

SUMMER INTERNSHIP PROJECT

ON
SUMMER PLACEMENT

In

Fortis Memorial Research Institute, Gurgaon

1st April – 30th May, 2015

A Summer Internship Report

Submitted By:

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MBA IN HOSPITAL AND HEALTH MANAGEMENT

(2014-2016)



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CERTIFICATE

This is to certify that Vaibhav Shanker has undergone summer training at Fortis Memorial Research Institute, Gurgaon from April 1 to May 30, 2015.

The candidate carried out all the studies related to summer training himself. His approach to the studies has been sincere, scientific and analytical. This summer training in partial fulfilment of the course requirement is recommended for the award of MBA in Hospital and health management.

I wish him success in all future endeavours.



Col. (Dr.) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. VP Raghuvanshi

Associate Professor

The IIHMR University, Jaipur

May 30, 2015

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Vaibhav Shanker** has undergone an internship in "Quality" from April 1 to May 30, 2015

During his training **Vaibhav** exhibited a high level of professionalism and a tremendous zest for learning.

We wish **Vaibhav** all the best in his future endeavors.

With Best Wishes,



Ritu Verma

Senior Manager- Human Resources

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1. ACKNOWLEDGEMENT

“Mentoring is a Brain to pick, an ear to listen and a push in the right direction”.

I would take the opportunity to acknowledge the people without whom this project wouldn't have seen the light of the day. In our effort towards the realization of the project work, I have drawn on the guidance of many people who facilitated in shaping & remodeling the project.

I got the opportunity to pursue my summer internship from Fortis Medical Research Institute, Gurgaon. It was an opportunity to work with one of the best health care service providers.

I would sincerely like to mention the significant role in project mentoring and help during the course of summer training by my mentor Dr. V.P. Raghuvanshi.

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Last but not least I would thank **Mr. Tarundeep** & BME department staff for their supportive and learning attitude. I'm also thankful to all those who have directly or indirectly encouraged me to complete this project.

2. Abbreviations:

FMRI: Fortis Memorial Research Institute

HICC: Hospital Infection Control Committee

CDC: Centre of Disease Control and Prevention

AMS: Antimicrobial stewardship

OT: Operation Theatre

OR: Operating Room

MTP: Medical Termination of Pregnancy

MABGIS: Minimal Access, Bariatric & Gastro Intestinal Surgery

OBGY- Obstetrics & gynecology

ENT: Ear, Nose and Throat

CDSCO: Central Drugs Standard Control Organization

ICU: Intensive Care Unit

HAI: Hospital Acquired Infection

MRI: Magnetic Resonance Imaging

BME: Bio Medical Engineering

MPM: Multi-parameter Monitor

3. Organization Profile:

3.1 Fortis Healthcare Limited

Fortis Healthcare Limited is a leading, pan Asia-Pacific, integrated healthcare delivery provider. The healthcare verticals of the company span diagnostics, primary care, day care specialty and hospitals, with an asset base in 11 countries, many of which represent the fastest-growing healthcare delivery markets in the world.

Currently, the company operates its healthcare delivery network in Australia, Canada, Dubai, Hong Kong, India, Mauritius, New Zealand, Singapore, Sri Lanka, Nepal and Vietnam with 76 hospitals, over 12,000 beds, over 600 primary care centres, 191 day care specialty centres, over 230 diagnostic centres and a talent pool of over 23,000 people. Fortis Healthcare is driven by the vision of becoming a global leader in the integrated healthcare delivery space and the larger purpose of saving and enriching lives through clinical excellence. The company provides patient services including nuclear medicine and cardiac imaging, laboratories, scans, cardiology, cardiac pacing, electrophysiology, neurosciences, orthopedics, gynecology and obstetrics, pediatrics, maternity services, diagnostic services, paediatric ophthalmology, neurophthalmology, internal medicine, general surgery, urology, nephrology, gastroenterology, mental health and behavioural sciences, rehabilitative services, pulmonology and IVF etc.

3.1.1 The Fortis Logo



LOGO

‘A Healing Passion’

The Fortis Healthcare Limited Logo defines the commitment to the patient care. The logo reflects their endeavor to achieve excellence in healthcare delivery system by bringing together the best of technology, medical expertise, and patient care. The logo also implies the human values that govern every facet of our organization.

The two nurturing hands along with a red dot on the top depicts – ‘nurturing hands caring for the human life’

GREEN is a colour of healing and depicts WELLBEING and RED is a symbol of steadfast focus, dynamic zeal and enthusiasm.

3.1.2 Mission of Fortis Healthcare Limited:

To become an Integrated Healthcare delivering organization guided by quality, excellence, technology and compassionate patient care

3.1.3 Vision of Fortis Healthcare Limited:

To be a globally respected healthcare organization known for Clinical Excellence and Distinctive Patient care

3.1.4 Values of Fortis Healthcare Limited:

Patient Centricity	Commit to 'best outcomes and experience' for our patients. Treat patients and their caregivers with compassion, care and understanding. Our patients' needs will come first
Integrity	Be principled, open and honest. Model and live our 'Values'. Demonstrate moral courage to speak up and do the right things.
Teamwork	Proactively support each other and operate as one team. Respect and value people at all levels with different opinions, experiences and backgrounds. Put organization needs' before department / self interest.
Ownership	Be responsible and take pride in our actions. Take initiative and go beyond the call of duty. Deliver commitment and agreement made.
Innovation	Continuously improve and innovate to exceed expectations. Adopt a 'can-do' attitude. Challenge ourselves to do things differently.

3.1.5 List of Hospitals of the Fortis Healthcare Limited:

Amritsar	Amritsar	Fortis Escorts Hospital
Bangalore	Bannerghatta Road	Fortis Hospital
Bangalore	Cunningham Road	Fortis Hospital
Bangalore	Nagarbhavi	Fortis Hospital
Bangalore	Rajajinagar	Fortis Hospital
Bangalore	Seshadripuram	Fortis Hospital
Chennai	Adyar	Fortis Malar Hospital
Dehradun	Dehradun	Fortis Escorts Hospital
Faridabad	Faridabad	Fortis Escorts Hospital
Gurgaon	SECTOR-44	Fortis Memorial Research Institute
Jaipur	Jaipur	Fortis Escorts Hospital
Kangra	Kangra	Fortis Hospital
Kolkata	Rash Behari Avenue	Fortis Hospital & Kidney Institute
Kolkata	Anandapur	Fortis Hospital
Mohali	Mohali	Fortis Hospital
Moradabad	Moradabad	Fortis Vivekanand Hospital
Mumbai	Vashi	Fortis Hiranandani Hospital
Mumbai	Kalyan	Fortis Hospital
Mumbai	Mulund	Fortis Hospital
Mumbai	Mahim	S.L. Raheja Hospital
Mysore	Mysore	Fortis Cauvery Heart Hospital
New Delhi	Greater Kailash II	Fortis La Femme
New Delhi	Shalimar Bagh	Fortis Hospital
New Delhi	Vasant Kunj	Fortis Flt. Lt. Rajan Dhall Hospital
New Delhi	Okhla Road	Fortis Escorts Heart Institute & Research Centre
Noida	Noida	Fortis Hospital
Raipur	Raipur	Fortis Escorts Heart Centre

3.2 Fortis Memorial Research Institute, Gurgaon (FMRI)

FMRI is a multi-super specialty, quaternary care hospital with an enviable international faculty, reputed clinicians, including super-sub-specialists and specialty nurses, supported by cutting-edge technology. A premium, referral hospital, it endeavours to be the 'Mecca of Healthcare' for Asia Pacific and beyond. Set on a spacious 11-acre campus with 1000 beds, this 'Next Generation Hospital' is built on the foundation of 'Trust' and rests on the four strong pillars Talent, Technology, Infrastructure and Service.

TALENT: Fortis Memorial Research Institute's comprehensive medical program is driven by reputed doctors, super- sub- specialists and specialty nurses, all committed to integrating their exceptional medical expertise, technology and innovation to offer best – in class treatments.

TECHNOLOGY: Fortis Memorial Research Institute has a complete spectrum of diagnostic and therapeutic technology, including several state-of the-art technologies that are first in the world, first in Asia and first in India.

- Radiation Therapy: First in the world - A collaboration between leading technology innovators Brain Lab and Elekta
- 3- Tesla Digital MRI - World's first digital broadband MRI
- Stem Cell - India's first stem cell lab in a hospital in collaboration with Totipotent Rx a, US based cell Therapy Company.
- Open Lab - India's first ever "see - through" glass lab with instant collection and real time processing of blood - samples.
- e- ICU- An advanced patient management system with two - way audio visual communication. It allows clinicians to access patient 24x7. First of its kind in the world.
- 256 Slice CT - A state of the art 256 Slice Brilliance CT Scanner with the ability to capture an image of the entire heart in just two heart beats
- Bi- Plane Cath Lab - State-of-the-art Bi Plane Cardiac Cath lab to address cardiac and vascular interventions
- Brain Suite - One of its kind CT based Brain Suite, equipped with intra operative CT for brain and spine.
- Time of flight PET CT - An installation with Time of flight (TOF) reconstruction for exceptional image quality. Has the ability to detect lesions as small as 0.1 inches.
- Voice Modulated & Integrated Operating rooms - Two modular operating rooms integrated with equipment and controlled by common control panel.

