

Summer Placement
Bhagwan Mahaveer Cancer Hospital and Research Centre
(April 1 to May 31st, 2015)

Streamlining Process of Pathology Department
&
Radiology Department

By
Kalpana Bindal

Under the guidance of
Prof. J.P. Singh

MBA Hospital and Health Management
2014-2016


Institute of Health Management Research, Jaipur

CERTIFICATE

This is to certify that **Kalpna Bindal** has undergone her Summer Training in **Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur** from 1st April 2015 to 30th May 2015 and has done project on-

“Streamlining Process of Pathology and Radiology department”

The candidate herself carried out all the studies related to her Summer Training. Her approach to the study has been scientific and analytical.

The summer training is in partial fulfilment of the course requirement recommended for the award of Master of Business Administration-Hospital & Health Management.

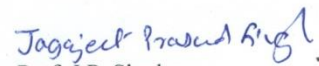
I wish her success in all her future endeavours.



Col. (Dr.) Ashok Kaushik,

Dean (Academic and Student Affairs)

IIHMR University, Jaipur



Prof. J.P. Singh

Associate Professor

IIHMR University, Jaipur



Bhagwan Mahaveer

Cancer Hospital & Research Centre

(Managed By K.G. Kothari Memorial Trust)

Dated : 30.06.2015

TO WHOM SO EVER IT MAY CONCERN
(NO OBJECTION CERTIFICATE)

This is to certify that **Ms. Kalpana Bindal** has done her Summer Internship in Bhagwan Mahaveer Cancer Hospital, Jaipur from **1st April, 2015 to 31st May, 2015**. Her topic was "**Streamlining Process of Pathology Department & Radiology Department**"

During this tenure she found Hardworking & Sincere.

We wish her all the best in her future endeavors.

For Bhagwan Mahaveer Cancer Hospital & Research Centre Jaipur.


Renu Pareek
HR Manager

Acknowledgement

For a management student, the power of knowledge is unattainable unless an element of practical observation and practical performance is added. I consider myself to be fortunate for having been provided an opportunity to undergo summer training at **Bhagwan Mahaveer Cancer Hospital and Research Centre.**

It is a great pleasure to express my sincere gratitude to Dr S. C. Pareek (Medical Director) And Dr Vrajesh Shah (Deputy Medical Superintendent) for providing me an opportunity to undergo training in this highly esteemed organization.

My very special thanks to Mr Ankit Pareek (Operation Executive) for helping me with his valuable suggestions in the completion of my report. He has been constant guiding light.

I would also like to thank the **Team of Pathology and Radiology Department** for clearing my doubts regarding my topic and providing the necessary details whenever was required.

I would also like to thank my faculty at IIHMR-Jaipur, especially my mentor Prof J.P. Singh sir and also feel privileged to acknowledge Prof V.P. Raghuvanshi sir, who was although was not my official mentor but continuously guided me and this report attained its final shape.

Lastly I would like to express my gratitude all those people who took time out from their busy schedules and cleared my queries. I would like to thank my family and friends for being constant source of inspiration to me.

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Acronyms-

OPD	Out-Patient Department
IPD	In-Patient Department
OT	Operation Theatre
ICU	Intensive Care Unit
CT	Computerized Tomography
USG	Ultrasonography
NABH	National Accreditation Board for Hospitals and Healthcare providers
NABL	National Accreditation Board for Testing and Calibration Laboratories
TAT	Turnaround Time
HR	Human Resource
PET-CT	Positron Emission- Computerised Tomography
ED	Emergency Department
CBC	Complete Blood Count
OPG	Orthopantomogram
BMCHRC	Bhagwan Mahaveer Cancer Hospital and Research Centre
CSSD	Central Sterile Service Department
PACU	Post Anesthesia Care Unit
BPL	Below Poverty Line
PFT	Pulmonary Function Test
MIS	Minimally Invasive Surgery

Overview

Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur (BMCHRC) came into existence in the year 1997 with initial bed strength of 50 beds as a beginning but gradually picked up with fast development with regards to infrastructure, installation of latest modern equipment, facility of OTs and 5 bedded ICU. Similarly, Surgical Oncology, Medical Oncology, Radiation Oncology, Radiology, Pathology, Blood Bank Departments were also equipped and well defined comprehensive state-of-art care facilities with bed strength of 150 were made available to the patients under one roof at BMCHRC.

At present with the construction of separate 9 floor IPD block (Phep Kanwar Kothari Memorial IPD), the bed strength has been further raised to 200 within no time in the interest of patient care being imparted here and have consistently achieved significant progress.

Under the constant supervision and guidance from the members of the management especially Chairman, Managing Trustee and Sr Vice Chairperson, this hospital has made a land mark in delivering cancer care services to the afflicted population of the nothern part of the country.

Vision

To make Bhagwan Mahaveer Cancer Hospital and Research Centre (BMCHRC) comprehensive world class Cancer treatment center with cutting edge technology.

Jaipur, the state capital of Rajasthan is the largest populated city in this region known for its art, culture and more. Though, there are quite good number of Government as well as private health care centers to cater to the needs of the suffering community, but still was lacking in specialized center which could take care of cancer patients. Ever since, various developments were initiated by the public as well as private sector to improvise the health care, but failed to establish a cancer care center in the state which was a dire need. As a consequence due to lack of proper infrastructure and treatment facilities, patients had to go out of Jaipur i.e. to Delhi, Mumbai, Vellore and other places for treatment which of course is not in reach of many patients who had to give up in need of treatment.

In the year 1992 on the auspicious occasion of Mahaveer Jayanti, an idea of establishing Cancer hospital in the city was explored amongst the august gathering of enlightened citizens of Jaipur in the presence of the then Chief Minister of Rajasthan and a draft proposal was submitted to the Government. A piece of land measuring 22166 sq. yards was allotted on a token price of Rs.1/-only and Shri N.R.Kothari, Chairman, K.G.Kothari Memorial Trust was asked to take up this project under his stewardship to fulfill the long awaited need of establishing separate cancer hospital in the city to benefit thousands of people in Rajasthan suffering from this dreadful ailment.

Though, the initial construction was started and some of the infrastructure was erected with the available funds from donations, but in the year 1995, fresh donations were almost negligible and it was not possible to move forward without sufficient funds. At this juncture, a team of trustees led by Shri Vidya Vinodji Kala, Shri Vimal Chandji Surana approached Shri N. R. Kothari with an appeal to extend his support and boost the project. Considering the social motive behind the project i.e. serving the suffering community specially cancer patients, K. G. Kothari Memorial Trust decided to take up Bhagwan Mahaveer Cancer Hospital and Research Centre, at Jaipur with the aim to make available the world class cancer care center with cutting edge technology so as to eliminate the problem of cancer in this part of the country.

Mission

The MISSION was to create a comprehensive tertiary care center for cancer treatment where patients are served with world class facilities.

The ultimate PHILOSOPHY behind this project is to keep in pace with modern advancements so as to update the treatment facilities with time in providing best possible treatment to the cancer patients irrespective of caste, creed and nationality. The ultimate goal is to make this hospital one of its kinds not only in Rajasthan but finest amongst all the centers in north India.

“To control & eliminate the problem of Cancer & to alleviate the suffering of cancer patients in the Country.”

Quality Assurance Department

Quality Management Department focuses broadly on the four core principles for quality assurance in the institution. They are as follows:

1. Patient (customer)
2. Hospital delivery systems (systems and processes)
3. Analysis and problem identification (performance measurement)
4. Team work

Quality Policy

BMCHRC provides total health care to its patients, with the highest levels of skill, professionalism and ethical practice, leading to their effective care and treatment at affordable costs. BMCHRC is committed to Continued Quality Improvement.

