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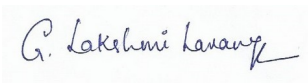
Responsibility of Updating :	**Designation: NABH Coordinator** **Name : G.Lakshmi Lavanya** **Signature :** 

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Guideline for using Amendment Record sheet:

Amendments made in Departmental manuals from time to time will be traced through the Amendment Record sheet maintained in the respective Department manuals. Amendment Record sheet will show the current amendment No. and date. The arrangement of the Amendment details would be such that the latest amendment (decided by Date) will be mentioned first followed by the other amendments arranged in reverse chronological order and the first amendment will be shown as the last item. Whenever the issue changes for any of the reasons mention above, the amendment record sheet will start afresh, not indicating the amendments made in the previous issue. The previous issued document will be stamped as obsolete and retained under the custody of NABH Coordinator.

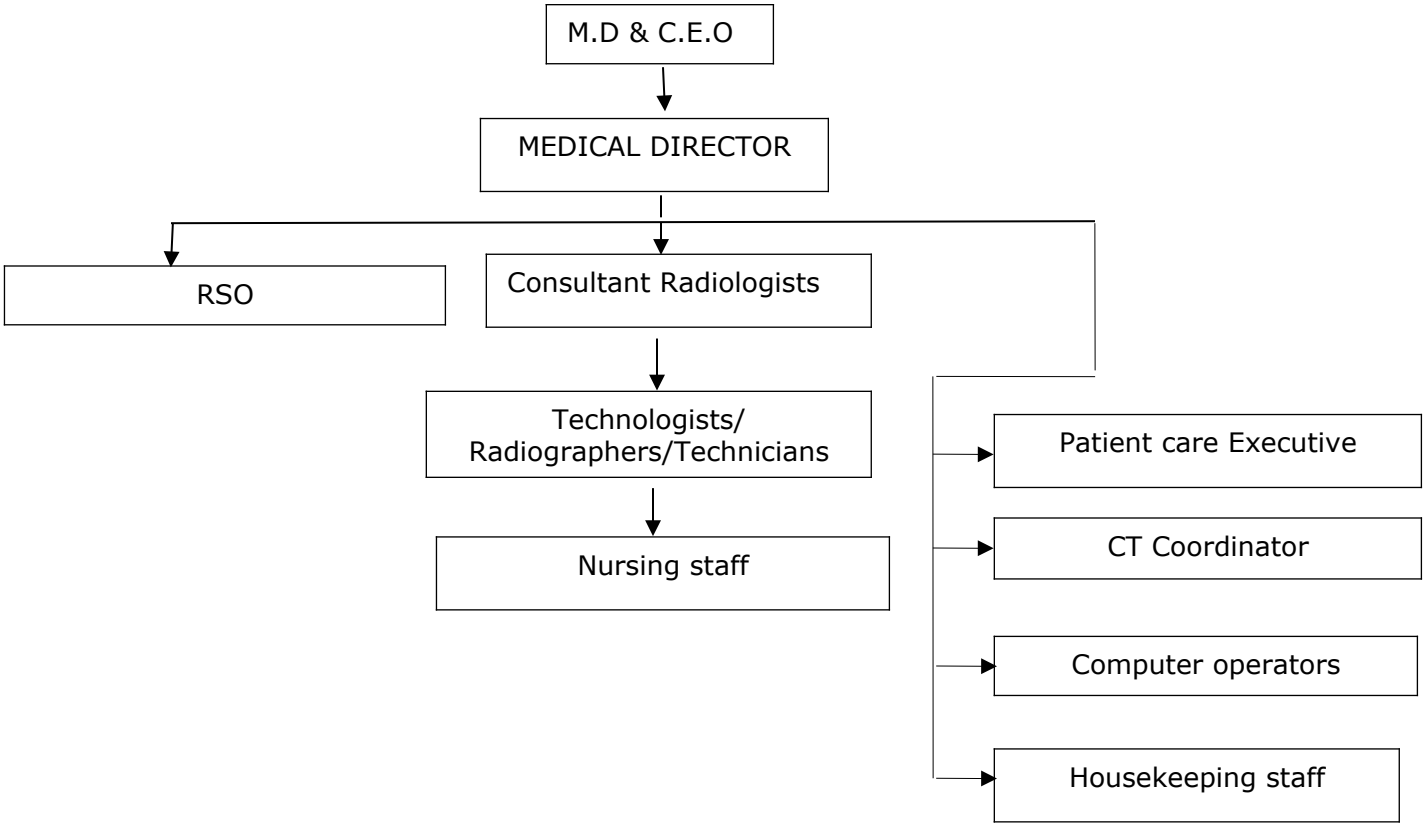
- **Control of Issue Number and Amendment Number**
  - *Any new document like QSM / Departmental manual issued for the first time shall have Issue No. 01 and Amendment No. 00 with an Issue date only and no Amendment date. Any change in the document will be reflected in Amendment No. The Issue No. and Issue date will remain the same.*
  - *The cover page / top sheet of such a manual shall have the same Issue No. 01 with same Issue Date*
  - *For Example, whenever there is a change in a document or a complete section of the document, having an Issue No. 01 and Amendment No. 00, the new amended document will have the same Issue No. 01 but the Amendment No. becomes 01, indicating the date of amendment.*
  - *The detail of the amendment is recorded in the respective amendment record sheet.*
  - *Whenever any document is re-issued, the issue number is increased incrementally by 1. For eg., if issue number 1 is reissued the next issue will be Issue No.2. The Amendment No. reverts to Amendment No. 00 in such cases. The circumstance under which there is fresh issue of documents is mentioned below. This is only an illustrative one and the issuing authority has powers to define a new issue.*
  - *The Issue No. of any Manual or Document will change only whenever:*
    - *There is a change in the requirements of the NABH standard, either in part or whole.*
    - *Periodical review of manual / document (yearly once)*
    - *Major change in the scope of accreditation*
    - *Major change in the document control procedure*