INFRASTRUCTURE: With landscaped greens, tranquil water bodies, sculptures, sunlit interiors, Fortis Memorial Research Institute follows a design philosophy aimed at healing. The hospital has been built keeping in mind all round wellness – mind, body and soul. Simultaneously meet simple needs of the caring attendants by means of facilities as the Tummy Luck, Meditorium, R&R lounge, Holistic Health, Mamma Mia, Retail Therapy, Crèche, Health 4 U, Spa and Fortiplex, to meet the simple needs of caring attendants.

1) Basement consist of:

Engineering and Biomedical department
Contractual Staff Dining
Materials and purchase department
PTS blower room
Stores: Pharmacy, kitchen & general stores
Radiation oncology
MRD
Mortuary
Nursing training room
Parking for staff and visitors

2) Lower ground floor consist of:

Radiology with:-

- Asia's first Ingina's 3 Tesla MRI
- 256 Slice CT scan with skylight

NIC
Nuclear medicine with PRT-CT & Gamma camera
Emergency
CSSD
In house Laundry
SRL's Open Laboratory
Swimming pool & Sauna and steam
60 OPDs for Oncology. Paediatrics, Orthopaedics, Neurology and other
Medical and Surgical OPDs
Staff entry, Fire control room
Mamamia

3) Upper ground floor consist of:

Spa, Salon & Fitness centre

'Health4U' Preventive health care
 Retail therapy- Titan Eye Plus, Fila, Being Human, Chicco, Mom & Me, Religare
 Wellness Pharmacy, Medimart,
 Tummy Luck- Subway, Haldiram's, Whole Foods, Joost Food Ventures, Baskin
 Robbins
 Fortiplex- 36 seater Mini Theatre
 VIP lounge
 Mother and child, breast clinic and IVF
 Kitchen
 Administrative office

4) Clinical infrastructure:

Operation Theatres 11	NICU & Nursery 18
Cath Labs 2	Dialysis 11
LINAC 2	Chemotherapy 10
LDR 4	Pre & Post Cath 12
Delivery rooms 2	ER Beds 14
Endoscopy Suites 3	Labour Beds 14
Nightingale wards 40	Pre-OP 6
Double Bed Rooms 88	Pre & Post Endoscopy 5
Single Bed Rooms 47	ICU beds 98
Deluxe Rooms 8	Operating rooms 11
Suites 4	Operating beds 288
Signature Apartment 1	

5) First Second and Third Floor consists of:

Sr. No	Name	Details
1	Labour Delivery Room	4
2	Meditorium	111 seated auditorium
3	Nightingale Ward	40 bedded
4	High dependency Unit	9 beds
5	Dialysis unit	11 units
6	Chemotherapy unit	10 units
7	Inhouse Blood Bank	
8	Pathology Lab	
9	Rest & Relaxation Lounge	76 recliners & 31 cubicals
10	Neonatal ICU	13 units
11	Well baby Nursery	5 units
12	ICUs	8 ICUs
13	Clinical Information Portfolio (ICIP) OT	11 Modular Operating Rooms

SERVICE: Woven into the fabric of the hospital are innovative services, where every attempt has been made to look after our patrons so that they feel cared-for and special.
Angel: A welcoming face at the hospitality desk to make visitors feel special.
Genie: A friendly and helpful companion to assist patients navigates the hospital.
Concierge: A facilitation desk to assist patrons with various needs in and outside the hospital.

3.2.1 Vision

To be the ultimate healthcare destination - "Mecca of Medicine"

3.2.2 Mission

To provide quaternary care to the community in a compassionate, dignified and distinctive manner

3.2.3 Motto

"Best is the Least We Can Do"

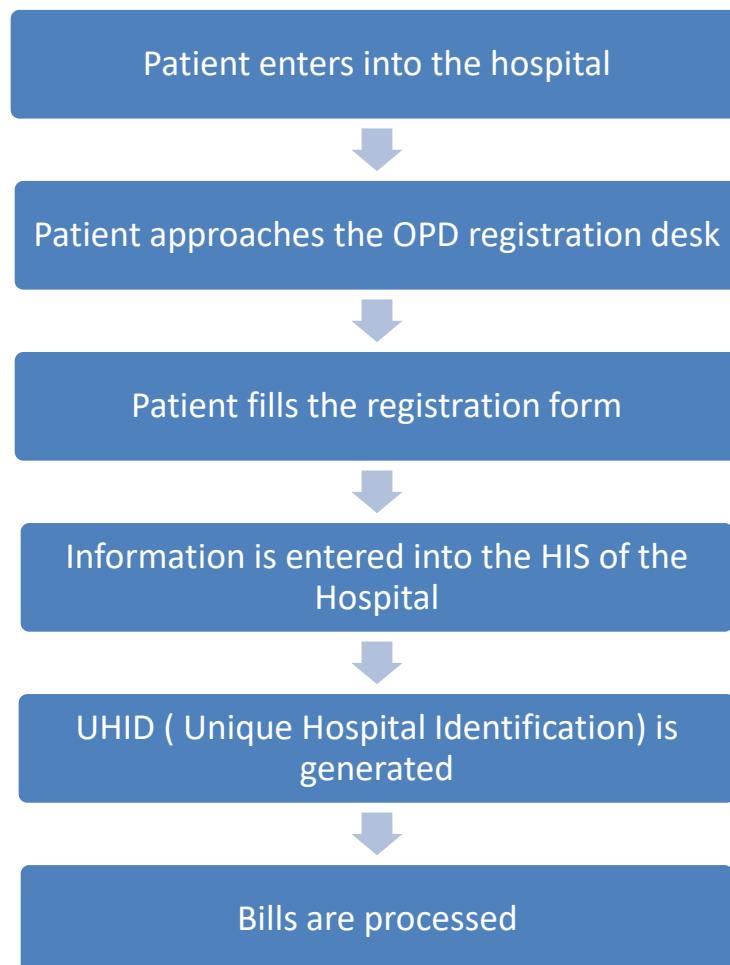
3.3. Departmental Profile

3.3.1. Out Patient Department:

Functions:

1. Reception
2. Information
3. Appointment
4. Registration – OPD, Diagnosis
5. Billing- OPD, Diagnostic, Emergency
6. Report/ Document Delivery
7. Customer Feedback

Registration Process of OPD



3.3.2. Human Resource Management

Functions:

1. Development of HR policies and Strategies
2. Manpower Planning
3. Recruitment and selection
4. Employee training
5. Salary Determination
6. Performance Appraisal
7. Personal data entry and record Maintenance
8. Consultation and advisory services to management and employees
9. Grievance handling

3.3.3. Medical Record Department

Functions:

1. Storage, Maintenance of medical records.
2. Maintenance of integrity and Confidentiality of medical records.
3. Submission of required data to the government.
4. Classify the medical files as per ICD-10.
5. Obtaining missing patient files

3.3.4. IT department

Functions:

It maintains all the software of the hospital. Modifications of the software are as per the requirement of the department. It covers the following modules

1. IPD billing
2. OPD billing
3. Administration
4. House Keeping
5. Ward/Nursing
6. Diet
7. Visitor's Pass
8. Store
9. Purchase

- 10. Laboratory Information System
- 11. Radiology Information System

3.4. Observational learnings

3.4.1. Accident and Emergency Department (ED)

The emergency department in a hospital plays a very important role for all people who are in acute need of immediate care like chest pain , stroke , accident cases, trauma cases etc. the ED At FMRI is a 6 bedded along with 8 beds in observation room. Also, there is a procedure room to conduct simple surgical procedures.

ED has separate entry, far away from the general entry and is quite spacious in order to allow free movement of stretchers/ trolleys from ambulance to the emergency room.

While brining in the patient from the ambulance, TRIAGE is done beforehand by the staff nurse at the ER reception and so Patients are placed according to the triage beds:

The TRIAGE patterns followed here is:

- a) RED bed for category 1 Patient i.e. critically Ill
- b) Yellow Beds for category 2 Patients who need to be admitted
- c) Remaining category 3 patients are kept in Observation room

There are centralized ambulance systems in the Accident and emergency department, the movement of which depends on the central emergency call centre at FMRI. The Fortis group of hospital in Delhi NCR has a centralized ambulance call centre at Fortis Escorts, Okhla (105010) where all the calls for requirement of ambulance are received and depending on the location of the case, the nearby branch is contacted, a case ID is given and then the ambulance is sent to the location.

A crash Cart is available in the emergency which provides a one place storage of all emergency medications required which saves the precious time during treatment. A code blue team is designated which consists of four sub teams

- a) Critical care team
- b) Emergency Team
- c) Cardiology team
- d) Anaesthesia Team

Accessibility which other Departments:

The ER is located on the ground floor, making it quite accessible to the other departments, the diagnostic department is next right to the ER department but the ICU and OT are at the second floor and it takes 4-6 Minutes to reach there.

Moreover, there is a direct inter- communication system between ER department and other services like blood bank, Lab, Diagnostic, ICU etc. It is all linked thorough HIS and Intercom service

The Staff in the ER department are:

- a) Nurses
- b) Doctors
- c) CMO
- d) Paramedical staff
- e) Ground Staff- GDA/ Housekeeping

Generally the patient to nurse ratio is 1:1, but team work approach is always followed wherever the emergency patient arrives.