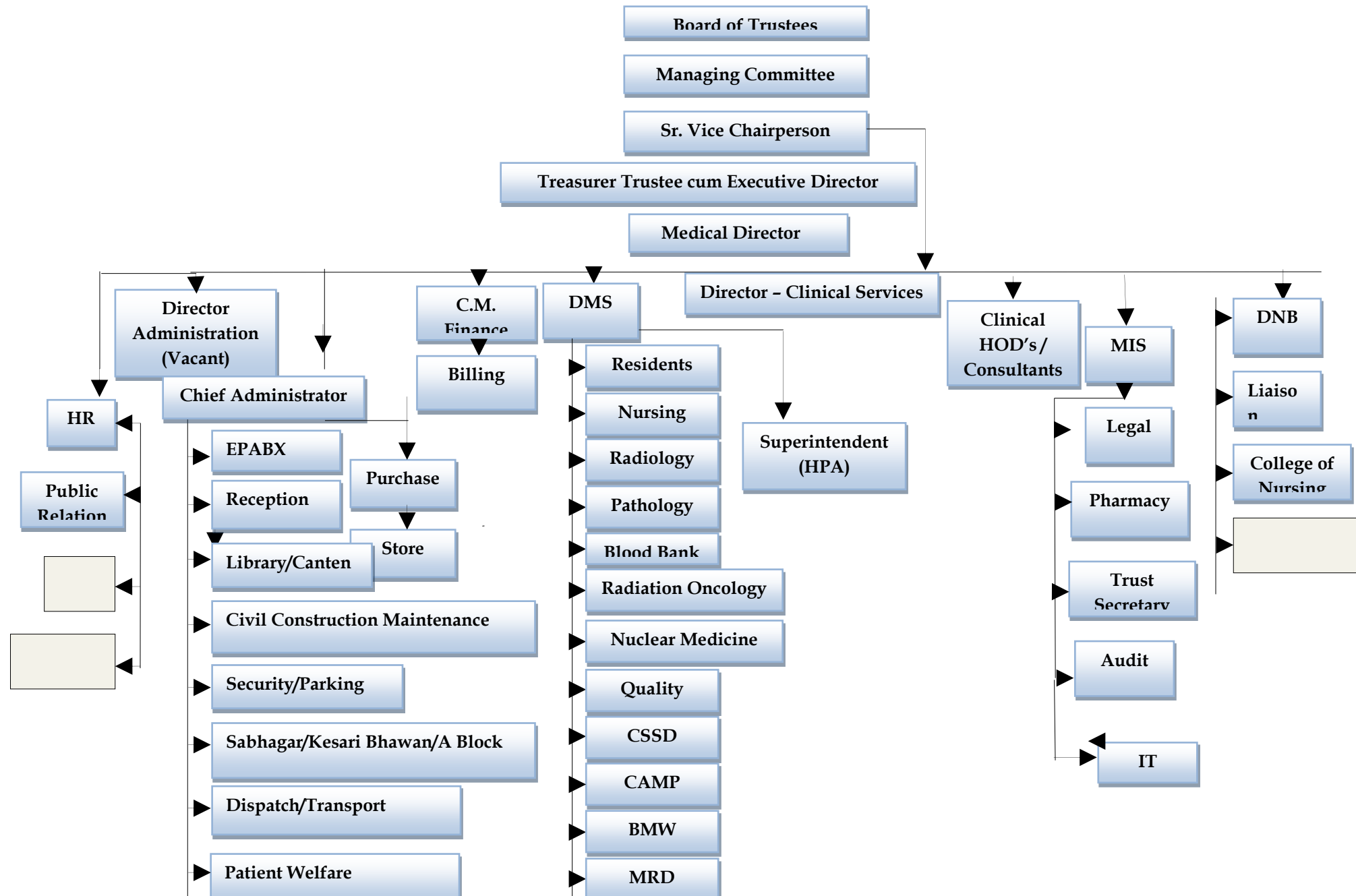
Quality department brings forward the innovative ideas for the patient safety & quality services, feasibility study, planning, implementing & control process.

Milestones

- Allotment of land for Bhagwan Mahaveer Cancer Hospital and research center on October 20th 1992.
- Bhoomi Pujan by Hon'ble Vice –President of India Shri Bhairon Singh Shekhawat on 23rd October, 1992.
- Inauguration of Preliminary Services at BMCHRC 23rd October 1997
- Inauguration of Acharya Hasti Bhawan by Hon'ble Chief Minister of Rajasthan Shri Ashok Gehlot 28th January, 2001
- CT scan and Colour Dopler inaugurated by Medical & Health Minister Shri B.D. Kala on 9th June 2003.
- Linear Accelerator inaugurated by Hon'ble Vice –President of India Shri Bhairon Singh Shekhawat on 25th March 2005.
- Phepkanwar Kothari Bhawan (Foundation Stone by Hon'ble Vice –President of India Shri Bhairon Singh Shekhawat on 23rd October, 2005.
- Nursing College Inaugurated on 12th May, 2006.

- I.M.R.T. and Kesari Bhawan Inaugurated by Hon'ble Vice –President of India Shri Bhairon Singh Shekhawat on 23rd October 2008.
- Inauguration of PET CT & GAMA Camera by Hon'ble Chief Minister of Rajasthan Shri Ashok Gehlot on 23rd October, 2010.
- Second Varian Linear Accelerator inaugurated by Shri S.K. Shrivastav, Head of Department, Radiation Therapy, Tata Memorial Center on 30th July 2011.
- Pain and Palliative Ward Started 4th June 2012.
- Inauguration of Advanced Operation Theatre & Surgical I.C.U. by Hon'ble Chief Minister of Rajasthan Shri Ashok Gehlot on 4th September, 2012
- Phepkanwar Kothari Bhawan (Inauguration by Hon'ble Chief Minister of Rajasthan Shri Ashok Gehlot on 29th August, 2013.

Organogram- Managed BY: K.G. KOTHARI MEMORIAL TRUST)



Facilities

BMCHRC provides various facilities and services. Besides professional care and support, hospital management is taking care of patients' inner comfort as well. Small greenery center while entering hospital stimulates inner calmness and relaxation. At hospital, patients have access to library and internet. The library is constantly enriching and is open 6 days a week.

Diagnostic Service

Radio Diagnosis Department

- 16 SLICE CT Scan (With Latest Technology)
- Mammography (To Diagnose breast Cancer)
- Color Doppler - 3
- Digital X-ray – 1
- OPG
- Colposcopy

Pathology Department

- Hematology
- Biochemistry
- Cytology
- Histopathology
- Microbiology
- Serum Marker Studies
- IHC Marker
- Clinical Pathology

Treatment Facilities

- Radiation Oncology Department
- Two Linear Accelerators (First in Rajasthan with technology of Rapid Arc, IGRT, IMRT and 3DCRT)
- Brachytherapy
- Cobalt

Nuclear Medicine Department

- PET CT 16 Slice (First in Rajasthan)
- Gamma Camera (For Bone Scanning)
- Radio Iodine Therapy (First & Only in Rajasthan only for Thyroid Cancer Patients)

Medical Oncology Department

- Day Care Ward (40 Bedded for Chemotherapy Patients)
- MICU

Surgical Oncology Department

- Operation Theatres
- 1 Integrated OT
- 3 Modular OT's
- 2 Other OT's
- 1 Endoscopy Theatre
- 14 bedded I.C.U

Department of Anesthesia & Palliative Care

- Home Care Facility provide by Palliative care to terminally ill patients

Blood Bank

- 24 hour available (all fractions of Blood)

Clinical Research Department

Pharmacy

- 24 hour available & Medicine are available at reasonable rates

Preventive Oncology

- Mobile Unit (Ambulance Services)- available for rural areas
- Nursing College (MSc, BSc & GNM Courses)
- Nursing Hostel
- Supportive facility
- Dietary Facilities
- Physiotherapy Facilities
- Newly Constructed IPD Block (9 story 200 Bedded)

Floor wise Facilities Arrangements-

Basement (old Wing)

- Pathology
- Blood bank

Basement (New Wing)

- CSSD
- Laundry
- Maintenance (Biomedical/ Electric etc..)
- Medical gases
- Housekeeping

Ground floor

Clinical-

- Nuclear medicine
- Radiation Oncology
- Day Care
- Dental Department

Non Clinical

- Reception
- Trust Office & Liaison Office

- PRO Office
- IPD Billing
- EPABX
- Canteen/ Cafeteria

Outside Area

- Pharmacy
- Bhojnalya
- Parking
- Bank

1st Floor (Old Wing)

- OPD (Medical/ Surgical)
- Radiology
- Internal Medicine
- Cancer Care
- Administration
- OPD Registration & OPD Billing
- Medical ICU
- Endoscopy
- OT
- PAC room
- Emergency
- BPL Counter

1st Floor (New Wing)

- Gynecology
- Physiotherapy
- Ward
- New Cancer Care
- Emergency

- MCU
- Palliative care

2nd Floor-

- New OT Complex
- Surgical ICU
- Ward II
- Pediatric Ward
- Patient Waiting Area

3rd Floor-

- Ward III (For General / BPL Patients)
- Deputy Nursing Superintendent

4th Floor

- Ward 4
- Discharge Section

5th Floor

- Department of Clinical Trials & Research
- Hospital Library
- HR
- Accounts
- Purchase
- MIS

6th Floor

- Semi Private Ward
- Super Deluxe Ward

7th Floor

- Deluxe Ward
- Super Deluxe Ward

A Block

- Residential Block

Specialties

Medical Oncology

The department of Medical Oncology is engaged in active treatment of patients suffering from acute lymphoblast leukaemia, acute myeloid leukaemia, Hodgkin and Non-Hodgkin lymphoma, multiple myeloma, breast cancer, lung cancer, ovarian cancer, colorectal cancer, hepato-biliary and pancreatic cancer, esophageal cancer, prostatic, urinary bladder, and kidney cancer.

The department, in collaboration with radiation oncology, is engaged in concurrent chemo radiation of head and neck cancer, cervix cancer, lung cancer etc.

The Medical oncology department is also engaged in the treatment of hematological disorders such as myelodysplasia, aplastic anemia etc.

Scope of Services-

- Now patients are being given chemotherapy in day care which is convenient to the patient. Our day care center has 40 beds and is open from 9.00 am till 9.00 p.m.