VOCABULARY

S. No	Abbreviation	Expansion
1.	*ALARA*	*As Low As Reasonably Achievable*
2.	*RPO*	*Radiation Protection Officer*
3.	*RPU*	*Radiation Protection Unit*
4.	*MD & CEO*	*Managing Director & Chief Executive Officer*
5.	*ev*	*electron volts*
6.	*kev*	*Kilo electron volts*
7.	*kVp*	*Kilo volt peak*
8.	*kV*	*Kilovolts*
9.	*mm*	*millimetre*
10	*Gy*	*Gray*
11	*HVL*	*Half-value layer*
12	*msv*	*millisievert*
13	*mR*	*milliroentgen*
14	*SID*	*Source-to-image distance*
15	*SSD*	*Source-to-Skin distance*
19	*GDP*	*General Department Procedure*
20	*MRI*	*Magnetic Resonance Imaging*
21	*CT*	*Computerized Tomography*
22	*USG*	*Ultrasound Sonography*
23	*ID*	*Identification Number*
24	*TRF*	*Test Requisition Form*
25	*CF*	*Consent Form*

26	*RIS*	*Radiology Information System*
27	*PACS*	*Picture Archiving and Communication System*
28	*DICOM*	*Digital Image Communication System in Medicine*
29	*TLD*	*Thermo Luminescence Dosimeter*
30	*PCE*	*Patient Care Executive*
31	*M.S*	*Medical Superintendent*
32	*AERB*	*Atomic Energy Regulatory Board*
33	*MPL*	*Maximum permissible limit*
34	*ADL*	*Annual dose limit*

ORGANIZATION CHART



RESPONSIBILITIES & AUTHORITIES

1. HEAD OF THE DEPARTMENT

- *Provide direction and control to personnel within the department.*
- *Ensure competence of personnel as per competency matrix and review performance every six months*
- *Handle and resolve customer complaints.*
- *Ensure conformity with applicable regulatory requirements*
- *Identify and control non-conforming service, implement corrective action on NC's*
- *Staff recruitment and leave sanction in the department*
- *To maintain the department library*
- *Supervise interdepartmental references*
- *Coordinate with all consultants*
- *Teach radiology fellows and DNB students*
- *Distribution of clinical and research work*
- *To get approvals from the management for development of the department*
- *To review patient feedback surveys and take corrective measures*
- *To participate with the purchase committee for any departmental equipment purchases*

2. RADIOLOGICAL SAFETY OFFICER

- *Works as a liaison between the institution and the Atomic Energy Regulatory Board (AERB) which is the regulatory body in India for the safe use of radioactive isotopes and radiation generating equipment*
- *Obtains the RSO license on his name for the institution from the AERB to look after all the radiation concerned activities of the institution*