The emergency department has the following equipments per bed:

Defibrillator, Suction machine, ECG, Cardiac Monitor, Oxymeter, ventilator, Syringe Pump (for the accuracy of dosage)

3.4.2. Blood bank

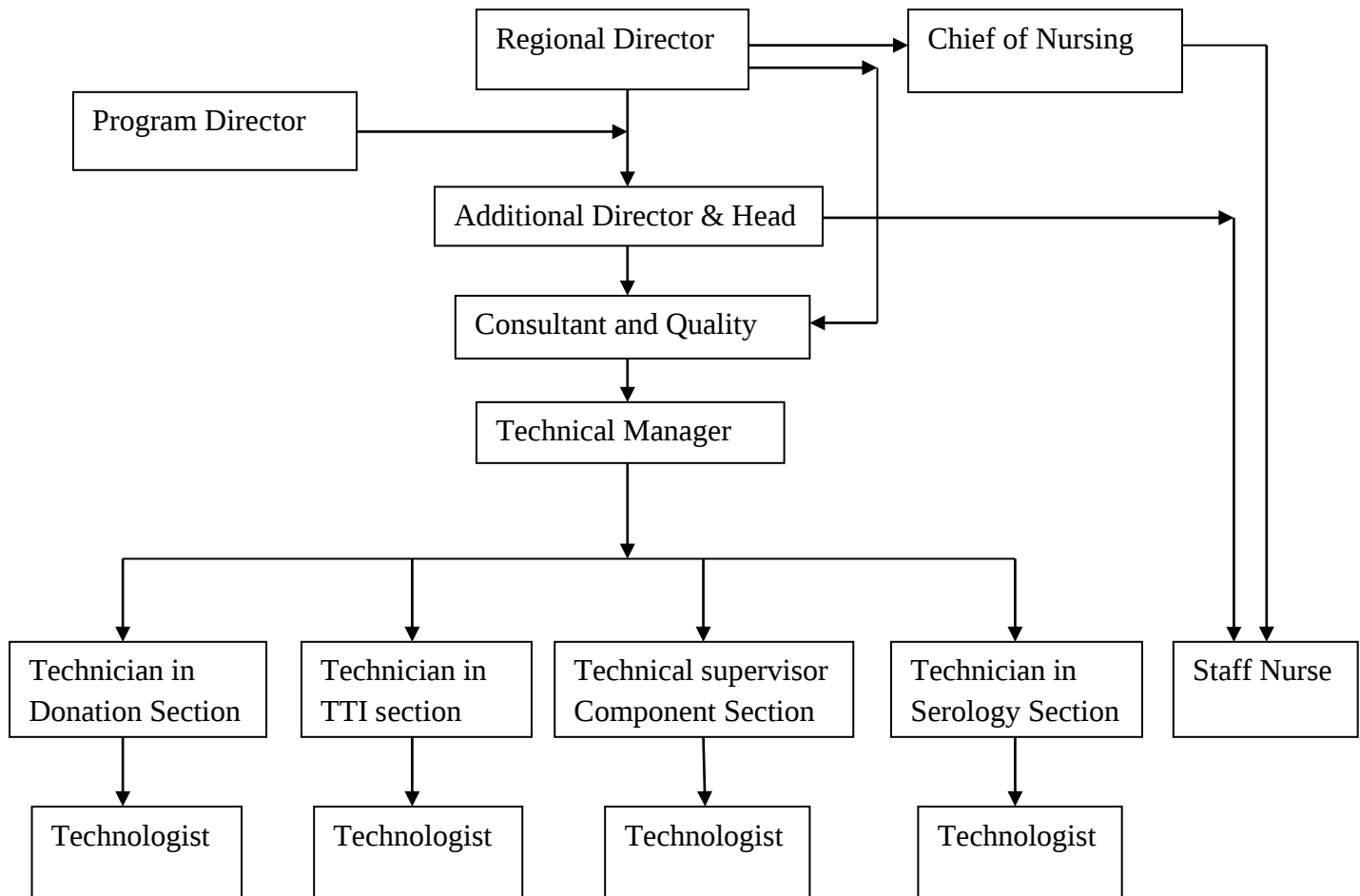
Blood is vital to human body and about 5.5 Lt is present in a person. It carries all nutrients, oxygen and metabolism throughout the body, but sometimes a life may be at stake due to blood loss/infection.

A blood bank is a collection and storage facility where blood is later used for blood transfusion. The term “Blood Bank” typically refers to a division of a hospital where the storage of blood product occurs and where proper testing is performed (to reduce the risk of transfusion related adverse events). However it sometimes refer to a collection center and indeed some hospitals also perform collection.

LICENSE: Blood bank of FMRI, Gurgaon is located on the first floor. It has both NABH and NACO (National AIDS control organization) accreditation and was able to get the accreditation within six months of the functioning of the hospital. The blood bank has a valid license from Central Drugs Standard Control Organization (CDSCO) and approved by the Drug Controller General (India), central license approving authority under drug and cosmetic rules-1945 with further amendments.

The blood bank is run by the FMRI (a fortis group Hospital) in order to provide blood and blood components to its patients and is licensed by the Drug Controller of India.

Organogram for transfusion Medicine Department



The blood bank area is of 181 square meters & has separate rooms each for:-

- Registration and medical examination room (air conditioned)- there are well lit rooms fully furnished with adequate number of chairs and examination table.
- Donor motivation and counseling area (Air conditioned) with a counselor
- Blood donation area is a well lit and air conditioned room having three fully motorized donor couches and having computerized bar coding system for a donor data entry.
- Refreshment room (air conditioned).
- Component Preparation Room- Air conditioned room with maintained temperature of 20-25°C and humidity below 60% and having Quarantine refrigerator for untested blood.

- f) Lab for TTI markers is well lit air conditioned room having maintained temperature and humidity.
- g) Lab for blood group serology is air conditioned and having marked area for grouping and cross matching, antibody detection.
- h) Specific area for sterilization and washing.
- i) Store & record room

3.4.3. Laboratory

The laboratory here at Fortis Hospital is outsourced to SRL lab and all the routine investigations are carried out here only. The staff strength is 30-40 with 3 people during night. The samples are received from both OPD & IPD patients and a prescription is not always required to get a test done until unless the history of the patient has to be traced back. This sample is received in boxes from respective OPD & IPD department and the housekeeping staffs carry the same. Also for emergency investigations a red seal is marked on the sample as well as on the prescription of the patient so as to give it a priority. Also, all the equipment's in the lab are automated i.e. they are linked to computers and so all the test results are automatically transferred in the computer and report is generated. The laboratory has laboratory Investigation System (LIS). This LIS is connected to the HID of the hospital in which all the information like Patients name IPID or UHID, test to be done and the reports stored. Once the report is generated, it is reviewed by the authorized person and then only it is made available in the LIS or send to the patient. Moreover, there is no telephonic communication of reports result, only during urgent or emergency cases report is spelled out and that too twice to ensure proper communication. Quality check and the calibration of the equipment is carried out twice in a day for quality assurance. Also, to maintain employee Safety ie. prevent occupational hazard, when an infected sample or any chemical bottle breaks in the laboratory, HAZMAT (Hazardous Material) team is called and immediately the spillage is cleaned up.

List of Equipments used in laboratory are:

Biomedical analyzer, Cell counter, Urine routine analyzer, Immuno assay analyzer, Centrifuge, Microscan, Bactec, Tissue Processor, Microtone Balance Glycosylated Haemoglobin analyzer (D10), Sample mixer, Microscopes, Pipettes

3.4.4. CSSD

CSSD stands for Central Sterile Supply Department. It is the department that is solely responsible for sterilization of all the instruments used all over the hospital.

CSSD has 3 zones:

- Dirty/ Receiving area
 - Clean Area
 - Sterile Area
- a) In Dirty area all used instruments from around the hospital are received after they are washed and cleaned. This movement takes place manually, while it is received through a dumb waiter from the OT. Here an ultrasound cleaner is located. This is a fully automated machine in which the used instruments are dipped in a solution and are sterilized under 40° Celsius for 15-20 minutes. This machine produces vibrations which sterilizes the instruments. After the above procedure is over the sterilized instruments are washed under running water. After this the instruments are dipped in preserve solution for 10-15 minutes.
 - b) In clean are the sterile instruments are kept packed in a double wrapped green colour cloth.
 - c) In Sterile are there is one autoclave machine that is used to sterilize the used instruments. It is a double door machine. Through one door the used instruments are loaded and through other door the instruments is de loaded after the procedure is over.

Two temperatures are set in this machine according to the instruments to be sterilized:

1. 120° Celsius- Under this temperature 20 minutes is the sterilizing time, 15 minutes is the dry time and 3 minutes is the pulsing time (pulsing time is a procedure by which the air present in the machine is moved out and steam is brought in).
2. 134° Celsius- Under this temperature. 7 minutes is the sterilization time, 3 minutes is the pulsing time and 10 minutes is the dry time.

After the sterilization process is over, the sterilization process is over, the sterilized instruments are packed and batch monitoring and labelling is done through a labelling gun. This labelling consists of:

- Expiry Date
- Packaging Date
- Machine Number
- Loading Number
- Sterilization Date

3.4.5. ICU (Intensive Care Unit)

ICU is located at the second floor of the IPD building making it accessible to all the outside services like lab, Diagnostics, OT's etc.

These are 7 different types of ICU's in the hospital which are as follows:

- Neurology, Orthopaedic, Polytrauma
- Cardiology & transplant
- CTVS
- Medical ICU
- Bone Marrow Transplant
- Paediatric ICU
- NICU

The nursing station is centrally located in the ICU and the Nurse to patient ration in ICU is 1:1.

Also, here at FMRI, Barrier nursing is practiced in ICU's so as to minimize the risk of the Hospital Acquired Infection (HAI).