The day care concept has been encouragingly welcomed by the patients as they are obviously benefitted as below:

- More convenient, as patients can return home the same day. It is less stressful particularly for children.
- Perception of being sick is reduced.
- Separate Pediatric oncology department.
- Clinical trial facilities – Phase I, Phase II, Phase III studies are being conducted.
- Isolation ward for neutropenia patients.
- Emergency services are available round the clock.

Internal Medicine The Department of Medicine provides a broad range of services for patients at the BMCHRC. The department meets the needs of –

- Patients with acute complications including infections, pulmonary complications, cardiovascular disease and metabolic disorders.
- Inpatient consultation service for management of medical illnesses of patients undergoing surgery, radiotherapy and chemotherapy.
- Complex surgical patients are also attended where potential medical risk factors for surgery can be identified and their risk for surgery is estimated.
- Out-patient consultations are also provided to patients who have medical illnesses such as diabetes or heart disease that require specialized management during their course of cancer treatment.
- Referral consultations to the intensive care unit and to the step down units.

On an average 15000 consultations are carried out annually by the department.

The department of medicine conducts the following specialty clinics:

1. Cancer thrombosis clinic: All deep vein thrombosis and pulmonary embolism patients are registered, worked up, treated and followed up.
2. Cardiomyopathy Clinic: Patients diagnosed with cardiac dysfunction following chemotherapy and radiotherapy is registered and offered long term treatment.

The medicine department offers following services:

1. Echocardiography: A state of the art 3-D echocardiography machine is available for transthoracic, transesophageal echocardiography. Annually about 5000 echo-cardiographies are carried out. In addition it has a portable unit to conduct emergency bedside 2D echo in the intensive care unit.
2. Pulmonary Function Testing laboratory: On an average about 2000 PFTs are carried out annually. The main patient load being pre and post op Lung cancer patients, follow up of patients who have received Bleomycin, breast cancer patients receiving radiotherapy
3. Electrocardiography: About 16,000 ECGs are carried out each year.

Surgical oncology

The department has a team of well qualified, experienced surgical oncologists. Operation Theatre staff is well trained and experienced to assist all types of major & supra major surgeries.

Operation Theatre complex consists of four ultramodern and sophisticated seamless modular theatres developed by Karl Storz Germany, first of its kind in Rajasthan.

ORI is the latest operating theatre concept with fully integrated for Laparoscopic surgeries (Minimally Invasive) routine surgeries.

ORI have 3 LCD H.D. touch screens for viewing the procedure. One wall mounted LCD screen and camera for live audio and video conferencing & recording for further references and teaching purposes.

Centre specializes in:-

- Head and Neck Oncology
- Breast Oncology
- Thoracic Oncology
- Gastro Intestinal Oncology
- Genito Urinary Oncology
- Gynec-Oncology
- Bone and Soft Tissue Oncology
- Minimally invasive surgery (MIS)
- Colostomy clinic
- Dietician
- Physiotherapy
- Acute pain service
- Palliative care services

Radiation Oncology

The department has the distinction of starting of the first linear accelerator facility in Rajasthan. At present it has the state of art radiation treatment facilities and well trained faculty to manage this ultra modern Department.

The treatment facilities include:

1. High energy Linear Accelerator (Clinac IX) with 3DCRT, IMRT, IGRT and Rapid Arc facilities – to deliver very precise treatment in less than five minutes.
2. High energy Linear Accelerator with 3DCRT & IMRT technologies – To deliver highly conformal Radiation Therapy.
3. Ultra-modern computerized treatment planning systems.
4. Dedicated PET-CT scanner and CT scanner for radiation therapy planning. MRI fusion facility is also available.
5. HDR Brachytherapy machine to treat mainly gynecological, esophageal, head & neck, breast & soft tissue malignancies with CT compatible applicators.
6. Well-equipped mold room to cast customized immobilization devices for each patient for precise treatment delivery.
7. Tele-cobalt machine

Nearly 200 odd patients receive treatment in radiation oncology department per day.

Thorough pretreatment and post treatment counseling is done for each patient. In house dietician takes care of all the dietary problems faced by the patients undergoing radiation therapy.

Hematology Oncology

Hematology is the study of blood, the blood-forming organs, and blood diseases. Hematology includes the study of etiology, diagnosis, treatment, prognosis, and prevention of blood diseases

Hematologist is a person who is expertise in the following diseases:

- Chronic leukemias- Chronic myeloid leukemia (CML), Essential thrombocytosis (ET), Myelofibrosis, Chronic lymphoid leukemia (CLL).
- Acute leukemias-Acute lymphoblastic leukemia (ALL), Acute Myeloid Leukemia(AML).
- Lymphomas- Hodgkins lymphoma, Non hodgkins lymphomas (NHL).
- Plasma cell dyscrasias - Myeloma, Amyloidosis.
- Anaemias- Nutritional, Autoimmune hemolytic anaemias, Anaemia of chronic disease.
- Thalassemias, Sickle cell disease.
- Thrombocytopenias- ITP, Platelet disorders.
- Leucopenia, Leucocytosis, Eosinophilia.
- Pancytopenia, Aplastic anaemia, Myelodysplastic syndrome (MDS).
- Polycythemia, Thrombocytosis.
- Bleeding disorders- Haemophilias, Von willebrand disease (VWD), others.
- Thrombotic disorders- Deep vein thrombosis (DVT), Cortical vein thrombosis (CVT), Pulmonary thromboembolism (PTE), and Abdominal vessel thrombosis.
- Disseminated intravascular coagulation (DIC).
- Pregnancy complications-Thrombocytopenia, Recurrent, pregnancy loss, Antiphospholipid antibody syndrome (APLA), Protein C & Protein S deficiency.

Gynecologic Oncology

Female patients can avail the following services in this department which is headed by senior specialized gynecologic oncologist.

Preventive services for all female who are suffering from genital cancers, This includes gynecological examination, Pap smear, Colposcopy, Hysteroscopy etc..

Treatment of all gynecological cancers in all age groups, specialized services for younger ladies in the form of Ovarian and hormonal function conservation wherever applicable.

Follow up and further screening for all treated patients.

Anaesthesiology-

Anesthesiologist seeks to encompass the entire Perioperative experience from Perioperative evaluation to intra operative regional or general anesthesia to post anesthesia care unit (PACU).

Our hospital having ultra-modern operation theater well equipped with advanced anesthesia work station, non-invasive and invasive monitors, infusion pumps, fiber optic bronchoscope for difficult intubation, body warmer it keep patient warm while prolong surgeries.

Key works of the department are:

- Preoperative assessment and Perioperative of patient for anesthesia.
- Conducting all major and supra-major cancer
- Monitoring maintenance of normal physiology during Perioperative period.
- Management of acute post-operative pain with the help of PCA pump, epidural infusion, nerve blocks, continuous I.V. Infusion.
- Management and teaching of cardiopulmonary resuscitation.
- Supervision & Teaching at both medical paramedical personnel involved in Perioperative period.
- Conducting teaching programs for senior residents and paramedics and providing fully encouraging academic environment for research activities.

The department of critical care includes state of the art medical and surgical critical care units governed by department of anesthesiology.

Surgical Intensive care unit (SICU)

OT is supported by well designed SICU for proper patient care. The surgical critical care unit has 16 fully equipped beds. SICU has infusion pumps, PCA pumps for post-operative pain management, DVT pump for DVT prophylaxis. Aim is early recovery of patient by providing good pain relief, early respiratory physiotherapy, and early ambulation

Medical Intensive care unit (MICU)

Medical ICU is fully equipped with 5 beds, having modern ventilators, Bipap ventilator, invasive and noninvasive monitors.

It provides sophisticated care to seriously ill cancer patients involving a multidisciplinary team of oncologists' physicians, physiotherapist nutritionist, and psychologist and well experienced critical care nurses.

Preventive Oncology

Since 1999 to December 2013 BMCHRC has organized total 872 Camps screening 142775 patients out of which 6464 suspected cases were referred for further diagnostic workup.

In the larger interest of community camp teams comprising of General Physician, Oncologist, Gynecologist, ENT Specialist, Radiographer, Paramedical & Nursing Staff dedicate their services at the door steps of needy and deserving patients.

In the Preventive Oncology Department Nurgis Dutt Memorial Mobile Van and Mammography Mobile Van – which are equipped with Mammography, X-ray Machine, Dark room, Laboratory procedures Room, air conditioner and Genset have proved their worth for early detection of breast cancer and lung cancer etc..

Mammography Mobile Van is also equipped with the hardware and software of telemedicine with the help of which X-ray and Mammography performed at distance remote areas can be sent to and studied by radiologist at BMCHRC, Jaipur and his observations can be reported back at the distant camp site.

Publishes year wise the summary and detailed data's about the camps, so that they can be made useful to the policy makers program managers, NGO's and other Charitable institutions in planning such activities.

BPL and Poor new Cancer Patients diagnosed at various camps

Special campaigns for youths in colleges, clubs, factories etc., where effective cancer awareness development is done.