- *Prepares the layout plans for the installation of X-Ray units in the Radiology, scanners in the nuclear medicine and tele therapy and brachytherapy units in Radiotherapy departments and obtains the approval from the AERB*
- *Prepares the specifications of the diagnostic and therapeutic equipment and guides the institution in the selection of the equipment used in Radiology, Nuclear Medicine and Radiotherapy. Obtains all the required import licenses from the concerned authorities for the institution on his name or on the name of the head of the institution*
- *Supervises the installation of selected equipment*
- *Conducts the acceptance tests and carries out the quality assurance tests on equipment*
- *Prepares the commissioning reports of equipment and obtains permission from the competent authorities to start the equipment for patient use*
- *Look after the radiation safety aspects of the equipment and personnel working in the institution and guides them to adopt optimal work practices to provide better services to the patients*
- *Maintains the log books of equipment and workers working under his supervision*
- *Prepares the treatment plans and supervises the treatment execution*
- *Involves in the selection of the staff, purchase of dosimetry equipment and maintenance of personnel monitoring service of the radiological staff of the institution*
- *Conducts Academic activities of the staff and consultants of Radiology Department.*

3. CONSULTANT RADIOLOGIST:

- *Performs all the radiological procedures, report all the procedures*
- *Perform the radiology guided biopsies*
- *Perform all specialized procedures*
- *To supervise subordinates & DNB doctors*
- *To assist HOD in research activities*
- *To do any other work assigned to him by HOD & medical superintendent.*

4. DNB DOCTORS

- *Completion of the records of the patients*

- *To prepare patient for procedures*
- *To assist consultant in clinical work*
- *Comprehensive care for patients during their stay in radiology department*

5. TECHNOLOGISTS/RADIOGRAPHERS/TECHNICIANS:

- *Check the parameters of the machine and working condition*
- *Check the stock of films and contrast*
- *Verify the patient requisition whether IP/OP patients*
- *Attend the bedside x-ray calls as per the register*
- *If out-patient, verify the bill and see whether it is correctly billed or not*
- *Enter details in the computer of IP for billing*
- *Entry is made in the radiology department register & explain the patient about the procedure in brief*
- *Perform the investigation.*
- *Print the film and keep it ready for reporting*
- *Verify whether the entry is made in the radiology register*
- *Explain the patient about the test, preparation and report time*
- *Advise the patient to remove metal articles from the body*
- *Take the consent in case of contrast study or invasive procedure*
- *Report to the doctor present*
- *Ensure safety measures of MRI and CT rooms.*

6. STAFF NURSE*:*

- *Assist the doctors while conducting the scans and other procedures*
- *Position the patients in the correct way*
- *Guiding the patients for USG scan*

- *Giving necessary instructions to the patient when going for scans and Doppler*
- *Giving appointments to IP and OP patients for Ultrasound*
- *Stock indenting and raising an indent for new stock*

8. COORDINATOR:

- *To take appointments for CT & MRI patients of new block & old block, to activate the mobile sim given to you and display the number with all the departments concerned so that they can contact you by phone and take appointments.*
- *Coordinate with walk in patients for respective scans, give appointments at an appropriate time in coordination with the technicians for smooth functioning of the departments.*
- *Coordinate with technicians regarding pending appointments, follow up the same with patients / Doctors for smooth functioning of the department.*
- *Morning and evening rounds to all the blocks and check for smooth functioning of CT & MRI departments and information pertaining to No. of appointments to be taken for OP and check for No. of IP requisitions received and coordinate with technicians, when to call the IP patients.*
- *Check Whether IP cases are properly handled or not and the same thing should be intimated to Manager – Radiology.*
- *No. of cases done on the previous day in each modality and the same thing to be intimated to Manager – Radiology by mail and a copy to the HOD.*
- *Preparation of TAT for CT & MRI in coordination with technicians and send the same to Manager – Radiology and copy to HOD.*
- *Collection of feedback forms from the patients and discuss with the patients in case of any of any complaints or suggestions under intimation to Manager – Radiology.*
- *Ensure that all OP cases of the day to be completed on the same day and discourage postponement of cases to the next day and minimum 25 appointments to be given on each machine including OP & IP.*
- *Coordinate with IP nursing head to send the IP patients at the stipulated time given to them to avoid mix-up with other patients which may lead to unnecessary delays.*

- *Coordinate with the nigh duty technician of the old wing first thing in the morning regarding No. of cases done at night, billing status of the same.*

9. PATIENT CARE EXECUTIVE

- *Greet and inquire about the nature of their visit to the radiology department*
- *Guide them to the concerned authorities*
- *If the patient has come for an appointment, then give them an appointment, inform the concerned technician and note down the details in the register*
- *Coordinate with doctor, patient and other staff in the department*
- *Attending phone calls and giving them appointments and call to remind the patients about their appointments both in the IP and OP*
- *Check the bill of the patient and enter it into the register*
- *Inform the patient the allotted time for the test*
- *Dispatch reports after investigations*
- *Ensure that the cleanliness and hygiene of the department is maintained*