Equipments used in ICU:

- a) Ventilator
- b) Intra Aortic Balloon Pump (IABP)
- c) Suction
- d) Inter Costal Drainage System (ICD)
- e) Portable Ultrasound (if needed)
- f) DVT Pump (Deep Vein Thrombosis)
- g) Bi-pap to give oxygen to the patient

There are 98 beds out of which 52 are ventilator equipped and 6 are isolation beds.

Quality Indicators are:

- CRBSI
- VAP
- SSI
- Returned to ICU within 48 hours
- Needle stick Injury

3.4.6. Operation Theatres

The operation theatres are located on the 2nd floor of the OPD building having a direct connectivity with ICU (2nd floor if IPD building) so that patient can be easily & quickly shifted to and from ICU.

At FMRI, there are 11 OTs:

- 1) OT 1 – Orthopaedics and Liver Transplant OT
- 2) OT 2 & OT 3- Neurosurgery OT
- 3) OT 4- Major & general (All cleaned & Planned cases are dealt)
- 4) OT 5- Cardiac & Transplant
- 5) OT 6- Planned, cleaned & emergency Cases
- 6) OT 7- MIS (infected minor, Day care & emergency Cases)
- 7) OT 8- Minor Surgeries

Zoning- Zoning is basically segmenting OT area according to the hygiene maintained in Different zones, here three different zones were observed:

- 1) Dirty Zone: Outside corridor, changing room
- 2) Clean Area: supply store, scrub Area, Pre-operative room
- 3) Aseptic Zone: OT, Sterile Preparation

This Zoning very essential in OT's as it helps to prevent Infection

Infection Control in OTs:

OT being such a sensitive area of a hospital, proper infection control mechanisms need to be followed in there. So, for the same, after every surgery they mop & clean the OT with 0.4% Virex & for fogging of OT they use they use 1% Virex for infected cases they use 2% virex.

Also, to maintain proper hand hygiene there are 3 scrubbing sections:

- 1) Scrubbing station 1 is in between OT 6 & 7
- 2) Scrubbing station 2 is in between OT 4 & 5
- 3) Scrubbing station 3 between OT 1 & 2

For hand washing and scrubbing, Micro shield & Betadiene scrub is used. Sterilization of instruments CSSD is there where all the instruments are properly sterilized and send back to the OT. To make this process more effective, a DUMB WAITER is used which is a lift which connects CSSD and OT.

The used instruments are first cleaned in instrument processing room in OT

It is then packed in a double wrapped green cloth. This pack is placed on the dumb waiter in dirty area of OT. It is received on the dumb waiter in dirty area of CSSD. Then it is sterilized, packed in the CSSD and a biological indicator is placed in the pack. It is then sent from the dumb waiter in sterile area of CSSD. It is received in the dumb waiter in sterile area in OT.

Moreover for equipments required during emergency in OT an autoclave and ultrasound machine is there wherein the instruments are sterilized and used. The surgeries are generally conducted from 8:00 AM to 8:00 PM, except in the cases of emergency. Also, the Time duration for a patient to be kept in pre-operative room is half an hour and one hour for post op room. This is as per the FOS, but it may vary with the severity of the case.

3.4.7. Radiology

- Asia's first ingina's 3 Tesla MRI
- 256 Slice iCT scan with skylight
- 5 ULTRASOUND MACHINE:
 - 2 ultrasound machines on upper ground floor
 - 1 ultrasound machine in health4U
 - 1 Ultrasound machine in gynaecology department
- 3 X-ray machine (Philips, mesems)
- 3 Portable X Ray machines
- 1 CT scan (256 slices) iCT Philips
- 3 Tesla MRI machine
- 1 CRI
- 1 Mammography
- 1 Bone Densometry
- 3 Printers
- 1 Technologist room
- 1 Reporting room
- X Ray Console room
- 1 patient lounge
- 1 HOD room
- 1 fluoroscopy room
- 2 changing room

Manpower:

- 1 Chief technician
- 1 Supervisor
- 17 Technicians

PROJECT REPORT

7.1 INTRODUCTION:

An asset is defined as any object that an organization uses internally including but not limited to life saving machines, tools, software, or office equipment. While employees may use a specific tool or tools, the asset ultimately belongs to the company and must be maintained. Therefore without an accurate method of keeping track of these assets, it would be very easy for a company to lose control of them.

Any hospital has hundreds or even thousands of such physical assets. It is vital to know their operating condition and where they are located. From monitors to MRIs identifying, tracking and controlling these assets with help of a unique identifying number or asset tags is critical to any hospital.

Benefit of using an asset management includes:

- Maximize employee and equipment efficiency
- Reduce equipment downtime through better planning
- Prevent theft and enhance security of items
- Help meet possible compliance requirements
- Real-time reports regarding the position of each asset

Increasing the overall accountability of your system also discourages the misuse of assets by employees and ensures you will notice loss as soon as possible; when loss is noticed immediately, it's far easier to recover from that loss. Tracking the assets and collecting the data using an asset tag has proven to be faster, less expensive and more accurate than manual data collection processes.

Properly implemented asset tracking techniques reduce the administrative costs, streamline the system & customer service, and allow you to scale your business upwards with ease.

7.2 LITERATURE REVIEW:

A large percentage of investments in a hospital are made in purchasing equipments & assets. It is important to utilize this investment in a judicial way. It has been estimated that at any given moment, the average hospital only utilizes about 40 percent of its equipment fleet, and other expensive assets sit idling.

Due to large number of equipments making sure that the system is organized poses a significant problem. A study shows that an average nurse spends 21 minutes per shift searching for misplaced equipment.

Another study shows that each year, between 5 and 15 percent of a hospital's equipment fleet disappears due to loss or theft, resulting in costly annual reinvestment. This can all be saved and reinvested in more demanding areas.

7.3 NEED FOR STUDY:

FMRI operates over 100 different types of biomedical equipments and spare parts, which plays a key and vital role in hospitals functioning.

These Physical assets are frequently out in the field for use, undergo repairs, sold, updated, removed or stolen. From purchase to disposal and all of the steps in between, an asset's history should be easily traced and reviewed using an asset management system that utilizes asset coding.

Asset tracking and asset management gives the data needed to increase the efficiency and organization of one's hospital physical space. Through asset tracking, one can identify items that are commonly accessed together and create a better structure for the physical system. Management will also be able to anticipate needs through an asset tracking solution by identifying trends in advance.

Asset inventory and control system helps in managing the physical capital and allows the organization to make more informed decisions regarding physical inventory, such as when to repair or replace items. It also helps in tracking and preventing theft of the assets.

Keeping this in view, equipment tracking is important. In an era of skyrocketing medical costs and industry-wide budget cuts, need for equipment tracking becomes ever so important

7.4 RESEARCH QUESTION:

What are the problem areas in asset tracking of equipments of Biomedical Engineering Department?

7.5 OBJECTIVE:

To study and analyze the problem areas in asset tracking of equipments of Biomedical Engineering Department.

7.6 HYPOTHESIS:

There are no problem areas in asset tracking of equipments of biomedical engineering department

7.7 RESEARCH METHODOLOGY:

7.7.1 Study design:

Descriptive cross sectional study

7.7.2 Study Area

Biomedical Department, Fortis memorial research institute

7.7.3 Department: Biomedical Engineering Department

7.7.4 Sample Size: 8 equipments

7.7.5 Sampling Criteria:

- 1) Samples were randomly drawn from a list of equipments present in the hospital with different level of criticality to the hospital. The criticality level has been decided by the BME department based on their role in saving lives.

Criticality A- 3 equipments (CT scan, MRI, ICT Spine)

Criticality B- 3 equipments (EMG, ECG, Pulse Oximeter)

Criticality C- 2 equipments (PH Meter Monitors)

- 2) The cohort Study undertaken was from randomly selected Department (ICU2) and equipment under observation was one with most number of units present. (Multipara Monitor).