Palliative Care / Home Care Services

The World Health Organization defines palliative care as care which focuses on patients with life-threatening diseases. Palliative care improves the quality of life of patients and families who face life-threatening illness, by providing pain and symptom relief, spiritual and psychosocial support from diagnosis throughout the course of illness.

Palliative care is often referred to as supportive care or symptom control. If the patient's cancer cannot be treated, then the palliative care focus shifts to end-of-life care.

Palliative care includes:

- Treatment of pain and other physical symptoms, such as fatigue, nausea, constipation, poor sleep, loss of appetite and weight loss
- Treatment of emotional symptoms, such as depression and anxiety
- End of life care

Day Care services:

Day care services provided include paracentesis, intravenous titration of analgesics, lymphoedema management and transcutaneous nerve stimulation and counseling.

Home Care services:

A dedicated and professionally qualified trained interdisciplinary team consisting of doctor, nurses and counselor provide home care to the patient with advanced cancer. The team visits the patient at home and provides medical, psycho social and emotional support. Weekly visits and follow-up are also done.

Telemedicine

"BMCHRC has partnered with TeleChikitsa, a telemedicine company to bring an opportunity to consult some of the leading researchers in the field of Oncology or any other specialty.

TeleChikitsa enables you to schedule and talk to the top American doctors in their fields right from the comfort of their telemedicine suite installed in Bhagwaan Mahaveer Hospital. You also have a choice to continue the follow up treatment with your own physician or physicians at BMCHRC.

TeleChikitsa, provides peace of mind by making sure that the treatment plan you are following is correct and if it needs to be modified, it can be done well in time to achieve optimal results. TeleChikitsa offers full service consults as well as second opinions for your radiology and pathology tests.

Ostomy Clinic

Bhagwan Mahaveer Cancer Hospital, Jaipur provides ostomy care for all types of ostomies. It trains patients and their attendants in ostomy care. It also provides the required counseling to the patients.

Procedure:

1. Ostomy patient must be referred by the surgeon for ostomy care.
2. Patient must get registered at the OPD Counter of BMCHRC for ostomy care. The registration will be free.
3. Clinic will provide free care services as per the instructions of the treating surgeon.
4. Services are available to both BMCHRC patients and patients from other hospitals.

Nuclear Medicine

Nuclear medicine specialists use safe, painless, and cost-effective techniques to image the body and treat disease. Nuclear medicine imaging procedures often identify abnormalities very early in the progress of a disease, long before many medical problems are apparent with other diagnostic tests.

Nuclear medicine uses very small amounts of radioactive materials (radiopharmaceuticals) to diagnose and treat disease. In imaging, the radiopharmaceuticals are detected by special types of cameras that work with computers to provide very precise pictures about the area of the body being imaged. In treatment, the radiopharmaceuticals go directly to the organ being treated. The amount of radiation in a typical nuclear imaging procedure is comparable with that received during a diagnostic x-ray, and the amount received in a typical treatment procedure is kept within safe limits. PET scans are commonly used to investigate the following Human Conditions. : Cancer, Heart, Epilepsy, Alzheimer's, Medical conditions

WHAT ARE COMMON USES OF THE PET-CT

- PET-CT can inform whether a tumor is benign or Cancerous.
- PET-CT can detect and stage most cancers and significantly modify treatment plan.
- PET-CT shows all organs of the body in single study, so it can indicate the intensity of cancer & area affected.
- PET-CT diagnoses Cancer often before it shows up on other tests which are generally used to diagnose the dreaded disease.
- PET-CT shows the growth of disease and how body responds to the treatment.
- PET-CT combined study provide Physicians both anatomical and molecular image in the same study.
- PET-CT can reveal the surgical potential of heart tissue and validate & direct course of cardiac surgery.
- PET-CT can produce vivid image of the functioning brain better than any other means.

Advantages of PET-CT

- Anatomical resolution, co-registration
- Anatomic and metabolic information
- Guiding biopsy
- Avoiding pitfalls on pet imaging
- Faster scanning
- Radiation therapy planning
- Additional anatomic information

- More appealing and convincing images

Limitation of PET-CT

- There is no major limitation of PET-CT except the cost and availability of the test.

PET-CT at BMCHRC

BMCHRC has installed latest SEIMENS biograph-16 PET-CT scanner which is the most advance and first PET-CT scanner in the state. The system acquires patients data using 3d volume mode and incorporates the most sophisticated reconstruction techniques. This PET-CT scanner will image the organs of body with precision and can detect the lesions as small as 2 mm.

Location

The PET-CT unit is located at ground floor main building left wing

PROJECTS

STREAMLINING PROCESS OF
PATHOLOGY DEPARTMENT

Introduction-

A medical laboratory or clinical laboratory is a unit where tests are done on clinical specimens in order to get information about the health of a patient as pertaining to the diagnosis, treatment and prevention of disease. It acts as a spine for the patient care. Accuracy, precision, timeliness, and authenticity are the four pillars of efficient laboratory services

Clinical laboratory practices should be used by all laboratories where test are done on biological specimens for diagnosis, patient care, disease control and research such as:-

- Microbiology and Serology
- Hematology and Blood Banking
- Molecular Biology and Molecular Pathology
- Clinical Pathology
- Immunology (Immunohematology and Immuno-biochemistry)
- Histopathology/ Pathology and Cytology

Following sections are conducting all the basic investigation round the clock:

- Surgical pathology includes frozen section, histopathology and IHC
- Cytology includes FNAC, fluid cytology, cytospin preparation, cell block
- Hematology includes CBC, PBF, Bone marrow aspiration & Biopsy, and cyto-chemistry
- Biochemistry includes RFT, LFT enzymes, lipid profile and electrolytes
- Microbiology
- Serology & immunology includes tumor markers, HIV & HBsAg, Hormone & anemia profile by chemiluminescence

For specialized investigations laboratory has tie up with outside laboratories. The department caters to the needs of the outdoor and indoor patients of the hospital, as well as to the outside cases for opinion.

“A total turnaround time is defined as the cumulative time taken for a sample to be processed. It includes the start time at which the sample is taken from a patient, time spent in transportation, its arrival at reception, pre-analysis and post-analytical phases until validation by laboratory staff, the result being issued and its subsequent receipt by the requesting physician.”⁽³⁾

“A laboratory turnaround time is defined as the total time taken for a sample to be processed within the laboratory, from its arrival at the reception until a validated result has been released to iCM.”

Literature review –

Along with accuracy and reliability, timely reporting of laboratory test results is now considered an important aspect of the services provided by the clinical laboratory. Whether or not, faster turnaround time can make any medical difference, patients and their physicians want reports as rapidly as possible. A recent review of laboratory turnaround time indicated that analysis of this time interval has helped in determining the cause of delay, which is then followed by the improvement in turnaround time.⁽¹⁾

A recent review of the laboratory turnaround time indicated that the most common way to monitor TAT is by recording some starting point and end point, and then analyzing the difference between the two.

The laboratory needs to manage clinician expectations and demonstrate that it is meeting those expectations. TAT monitoring is the ideal choice of activity to illustrate the laboratory's commitment to providing a high quality service. Improved TAT can be the key to greater user satisfaction with the laboratory.

Inspection of the literature reveals a variety of different approaches to definition of TAT. TAT can be classified by test (e.g. potassium), priority (e.g. urgent or routine), population served (e.g. inpatient, outpatient, ED) and the activities included. This last area is the greatest source of variation in reporting of TAT. The steps in performing a laboratory test were outlined by Lundberg, who described the brain to brain TAT or “total testing cycle” as a series of nine steps: ordering, collection, identification, transportation, preparation, analysis, reporting, interpretation and action.⁽²⁾

Unsatisfactory TAT is a major source of complaints to the laboratory regarding poor service and consumes much time and effort from laboratory staff in complaint resolution and service improvement. Despite advances in analytical technology, transport systems and computerization, many laboratories have had difficulties improving their TATs

Rationale-

Laboratory are the one of most revenue generating component in the mega million industry that health care has become nearly 19% of this is related to diagnostics. Discussion with patients showed that they were not happy because they have to wait long for lab reports. There was lot of complaints regarding delay in lab reports. Hence management wanted to know the reason for delays in the report generation above the standard turnaround time set by hospital. The results would help in reducing the lab report process time and increase patient satisfaction. Appropriate and timely clinical decisions depend on timely reporting, which in turn affects patient outcome.

Aim –

The aim of this study was to study processes and if any, reasons of delay of turnaround time (TAT) of tests in the section of clinical biochemistry and hematology.

