharge of patient Care should be taken to advise patients on how to obtain further analgesics when discharge precedes a national holiday period
Human resource								
		Untrained professionals Overburdened staff may lead to inefficiency	1	2	2	L	1)Credentialing and privileging is done before hiring staff 2)Adequate manpower	

RECOMMENDATIONS

- Advice implementation of computerized physician order entry system.
- Any change in variety of implant and its cost should be informed to the financial counselling department before final bill is generated.
- Visual screens are attached on the admission counter to reduce wrong entries while preparing patient file.
- International patient safety goal training should be given to both clinical and non-clinical staff
- Telephonic call to the patient one day prior to the surgery to give pre-operative instructions.
- Prophylactic antibiotics should be given to the patient in pre-hold area for its maximum effectiveness.
- Warning bracelets e.g. MEDIC ALERT should be given to patient with known drug allergy
- Motivational seminars and Yoga sessions are arranged for surgeons
- Use of incontinence pads around surgical site during preparation of patient
- Patch test for anesthesia sensitivity should be done at the time of PAC
- CMO should do the initial assessment in emergency in case of non-availability of bed
- Case booking register should contain the column of duration of surgery and special requirements
- Regular fire drills should be done for evacuation
- Vulnerability assessment tool should be implemented

CONCLUSION

Hazards risks identification in hospitals help in identifies the hazards and the risk associated with it. It significantly increases patient safety and therefore increasing patient satisfaction. The application of this study is used in OT by identifying, analyzing and prioritizing all hazards in OT. This case study considers for the vulnerabilities of a specific hazard, consequences if a hazard is realized and means to prevent those hazards.

This study illustrates what are the types of hazards that can happen in the department and how to prevent them. The study also depicts about the preventive measures taken by hospital so that the risks are reduced to its lower level.

The staffs of the OT are trained and provide Patient care to the fullest. Staff is competent in usage of the equipment to avoid hazards in the department. Equipment's are timely calibrated to avoid failure during procedure.

HIRA is one of the pillars for building a safety culture in health service areas.

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