7.7.6 Data collection tool:

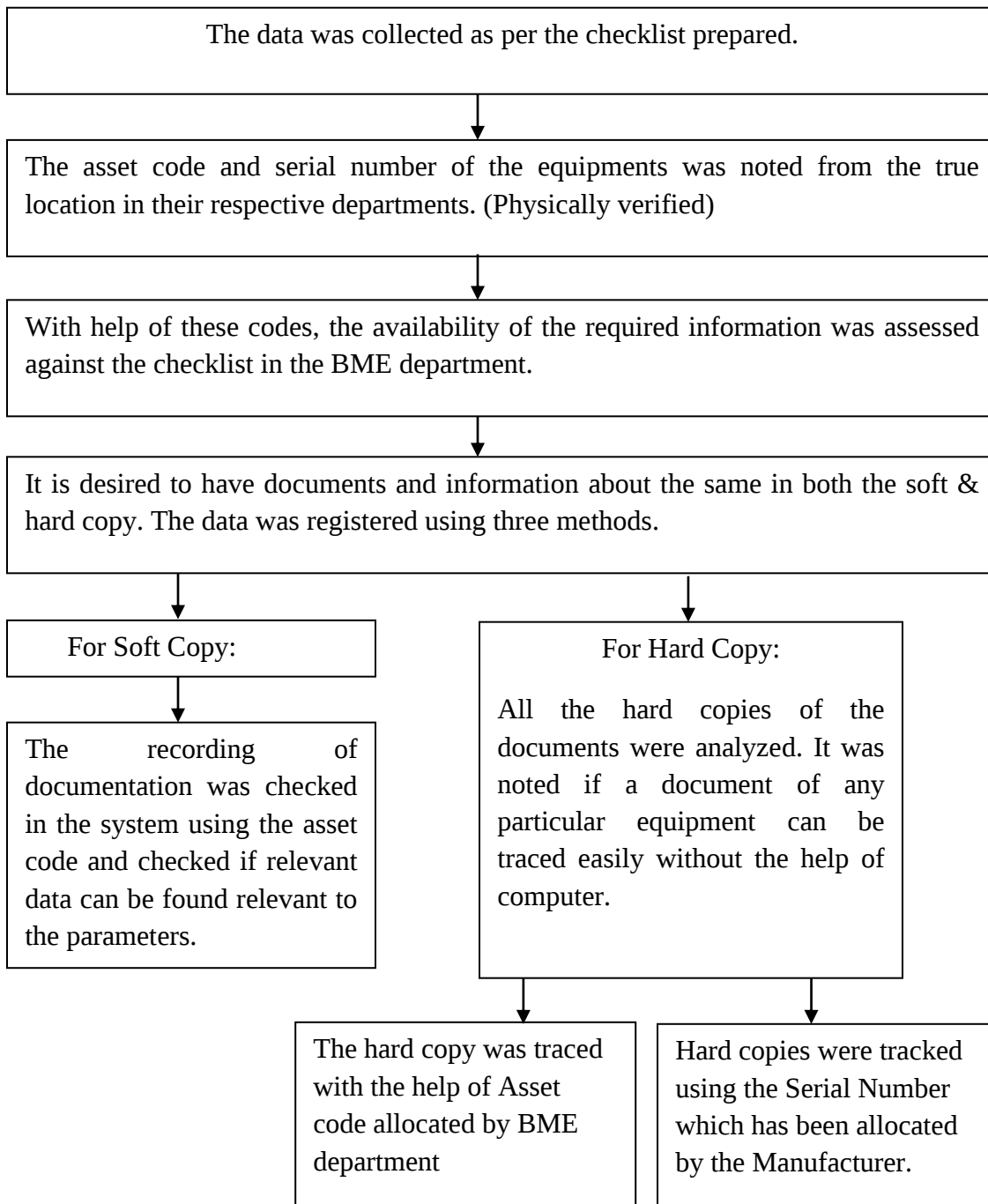
A checklist, containing required general details about the equipment, was used for data collection. This checklist was prepared in consultation with the Head of BME department, DM Quality and concerned members in the hospital.

7.7.7 Data collection variable:

The following list shows the parameters under which the tracking has been carried out. These parameters are the basic information which should be easily available to the department.

Product	Operational Status	Maintenance	Documents	Information of the Vendor	Inventory
Location Of the Equipment	Active/ Standby/ Repair	How is it maintained/ calibrated/AMC	Documents required before purchase of equipments (Board members signatures, MOM.)	Name & particulars of the vendor	Document stating Inventory of parts of the equipment
Description of the Product		Expenditure done on the equipment	Documents of shifting of machine, with appropriate reason	Certification (eg. NABL) of the vendor	Quantity of spare parts in the inventory
Life of the Product		List of all maintenance carried on the machine till date	Purchase Invoice	Date of Installation	
Relating to Harmful Radiations		Name of the personal who carried out the maintenance	Delivery Note		
		Documents listing damages to the machine	Gate pass		
		Documents listing the upcoming maintenance and future checks			
		The number of parts replaced.			

7.7.8 Data Collection Technique:



7.8 OBSERVATIONS & ANALYSIS:

7.8.1 Observations in the Bio Medical Engineering Dept:

Department of Biomedical engineering is in charge of providing an efficient support in maintaining the various equipments in the hospital in a good working condition. The department functions round the clock to render emergency service support on breakdown/ failure of equipments. The department ensures quality functioning of all category of equipments in the multi specialties of the hospital. The biomedical engineering department plays an important role in aiding smooth and complete patient care.

BME department is in charge of keeping all documents relating to biomedical equipment in both soft and hard copy except purchase order which is kept in custody of purchase Department.

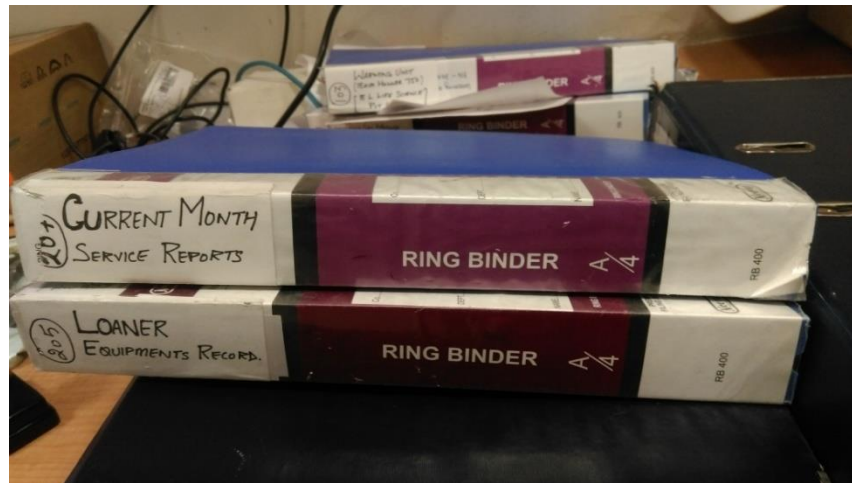
7.8.1.1 SOFT COPY:

The Department keeps the reports in the given format on the system. Which includes company name, New asset tag, Equipment name, Location Name, Department, Manufacturer, model , Serial number, Vendor name & Contact number, Contract type, Warranty start & expire, Preventive maintenance frequency, Purchase cost, Purchase date.

S No.	Company	FAR ID	New Asset Tag	Equipment	Location Name	Dept Name	Manufacturer	Model	Serial no.	Vendor	Contract Type	Warranty Start	Warranty Expire
151	FHMNL	MEGP0036	OPR/CTS/001	ICT Spine	2nd floor	OT-B	Brain Lab	ICT	NA	Brain Lab	Warranty	8/19/2012	8/16/2013

-8.1.1-

7.8.1.2 HARD COPY:



-8.1.2-

The filing is done in the given format:

All the files of equipments are maintained in chronological order i.e. according to the equipments used in a particular department.

All the equipments are also coded according to their level of criticality or importance in contribution in life saving capability or functioning of hospital.

- A - High
- B - Medium
- C - Low

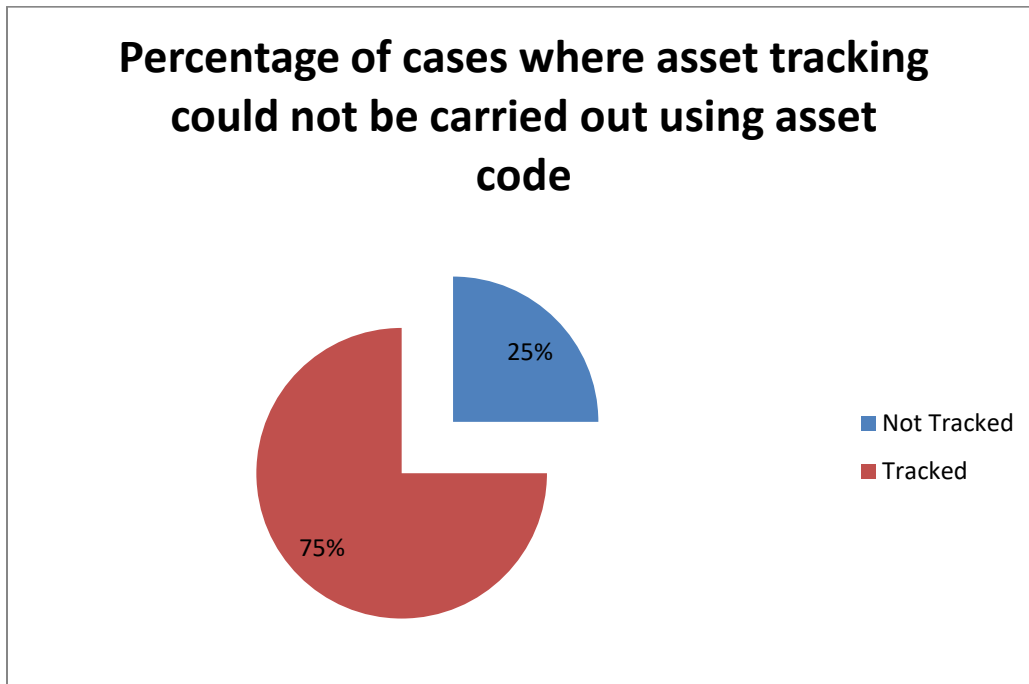
For each department racks are allotted and files are arranged accordingly.

Each of the files of equipment contains Preventive maintenance records, Purchase order, Service reports, handovers & documents relating to installations and calibration.

Separate files are maintained for the gate passes. Gate pass neither have entries of the serial number nor the asset code. Thus a separate register is also maintained which includes the serial number against the equipment which is outbound.