Objective-

1. To study the difference between time taken for lab reports generation and dispatch with the standard time set by hospital.
2. To find out the cause of delay in process of sample collection to lab report dispatch.
3. To check and observe the maximum utilization of resources and minimize wastage by effective inventory management
4. To provide recommendations accordingly

Research Methodology

- Study Design: Descriptive study and Observational study
- Study Area: 200 bedded hospital (Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur)
- Study duration: 20th April 2015 to 30th April 2015
- Study subjects: Patients providing sample for hematology and biochemistry test
- Sample size: Total 50 patients. 25 patients sample for hematology test and 25 patients sample for biochemistry test
- Sampling technique: convenient sampling
- Study time- 9am: 5pm working day (Monday to Saturday)
- Inclusion criteria: patients who come for hematology and biochemistry investigations for OPD patients
- Exclusion criteria: In-patients investigations .
- Data Collection Tools: Observation, review of records – Registers , Literature review

Hematology process flow chart



Data collection-

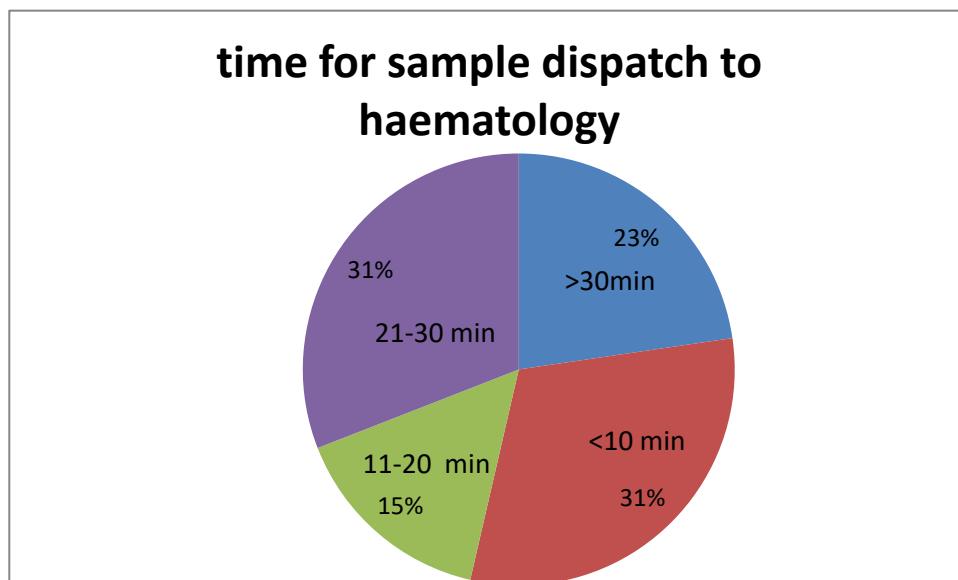
Primary data- information about process of sample collection, dispatching and processing is taken by direct observation and through interactive session with pathologist, technicians and phlebotomist.

Secondary data- information about laboratory and machine was collected from literature reviews. Patient records were taken from patient entry digital system.

Data Analysis and Interpretation-

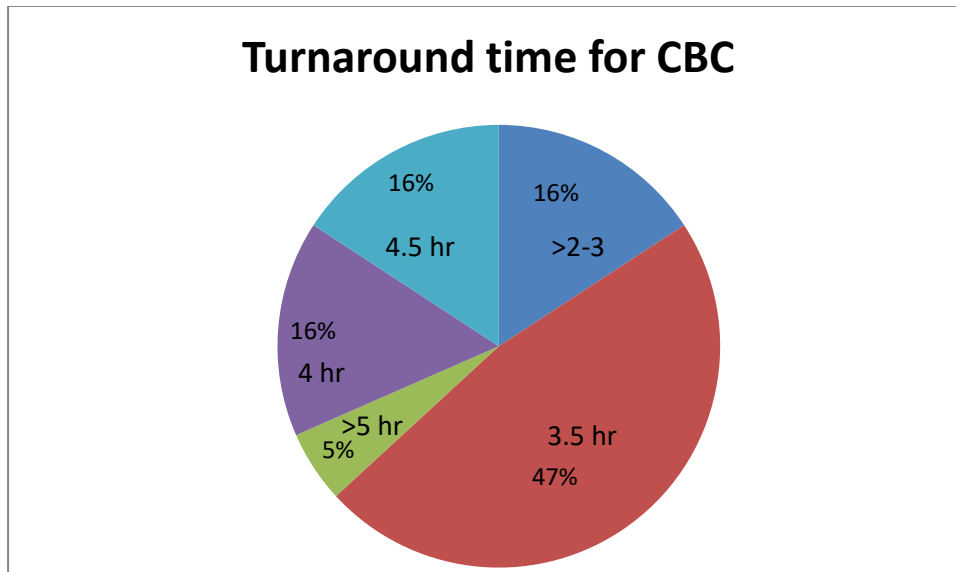
Haematology- Standard time set for sample dispatch to lab is 10 minutes.

Delay in sample dispatch from sample collection room to laboratory



pie chart depicts that delay for sample dispatch after standard turnaround time is >20 minutes in 23% cases, 11-20 minutes in 31% case, 10 minutes in 15% cases and rest 31% cases doesn't delay.

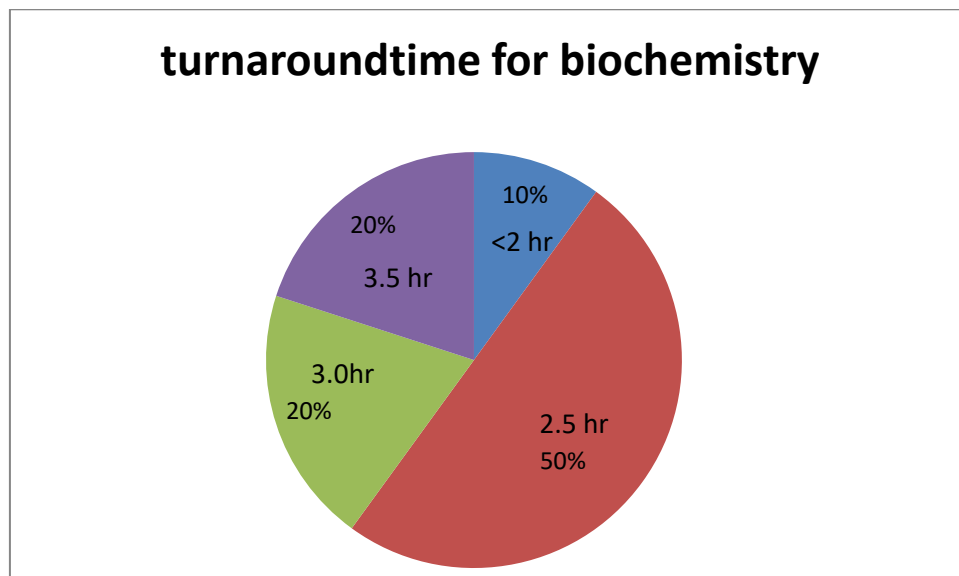
Turnaround time for CBC report – standard turnaround time is 1-2 hour.



Pie chart depicts that delay in CBC report after standard turnaround time is 1 hour in 16% cases, 1.5 hour in 47% cases, 2 hour in 16% cases, 2.5 hour in 16% cases and >3 hour delay in rest 5% cases

Biochemistry-

Standard turnaround time for biochemistry department- 2 hour



Pie chart depicts that delay after standard turnaround time is of 30 minutes in 50% cases, 1 hour in 20% cases, >1.5 hour in 20% cases and rest 10% reports takes standard time.

Findings-

- There is no permanent ward boy for taking collected sample to laboratory. After each half an hour ward lady comes from laboratory, which leads to accumulation of collected samples and also waste of time.
- There is no register or entry system for collected sample but they do mention at what time sample is being collected on investigation slip.
- Sample collection area is on 1st floor and laboratory is in basement so transfer of sample takes time.
- Approximately 10 samples come at a time, brought by ward lady due to delay dispatch.
- At haematology section machine report is generated in approx. 30 minutes but manual report takes almost more than 3 hours due to complex process i.e.-
 - a. Slide preparation
 - b. Staining of slide and drying
 - c. Send for reporting by DNB students and pathologist, which is a time consuming process and patients have to wait long time for a CBC report.
- For every sample comes to laboratory, entry is done in computer and lab no is generated.
- CBC cost is very less on 3 part analyser as compared to 5 part analyser but every time using 5 parts machine for both CBC and TLC which is a loss.
- In biochemistry section inventory of reagents is for 6 months , which may expire and a loss too.
- Sometimes machine breakdown leads to delay in work process .
- Reports take longer time to dispatch both in OPD and IPD because delayed authorization of report.
- Shortage of staff in biochemistry as more of the work load has on one staff and sometimes when machine breakdown occur then creates double burden on them.

Recommendations-

- There should be fixed ward lady/boy for dispatching the collected sample to laboratory in every 10 minute.
- There should be entry system for collected sample at collection site also so that while dispatching, sample doesn't get misplace and to keep a record.
- Unsigned report of CBC can be provided within time frame, if one machine is shifted to sample collection site.
- Most of the times unsigned report is similar to manual reports so for cross checking send only those reports to manual check or slide preparation which has some critical values or out of range values.
- Bar code system should be developed to reduce time taken for entry, to generate lab no.
- Online authorization- the facility for online authorization of reports should be provide to consultant to reduce the authorization time.
- Either use 3 parts analyser machine for TLC test and if 3 part analyzer has some technical problem then ask consultant to write only CBC test (not TLC or Platelets as separate test) so that there will be no loss and will be able to generate revenues
- First use available stock then indent should be prepared by pathologist and rest monitoring would be done by operations head.
- For machine breakdown, engineer should meet and check machine.