7.8.2 Analysis:

7.8.2.1. Percentage of cases where asset tracking could not be carried out using asset code:



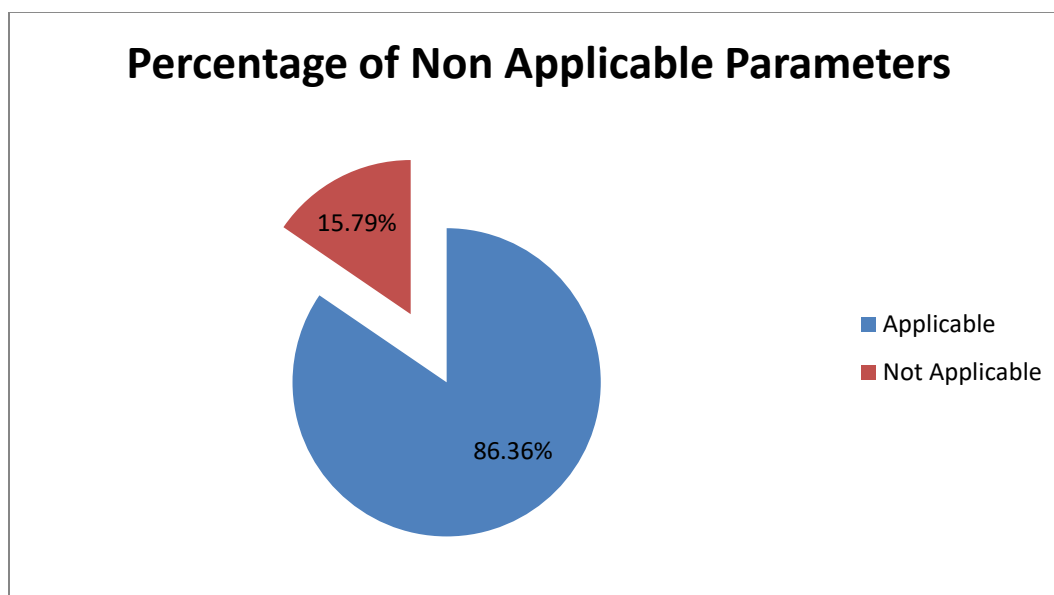
-Graph 8.2.1-

Equipments that could not be tracked: 2

- 1) Multi-parameter Monitor
- 2) ECG Machine

Serial No.	Equipment Name	Reason of Not Tracking
1	Monitors	Asset code not matching with the System
2	ECG	Asset code not found on the Equipment

7.8.2.2 Percentage of Non Applicable Parameters:



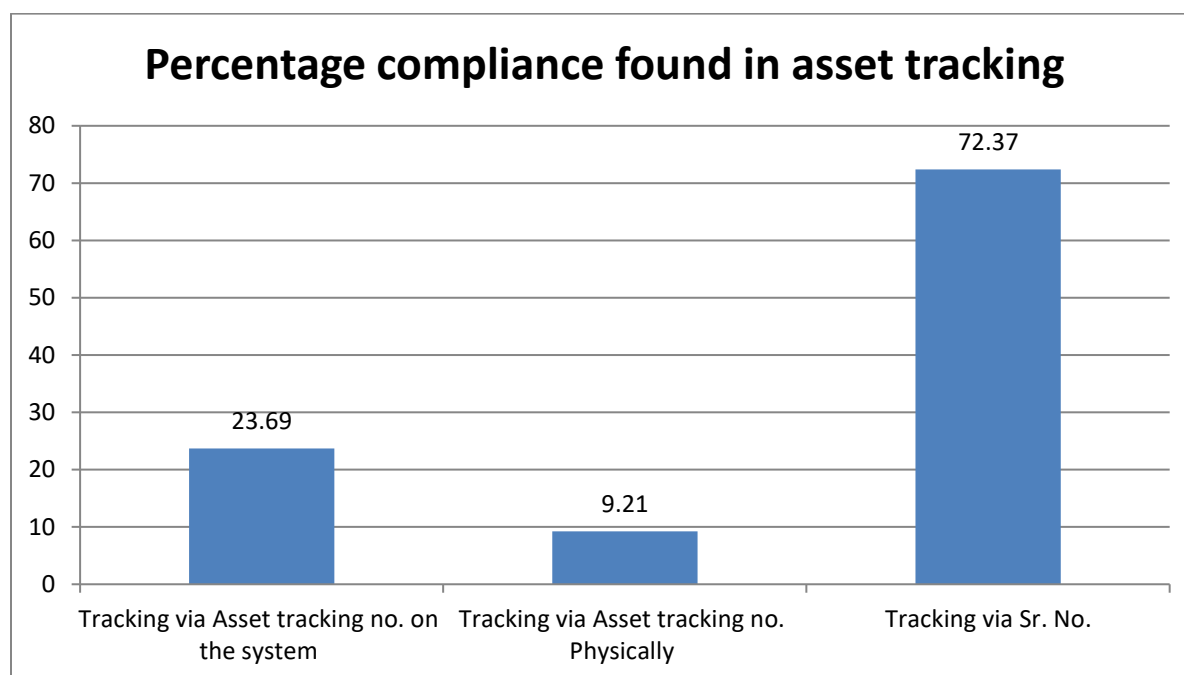
-Graph 8.2.1-

Sr No.	Parameters	Reason
1	Life of the Product	It has not been defined. *
2	Documents required before purchase of equipments (Board members signatures, MOM.)	The Equipments were purchased by the head purchase and not at the unit.**
3	Purchase Invoice	

*Life of the product has not been declared by the manufacturer. Alternatively, equipment's life can also be determined at unit level by taking the average machine life years but as FMRI has all newly purchased equipments it cannot be determined.

** The equipments purchased during establishment & costing more than 1 lac are purchased from the head office and not by the unit. Thus the committee was not involved in purchasing the equipments under observation.

7.8.2.3 Percentage compliance found in asset tracking:



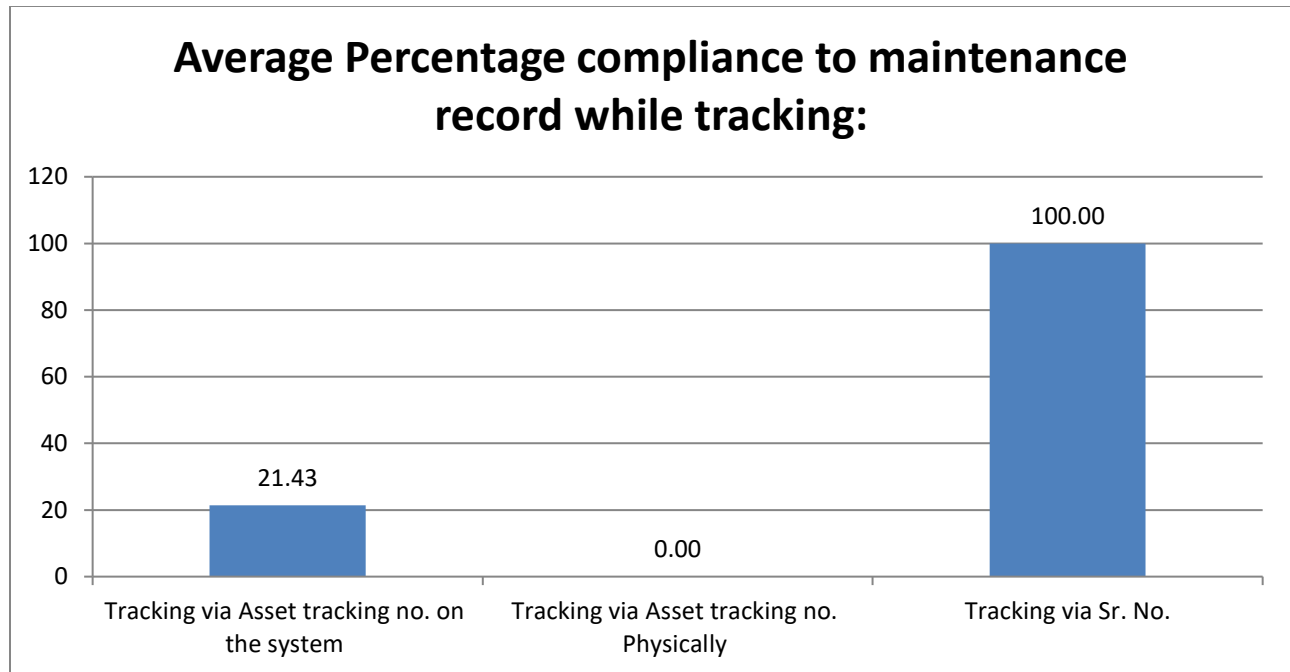
-Graph 8.2.3-

It is found that the primary tracking number (or asset code) can only trace 24% of the given components on the system while only 10% compliance is found on hard copies.

While tracking equipment using serial number compliance is found to be 74%.

	Tracking via Asset tracking no. on the system	Tracking via Asset tracking no. Physically	Tracking via Sr. No.
CT scan	31.58	10.53	73.68
EMG	31.58	10.53	73.68
ICT spine	31.58	10.53	73.68
Monitor	0	10.53	73.68
MRI	31.58	10.53	73.68
PH meter	31.58	10.53	73.68
Pulse Oximeter	31.58	10.53	73.68
ECG	0	0	73.68
Total compliance %	23.69	9.21	73.68

7.8.2.4 Average Percentage compliance to Maintenance record:



-Graph 8.2.4-

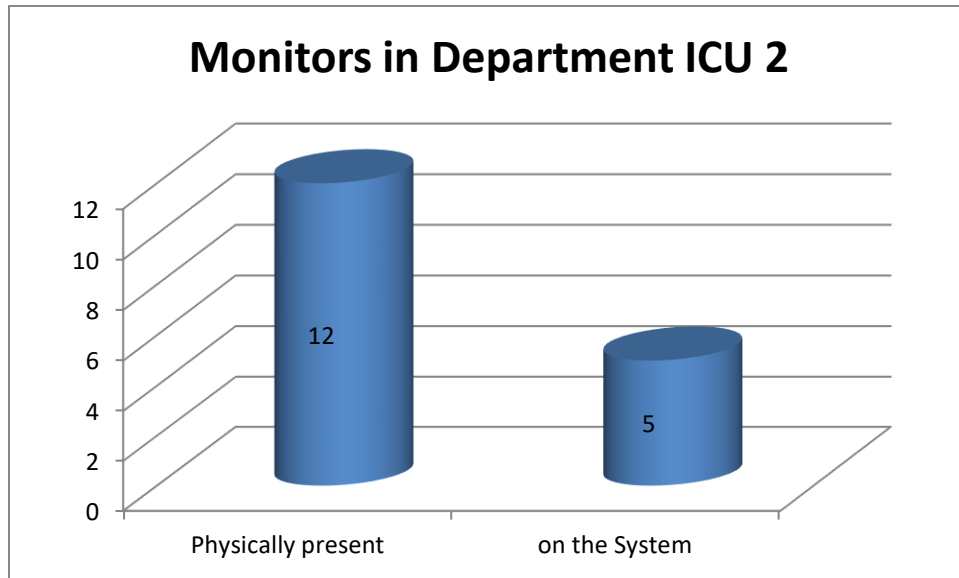
	Tracking via Asset code on the system	Tracking via Asset code Physically	Tracking via Sr. No.
CT scan	28.57	0.00	100.00
EMG	28.57	0.00	100.00
ICT spine	28.57	0.00	100.00
Monitor	0	0.00	100.00
MRI	28.57	0.00	100.00
PH meter	28.57	0.00	100.00
Pulse Oximeter	28.57	0.00	100.00
ECG	0	0	100.00
Average	21.43	0.00	100.00

Average compliance of Tracking via asset code is found to be 21.43%, while on hard copy of Preventive maintenance certificate it is found to be 0%.

On the other hand Asset's documentation can be traced back 100% while tracking by the serial number.

THE GROUP STUDY:

7.8.2.5 Monitors in Department ICU 2:

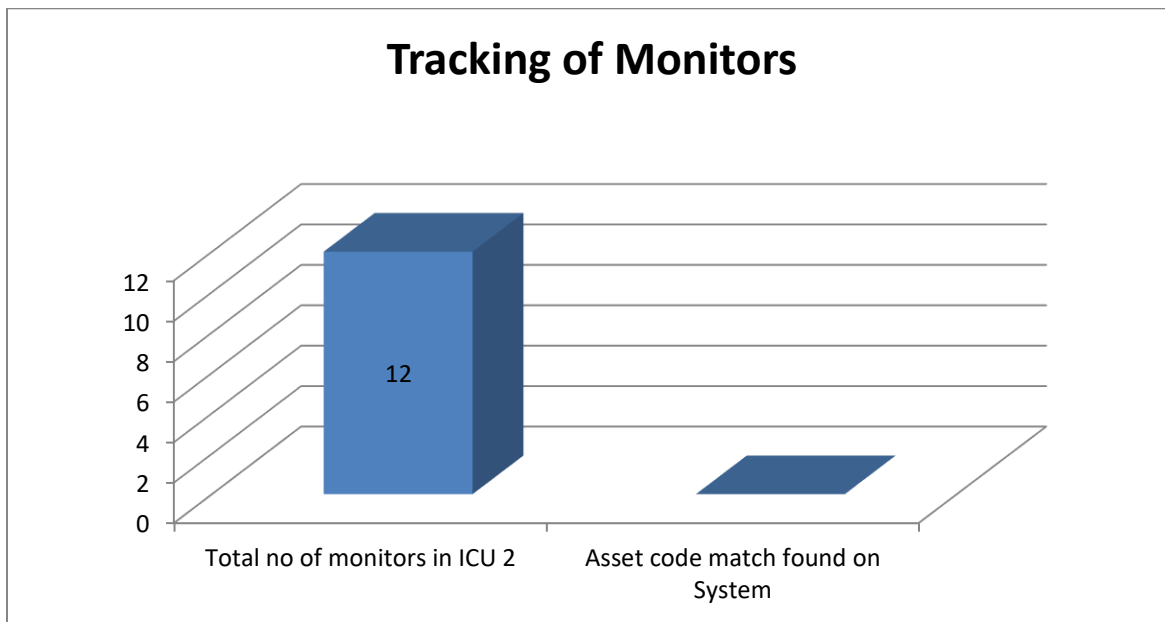


-Graph 8.2.5-

Bed No.	LIST OF MPM's FOUND IN ICU2	ON THE SYSTEM
2201	IC2/PMO/003	IC2/MPM/017
2202	IC2/PMO/013	IC2/MPM/018
2203	IC2/PMO/011	IC2/MPM/019
2204	IC2/PMO/007	IC2/MPM/020
2205	IC2/PMO/012	IC2/MPM/021
2206	IC2/PMO/001	
2207	IC2/PMO/009	
2208	IC2/PMO/008	
2209	IC2/PMO/004	
2210	IC2/PMO/010	
2211	IC2/PMO/002	
2212	IC2/PMO/006	
Total	12	5

It is observed that physically there are twelve monitors present in ICU 2 (excluding isolation room) but on the system (soft copy) there are only five monitors registered for the department.

7.8.2.6 Asset codes matching the system:



-Graph 8.2.6-

The above graph shows that there are 12 MPMs present in department but none of their asset codes matches with the ones registered in the system.

The tags on the monitors are obsolete and new coding has been introduced. The code has been updated on the system but old codes are still pasted on the equipment

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Technical service report does not showcase the asset code. Document or report of any equipment must contain the asset code and should be arranged according to the asset code.

NIHON KOHDEN INDIA PRIVATE LIMITED
TECHNICAL SERVICE REPORT TOLL FREE NUMBER: 1800 103 81
 FORM NO: CS/02/01

Report No.: NG02/4 **34191**
 Service Notification Number: _____
 Customer ID: _____

CALL ATTEND DATE: **22/12/2014** TIME: _____ CALL CLOSE DATE: **22/12/2014** TIME: _____

Lab/Hospital Name: **Tejash Hospital**
 Address: **Nagar Chh. Ghat, Netaji Subhas Marg, Gurgaon**
 City: **Gurgaon** State: **Haryana** Pin: _____
 Contact Person: _____
 Tel./Mob. No.: _____

Equipment Status: **WARRANTY**
 AMCO/CHARGABLE STATUS: FROM _____ TO _____
 SITE VOLTAGE: **L-N 230V VAC** L-G: _____ N-G: **23V VAC** STABILIZERS: **OFF** ☐ N
 SITE CONDITION: **OK**
 SITE RECOMMENDATION: _____
 EQUIPMENT NAME: **Emg. For Pms** MODEL: **MEB-9400K** SR. NO.: **00119**

ISSUES OBSERVED:
 1. **Not taken cleared external wiring & cables checked Main Unit, power cord given voltage & current check is working well & ready to use**

WORKING STATUS & SERVICING CHECKLIST OF MEK SERIES (Mandatory)

Step	☐ OK	☐ N.O.K	Working and clean	☐ Y	☐ N	Hi/L LED ON	Volts	WISC L-mannometer	Volt
Step 1 checked	☐ OK	☐ N.O.K	Strong Cleaning	☐ Y <td>☐ N</td> <td>Hi/L LED OFF</td> <td>Volts</td> <td>WISC U-mannometer</td> <td>Volt</td>	☐ N	Hi/L LED OFF	Volts	WISC U-mannometer	Volt
Step 2 checked	☐ OK	☐ N.O.K	Normal Cleaning	☐ Y <td>☐ N</td> <td>RISC Electrode</td> <td>Volts</td> <td>RISC L-mannometer</td> <td>Volt</td>	☐ N	RISC Electrode	Volts	RISC L-mannometer	Volt
Step 3 checked	☐ OK	☐ N.O.K	Films Cleaning	☐ Y <td>☐ N</td> <td>RISC Electrode</td> <td>Volts</td> <td>RISC L-mannometer</td> <td>Volt</td>	☐ N	RISC Electrode	Volts	RISC L-mannometer	Volt
Step 4 checked	☐ OK	☐ N.O.K	Bath cleaning	☐ Y <td>☐ N</td> <td>Background Noise</td> <td>☐ Y <td>☐ N</td> <td>Circuit Check</td> </td>	☐ N	Background Noise	☐ Y <td>☐ N</td> <td>Circuit Check</td>	☐ N	Circuit Check
Step 5 checked	☐ OK	☐ N.O.K	Apertur Cleaning	☐ Y <td>☐ N</td> <td>Mechanical Scaling</td> <td>☐ Y <td>☐ N</td> <td>Touch Screen</td> </td>	☐ N	Mechanical Scaling	☐ Y <td>☐ N</td> <td>Touch Screen</td>	☐ N	Touch Screen
Step 6 checked	☐ OK	☐ N.O.K	Flowcell Cleaning	☐ Y <td>☐ N</td> <td>Mechanical Cleaning</td> <td>☐ Y <td>☐ N</td> <td>Background Noise</td> </td>	☐ N	Mechanical Cleaning	☐ Y <td>☐ N</td> <td>Background Noise</td>	☐ N	Background Noise
Step 7 checked	☐ OK	☐ N.O.K	Air pressure	☐ Y <td>☐ N</td> <td>Sensitivity & Tst.</td> <td>☐ Y <td>☐ N</td> <td>Value Check</td> </td>	☐ N	Sensitivity & Tst.	☐ Y <td>☐ N</td> <td>Value Check</td>	☐ N	Value Check
Step 8 checked	WISC	RISC	Dilution	Y <td>N</td> <td>Diluent Value</td> <td>Factor</td> <td>Lys-Volts</td> <td>Factor</td>	N	Diluent Value	Factor	Lys-Volts	Factor