Streamlining Process of Radiology

Department

Introduction-

Radiology department is situated on first floor. Radiology department provides full range of imaging services except MRI for every age group right from infant to older people at Bhagwan Mahaveer Cancer Hospital, Jaipur. Patient visit to the radiology department for various reasons such as to get their disease diagnosed and to get further treatment and consultation and also for preventive measures in case of preventive health care.

Services available in the radiology department-

- I.I.TV with 500 Ma X-ray and ultrasonography with superficial, abdominal, transvaginal and transrectal probes.
- Mammography, orthopantomography and 60 MA mobile x-ray machine & Spiral CT.
- 16 slice CT scan with ASIR Technology for low dose of radiation to patient has been acquired. This machine is having the latest software to diagnosis small lung & bowel tumors. All types of angiographies can be done.
- High end Color Doppler machine is there with added feature of ELASTOGRAPHY which is an innovative modality to differentiate benign and malignant tumors.
- In the department CT & USG guided FNAC's & biopsies are conducted regularly, even for small masses adjacent to vessels, vital organs and at remote sites.
- Cancer Marker study started recently.

Function of radiology department-

- To conduct the radiological investigations as per mentioned scope of services.
- To provide quality services based on quality assurance system.
- To ensure staff safety while conducting the radiological procedures & follow the defined safety parameters.
- To deliver the reports within defined TAT for every test.
- To ensure calibration status of all the equipment are updated

Staff-

Radiologist- 3

X- Ray Staff-

- Senior Radiographer- 2
- Junior Radiographer-2

CT Scan Staff-

- Senior Radiographer-1
- Junior Radiographer-2

Additional Staff -

- Medical Typist
- Registration staff
- Ward boy
- Ward lady

Average no test per day-

- X ray- 40 to 45
- USG- 30 to 35
- Mammography- 6 to 7
- CT Scan-25 to 30

Records-

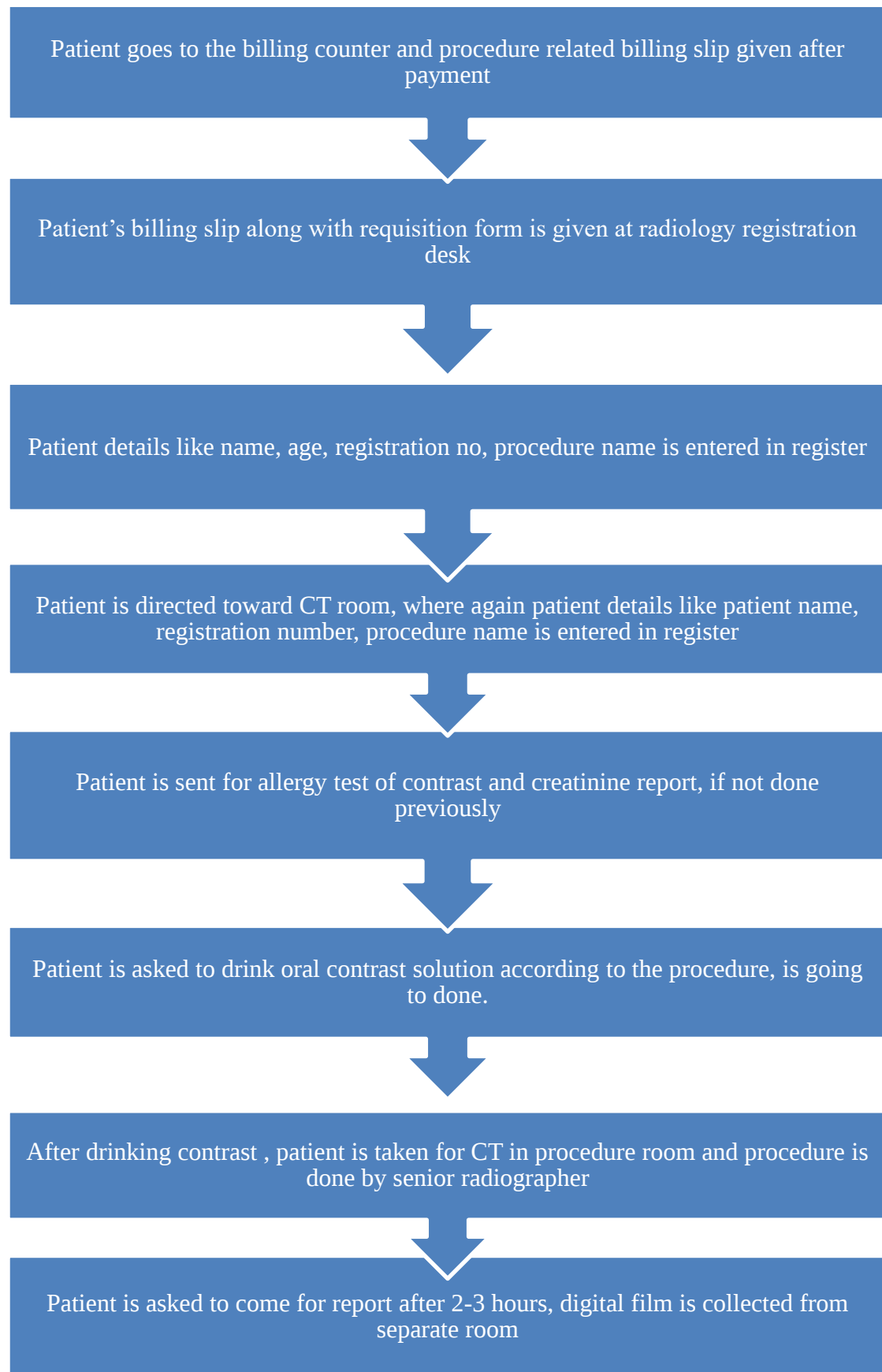
- Adherence to safety precautions
- Redo's record
- Radiation protection record
- Stock register
- Indent book
- CT SCAN- Patient entry register
- PET-CT consumables transfer register
- Matching record (physician diagnosis to radiologist diagnosis)

- Contrast allergic reaction record
- Anaesthesia record
- Consumable items indent record
- Stock record

Contrast used in procedure-

Procedure	film	Iv contrast	Oral contrast
CT brain	1 or 2	40 ml	
CT whole abdomen	5	100 ml	40-50 ml
CT neck	3	60 ml	
CT chest	4	70-80 ml	
CT pelvis	3	80 ml	40 ml
CT chest with upper abdomen	6	80 ml	
CT upper abdomen		70-80 ml	30 ml

CT SCAN PROCESS FLOW-



Radiologist see the film in computer and write a report on paper and send this for typing at radiology registration desk



Data entry operator types the report as per radiologist sent him, prepare a format and send to the radiologist

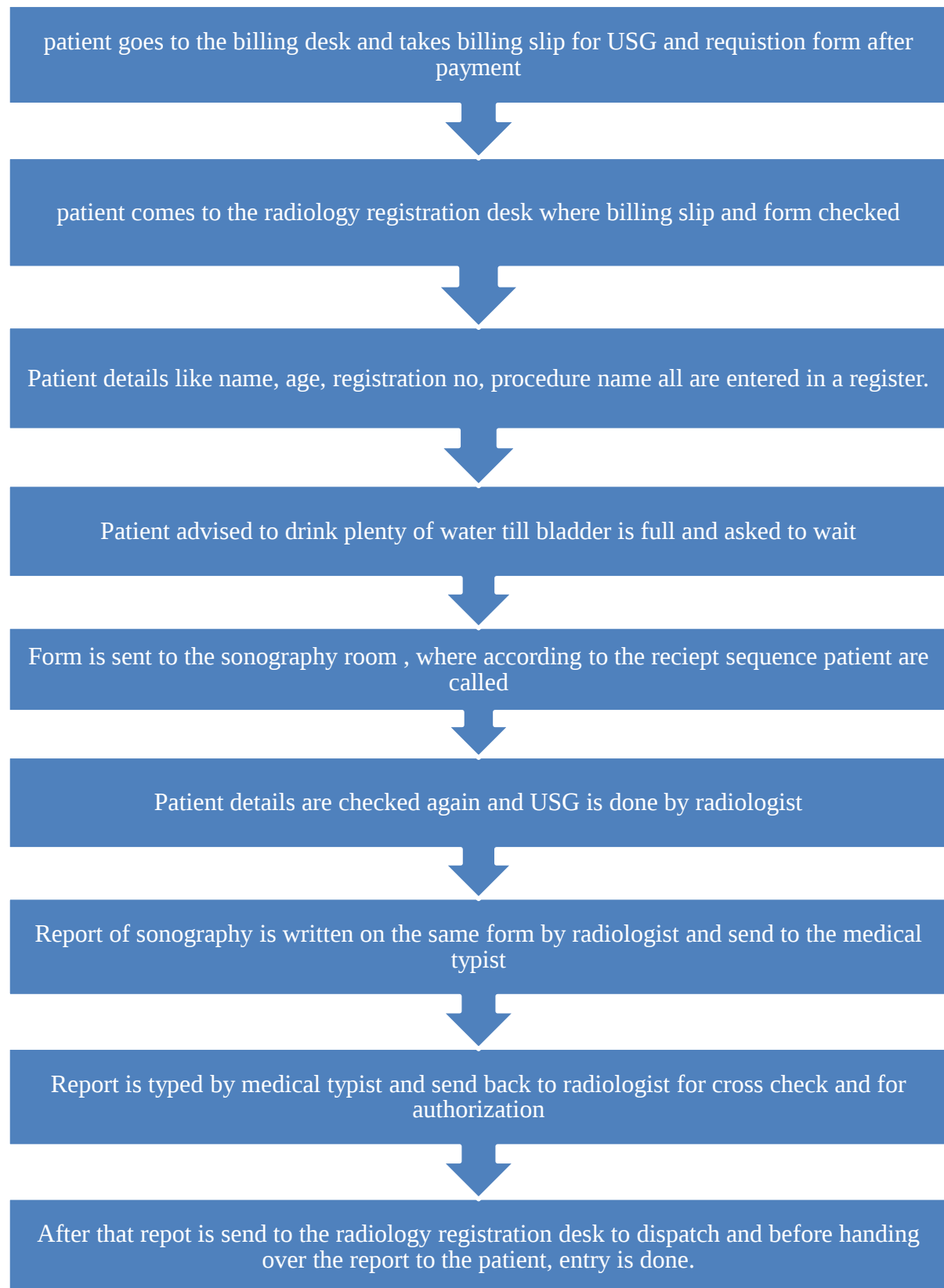


Radiologist authorize the final report and send to the radiology registration desk.

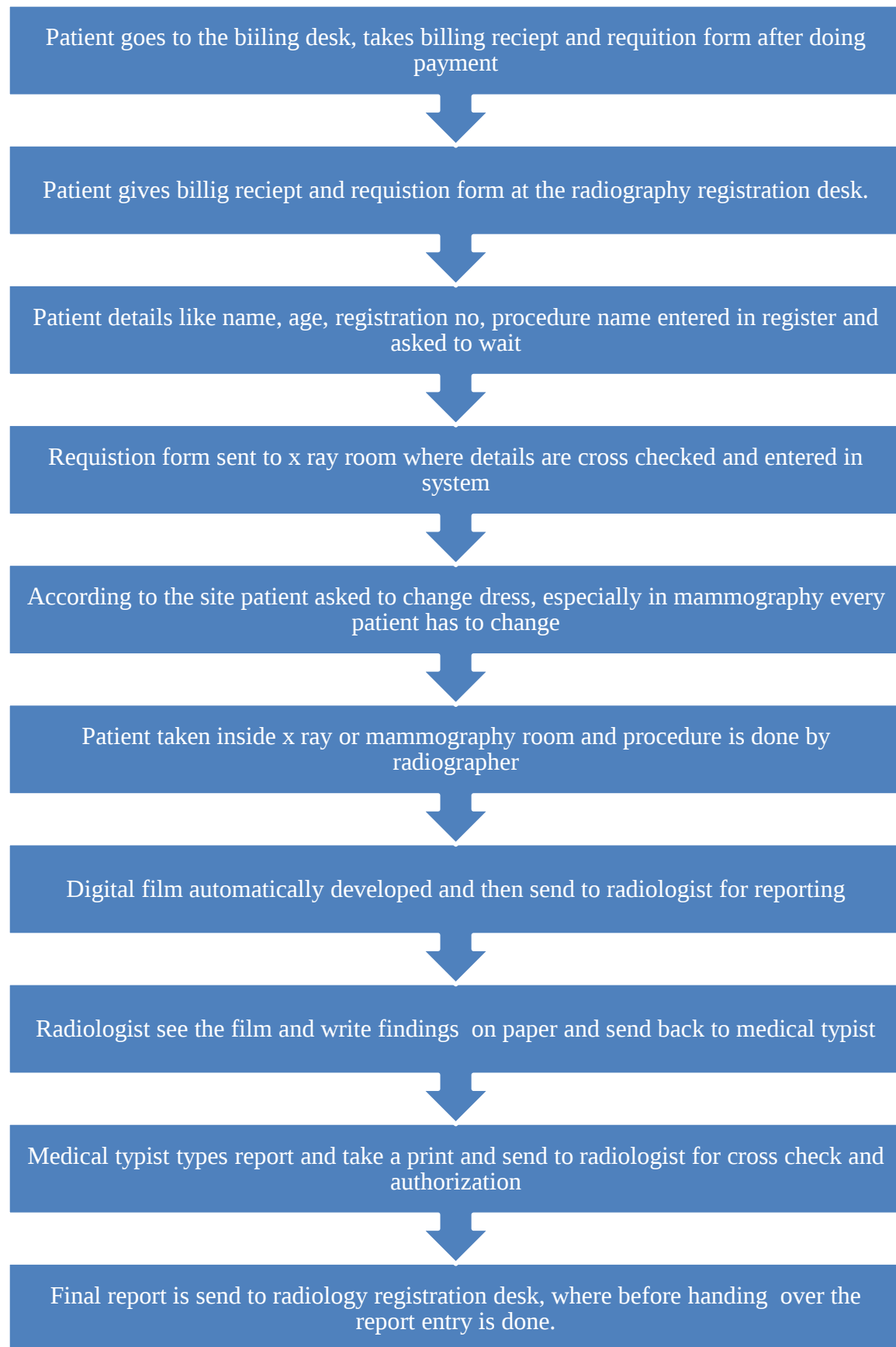


Patient collect the report and final dispatch entry and name of the person who has received the report done in register.

USG Process flow-



X-RAY AND MAMMOGRAPHY PROCESS FLOW-



Literature review-

Diagnostic medical imaging includes the use of x-ray, ultrasound, magnetic resonance imaging (MRI), and computed tomography (CT) to provide physicians with important information for diagnosing and monitoring patient conditions.

Success in a radiology practice depends on efficient technological workflow as much as it depends on the value of streamlined brand. If a diagnostic center fails to be efficient with both its workflow and branding, the bottom line is that physicians and patients will look elsewhere to accommodate their imaging needs. ⁽⁵⁾

An important aspect that arises during the analysis of TAT is to clarify the purpose behind measuring or optimizing process times, for which there are different motivations. The most common background and motivation is to reduce the waiting time for patients, so that the treatment can be started earlier or the patient can be discharged earlier. Sometimes this can decrease costs for the hospital due to reduced redundant work and process streamlining. Here we define TAT in our project as “from the time requisition is ordered at respective department to the time the report is ready for dispatch.” ⁽⁵⁾

Aim-

To study the turnaround time and process flow of imaging services (CT scan, Ultrasound, X-ray and Mammography)

Objective-

- To evaluate turnaround time (TAT) in Radiology department (CT scan, USG, X-ray) pertaining to the requisition from OPD at BMCHRC
- To find out the cause of delay in reports delivery process for outpatients, if any
- To analyze the collected information & suggested recommendations for the same.

Rationale-

Patient care is a permanent responsibility of the hospital. Radiology department is major diagnostic department and also many other departments are dependent on it. Out of which X-Ray, Ultrasound and CT scan receive maximum amount of patients both outpatients and inpatients. This department is one of the revenue generating centers of the hospital so to keep pace with patient flow and providing services without long waiting time, Radiology reports delivery should be on time. By carrying out this study, the turnaround time can be further improved which would ultimately aid and improve patient care.