ISSUES USED BY CUSTOMER (FOR ME & NEURO): ☐ ORIGINAL ☐ THIRD PARTY

Test performed (Please attach the instrument generated result printout):
 TEST DESCRIPTION RESULT OBTAINED REMARKS

SERIAL NO.	DESCRIPTION	QTY.	OLD SPARES SR. NO.	NEW SPARES SR. NO.
Following parts replaced/needed to be replaced				

Before parts are in use: ☐ Part of Cost ☐ Will be Invoiced to Customer
 NO. OF SAMPLES: _____ NO. OF CS REQ: _____

Engineer's Name: **Machine is working well** Customer's remarks: _____
 SMO Engineer's Name: **ABHINAV VERMA** SMO Engineer's Name: _____
 Signature: **[Signature]** Signature: **[Signature]**

NOTE: CUSTOMER, PINK, NO. YELLOW, ENGINEER

N.B.: Please ensure filling and sending of installation check list along with this report at the time of installation.
 Subject to Customer's Signature
 Nihon Kohden India Pvt. Ltd., 208, Tower-A, Spangola, Sector-47, Solana Road, Gurgaon, Haryana, Pin 122002, India
 Tel: +91-0124-0871000-28 Fax: +91-0124-0871015, www.nihonkohden.com

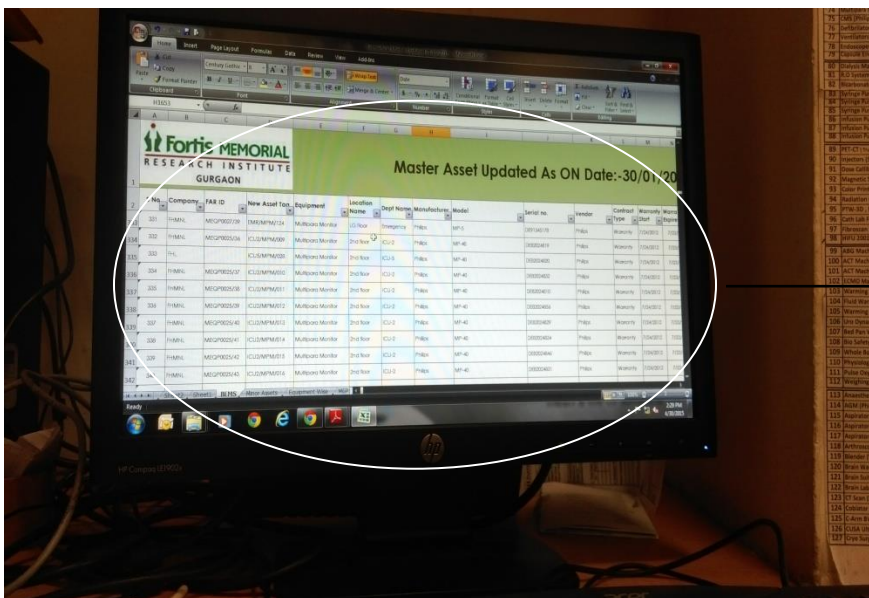
Foot switch works correctly. Yes ☒ No ☐

Service Manual MEB-9400

7.9.2 All the equipments are not registered in the system. Thus tracking the asset using the asset code becomes impossible for these particular equipments.



Asset Code:
IC2/MPM/013



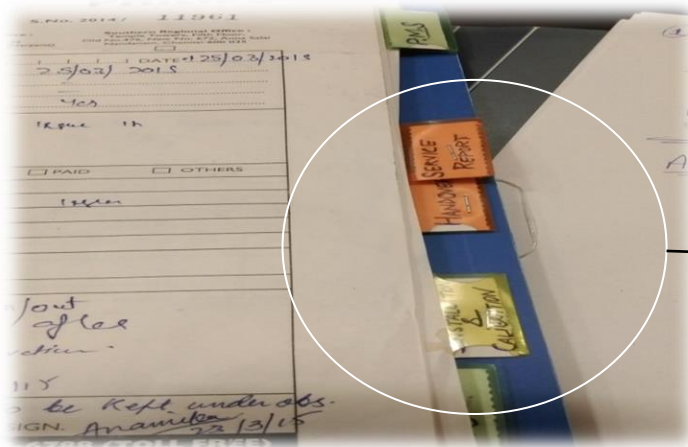
ASSET CODE NOT
PRESENT IN THE
SYSTEM

7.9.3 It is observed that the asset tracking code is not put or by accident has been peeled off from few of the equipments. This makes the equipment tracking using the asset code a tedious procedure.



-ECG machine-

7.10 Searching for documents of particular equipment presents a problem as the documents are not arranged according to their Asset number or chronological order.



The documents are numbered according to date and not of any asset code wise.

- 7.9.4 The list is not updated regularly. Even if the warranty is expired, the system continues to show it as under Warranty.

Asset Updated As ON Date:-30/01/2015

Model	Serial no.	Vendor	Contract Type	Warranty Start	Warranty Expire	PM Frequency	Purchase Cost (₹)	Purchase Date	PO No.	Contact No.
ICT	100277	Philips	Warranty	2/20/2012	2/19/2014	SEM-ANNUALLY	30,000,000.00		Agreement	18004196780
Ingenio	42072	Philips	Warranty	2/20/2012	2/19/2014	SEM-ANNUALLY	135,000,000.00		Agreement	18004196780
Essenza DR	1100097	Philips	Warranty	2/20/2012	2/19/2014	SEM-ANNUALLY	10,000,000.00		Agreement	18004196780
Essenza RC	42411234895A	Philips	Warranty	2/20/2012	2/19/2014	SEM-ANNUALLY	6,000,000.00		Agreement	18004196780
Care P2	3H71234895A	Amnec	Warranty	4/22/2012	4/21/2014	SEM-ANNUALLY	1,365,000.00	9/14/2012	PHGG-1/ME/11-12/2011	011-25546482
Aluka Xper FD 20	232	Philips	Warranty	4/22/2012	4/21/2014	SEM-ANNUALLY	45,000,000.00		Agreement	18004196780
Multi model 2.5	MM2 5/23489	Siemens	Warranty	5/16/2012	5/15/2014	SEM-ANNUALLY	225,000.00	11/22/2011	PGGG-1/ME/11-12/2011	18004197477
Multi model 2.5	MM2 5/23487	Siemens	Warranty	5/16/2012	5/15/2014	SEM-ANNUALLY	220,000.00	11/22/2011	PGGG-1/ME/11-12/2011	18004197477
Multi model 2.5	MM2 5/23484	Siemens	Warranty	5/16/2012	5/15/2014	SEM-ANNUALLY	220,000.00	11/22/2011	PGGG-1/ME/11-12/2011	18004197477
CPM Pentara	463148245	Carl Zeiss	Warranty	5/17/2012	5/16/2014	SEM-ANNUALLY	6,000,000.00	12/31/2010	PHGG-1/ME/10-11/2009	011-48154000, 8025

Warranty has expired. Still the contract type displays as warranty.

It must display under CMC

- 7.9.5 The gate pass does not bear any serial number or other tracking number which can be traced. Instead, a separate register is maintained which bears the product serial number against the gate pass. This proves duplication of work.

Fortis Memorial Institute
BUREAU

RGP Status Details For Biomedical Engineering

GP No.	Particular	Out Date	In Date	Remarks
1015	Corporate Office Fortis Sci 44 (Largan) Weight Machine (BPA) Height meter (es)	29/04/15	29/04/15	Received
116	Corporate Office Fortis Weighting m/c Height meter	29/04/15	29/04/15	Received
17	Gen-X Medical System New Delhi Multipurpose Monitor MP-40 (es) mms (es)	01/05/15		
18	Gen-X Medical System Power Supply for Elumpe	01/05/15		
19	Smith Medical System MRI Compatible Syringe Port (Medfusion 9550) C. No. 123456789	01/05/15		

RETURNABLE GATE PASS

Serial No. 1827

19/04/15

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7.10 RECOMMENDATIONS:

Ideal condition would be to acquire an asset management system which would automatically update all the required information regarding an asset and duplication of work could be skipped.

Meanwhile following steps should be undertaken so as to improve the current system:

- 7.10.1 Conducting audits for all the instruments and making sure that each equipment bear its asset tracking code.
- 7.10.2 According to the present condition entries on the system needs to be revised & updated.
- 7.10.3 A separate excel sheet should be made for each of the equipments which would include all the existing entries as well as the dates of previous preventive maintenance, any parts replaced on the equipment and gate pass serial number, if the equipment was sent out of facility for maintenance.
- 7.10.4 The master copy needs to be modified and should include the last maintenance carried out on the equipment.
- 7.10.5 All the documents must bear the relevant equipments asset code and filed equipment wise so as to track them with ease.
- 7.10.6 The maintenance data and the downtime should be in reference to the asset code; thus making the asset code as widely used as possible and uniformity is maintained.

7.11 CONCLUSION:

It is extremely important for a learning organization and even more for a health care sector such as a hospital to manage and keep track its assets. These are vital for any growth oriented organization as they maximize employee and equipment efficiency & reduce equipment downtime through better planning.

The department under observation has a manual asset tracking system in place but few gaps were found while tracking the equipments. Its analysis was carried out based on a checklist prepared & gaps were analyzed.

Accordingly upon analyzing the situation and current system in place, the recommendations given where efficient management of resources and vigilance will be able to cover these specific gaps.