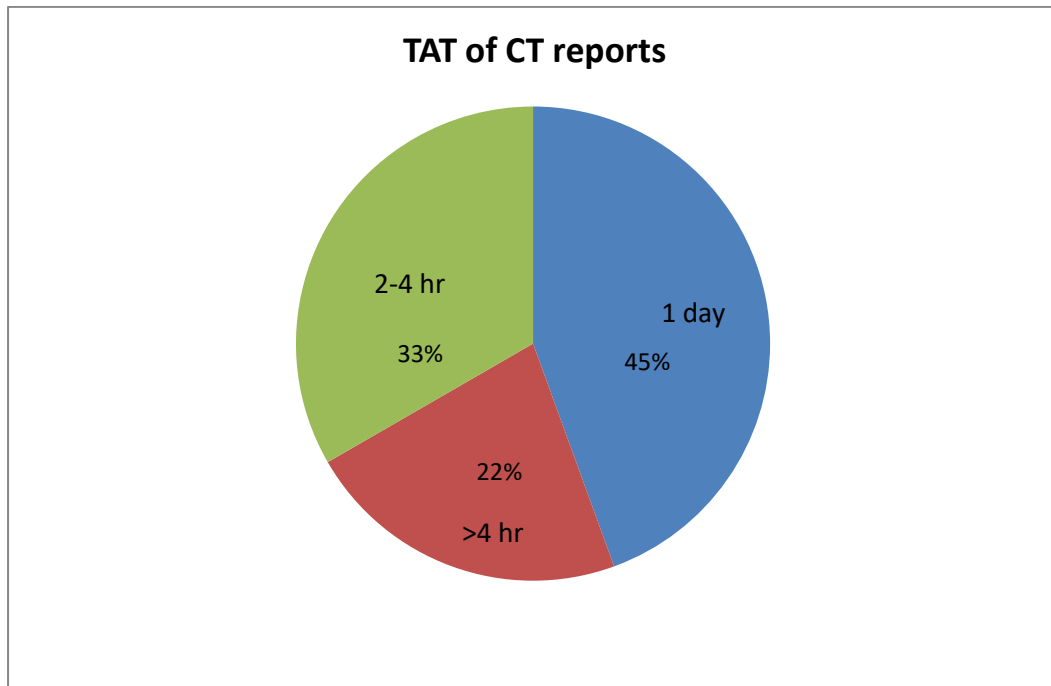
Research Methodology-

- Study Design: descriptive study and Observational study
- Study Area: 200 bedded hospital (Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur)
- Study duration: 6th May 2015 to 14th May 2015
- Study subjects: OPD Patients coming in radiology department to get the CT scan, Ultrasound, X ray and Mammography done.
- Sample size: 200 patients out of which 40 patients of ultrasound & 40 patients of CT scan, 40 patients of X ray and 40 patients of Mammography
- Sampling technique- convenient sampling
- Study time- 9am – 5pm (Monday to Saturday)
- Inclusion criteria- OPD patients who have come for ultrasound, CT scan, X-ray and Mammography walk in patients.
- Exclusion criteria- In-patient department.
- Data collection methods-
Primary data- observation of patients and interactive session with radiologist, radiographers.
Secondary data- review of patient records and literature review.

TAT for reports is, if the test is conducted till 12pm then the reports should get ready by 5pm in the evening on the very same day, but if the test is conducted after 12pm then the reports should be ready by 12pm next day.

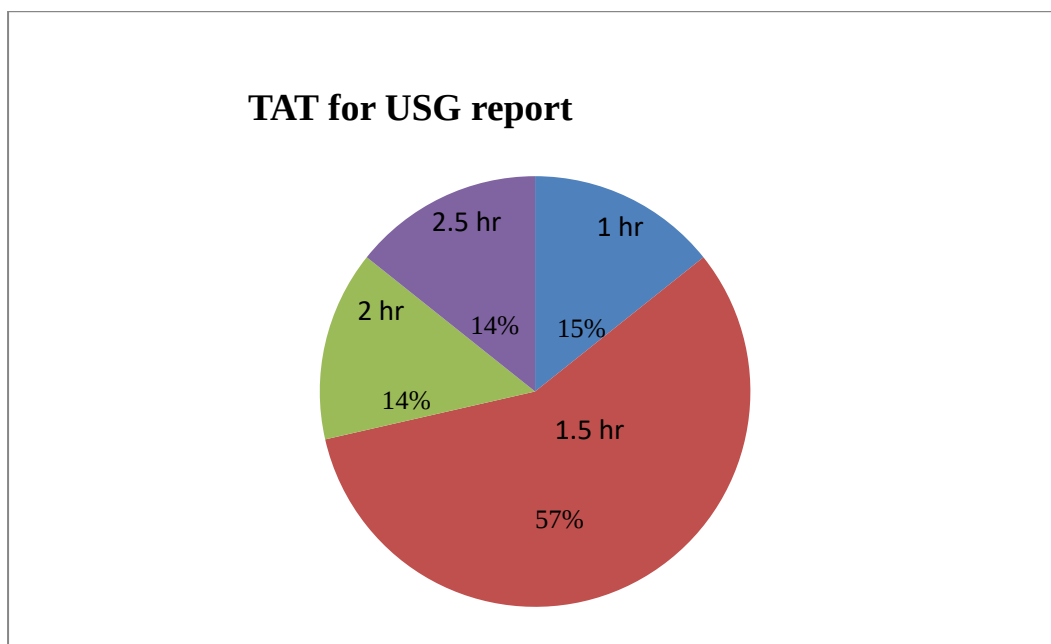
Data Analysis and Interpretation-

Turnaround time for CT scan reports- Standard time set by hospital is 4 hour.



pie chart depicts that 45% reports comes next day, 22% reports takes more than 4 hours and rest 33 % reports comes within 2-4 hours (standard time).

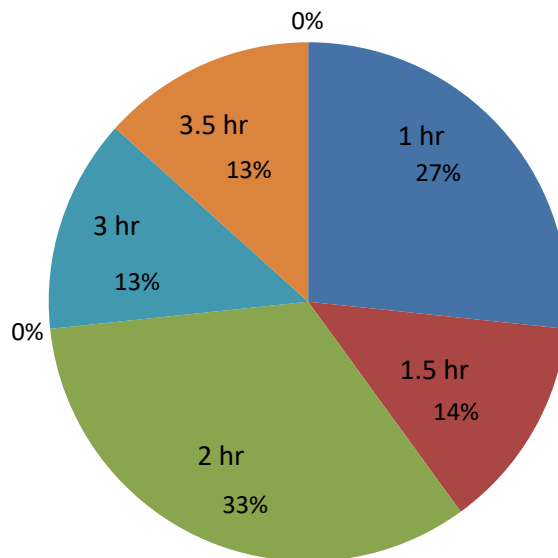
Turnaround time for Ultrasound report- Standard TAT set by hospital is 2 hours



Pie chart depicts that 14% reports delayed by 30 minutes after standard turnaround time and rest 86% reports dispatched within set standard time frame.

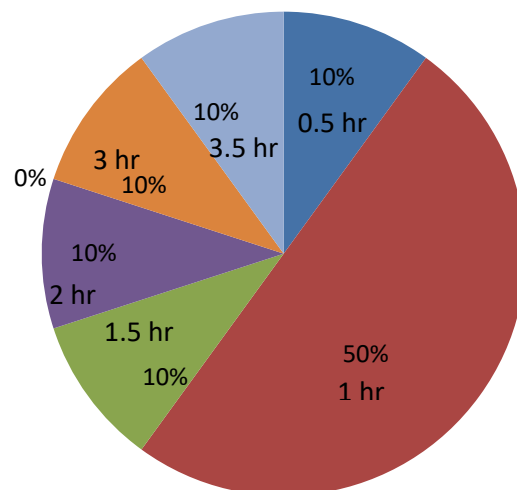
Turnaround time for X ray and mammography- standard time set by hospital is 2 hour

TAT for X ray report



Pie chart depicts that 26% reports took more than 2 hour and rest 74% reports were dispatched within standard time frame.

TAT of mammography report



Pie depicts that 20% reports took more than 2 hours and rest 80% reports were dispatched within standard time frame.

Findings-

- Different time slot for OPD and IPD is not there, as IPD patient comes in peak OPD hours so waiting time for OPD patient increases.
- Appointment system is not being followed
- Human resource management is not done properly.
- Proper counselling of patient is not done.
- One of the CT staff doesn't have TLD badge since he has joined (approx. 4 month).
- Delay in reports due to-
 - Wait for creatinine report
 - Reporting by radiologist
 - Typing delay by data entry operator
- Previous day work kept pending for reporting, typing and dispatching.
- Records are not maintained properly related to data validation, matching records.
- Pre counselling of patient about drinking no of water bottles and holding of urine and fasting is not done.
- Appointments of IPD patients are not properly scheduled.
- Patients also go for other investigations.
- Staff doesn't use proper radiation protection guidelines like lead apron, eye protection, thyroid protection except lead wall.
- Lead apron test records are not updated.
- Critical report information records are not updated too.

Recommendations-

- Counseling of patients should be done in terms of-
 - Hours of fasting prior to the procedure.
 - Specify number of bottles to be taken per oral.
 - Holding of urine as per requirement of the test.
 - If any investigation has to be done prior.
- Crosscheck of appointments should be done so that walk in patients could be adjusted.

- Reconfirm the patient's appointment date & time.
- Proper signage should be present indicating patient number undergoing the procedure so that next patient can know when his number will come.
- Appointments slots should be made according to the average time taken for the procedure.
- IPD patients should be called only during their time slots, only exception would be any emergency & if no appointment or walk in patients are there.
- Review of pending work e.g. Reports should be done on the daily basis by the staff during morning hours.
- Job specifications should be made clear to the staff.
- Pre-procedure CT checklist should be used.
- Proper counseling of the patient should be done at the time, when doctor write for sonography investigation.
- Patient should be asked to take appointment and time slot should be designed.
- IPD patients except emergency case should be given appointment according to the OPD workload.
- Radiation safety officer should keep check on the usage of radiation safety guidelines.
- Staff should also provide training related to use and safety issues of radiation
- Records should be maintained and updated , regular audit should be done.

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