10. HOUSE KEEPING STAFF

- *Cleaning and dusting the facility*
- *Cleaning of instruments and autoclaving*
- *Attending to the technician requests*
- *Delivery of reports to the patients*
- *Bringing stock from the stores*
- *Shifting the patients from Wards to MRI, CT, Ultrasound and x-ray*

1. PURPOSE: *The purpose of this procedure is to explain the manner in which patients coming for various imaging services are to be registered and handled.*

2. SCOPE: *To receive the patient for Imaging and guiding the patient to various services available and location in Radiology department.*

3. RESPONSIBILITY: C*oncerned PCE/Front office executive are responsible for this process.*

4. PROCEDURE:

4.1. *The procedure for receiving the patients in the Radiology department is as follows*

- *There is a proper reception area with a waiting area and the imaging signages are displayed in all the appropriate locations along with the radiation safety signage.*
- *The PCE/Front office executive will collect the Requisition Form and doctor's prescription from the Patient / Attender.*
- *The PCE/Front office executive will check the Requisition form (INH/RAD/F/01) for all the entries in the fields and if any of the details are incomplete, he/she will fill up the same looking at the case record and returns the requisition form to the patient.*
- *If the patient comes with the Requisition Form & the procedure room is free then the front desk staff will schedule the procedure in the system and then the patient is sent for investigation. If not an appointment is given at a later date.*
- *Prior appointment is required for all the procedures except X-Ray.*
- *If any patient requires an appointment, the receptionist will direct the call to the concerned sub units and the personnel responsible for will fix the appointment for the test*

and enter the details in the respective Appointment Registers. (INH/RAD/R/X-Ray/CT/USG).

- *The PCE will give necessary instructions to the patient regarding preparation, if any required for the test and other details like cost, duration of the test, location of the equipment room and collection of the Report etc.*
- *The receptionist will also attend all telephonic calls pertaining to the Department/patient from Professionals, Ambulance Services of the institution and Enquiry from hospitals/ Patients.*
- *If required by the consultant, receptionist will collect all the old scan reports, blood reports, X-ray reports if available, from the patients.*
- *The PCE will check the Patient ID, Payment details and the test to be conducted, guide the patient accordingly to the concerned procedure room and also gives the probable date and time of delivery of reports.*
- *The Patient will be provided wheel chair, stretcher and other facilities if any on request at the Reception desk. The patients/attenders will be provided with basic amenities such as Drinking water, toilets etc and will be guided for other needs if any. The PCE / Front office executive, nurses and helpers are responsible for the hospitality, comfort ability and safety of the patients/attenders visiting the Department for the procedures.*

5. Delivery of Report

- *The PCE/Front office executive will collect the final report from the respective*
- *Procedural rooms/reporting room of the department and ensure that the report is signed by the doctor, and verify the name, age and ID and keeps them ready as scheduled for issuing. All the reports (X-Ray, CT, Ultrasound) are dispatched within a time frame of 24 hours.*
- *The PCE / Front office executive will deliver the final report along with the old report if any to the patient/attendant after getting his/ her signature in the concerned Report Dispatch register [(INH/RAD/R/03),(INH/RAD/R/10)]*
- *Enter the details of delivery of final report in the Report Dispatch Register*

6. Customer complaints

- *The PCE/Front office executive will maintain Customer Complaints/Suggestions register (INH/RAD/R/14) for recording the complaints/suggestions by the patients.*
- *Correction & Corrective action will be taken by the concerned department in charge & HOD will authorize them.*

7. Transfer of Patients:

- **Inpatients**

- At the time of admission, they provide an ID band to the patient
- The ID band is tied and sealed on the right hand of the patient

- **Transfer of Patients:** For all IP, OP and Emergency patient's hospital has provisions for identification and transportation of patients to Radiology Department. Nurse in charge along with the House keeping personnel take the responsibility to safely transport the patients to radiology.

  For Unstable Patients: - Doctors along with the Nursing staff take the responsibility to safe transport of patient to imaging services.

  The patient is transported back in the same manner.

5. INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-9 (f), NABH Standards requirements-4th Edition-Dec 2015.*

PURPOSE: *The purpose of this procedure is to specify the manner in which patients coming for X-Ray are to be prepared and various records to be maintained in the department.*

SCOPE: *All types of X-Rays.*

RESPONSIBILITY: *The radiologist and the radiographer in-charge of the X-ray unit are responsible for this process.*

PROCEDURE

The Radiographer on duty In the prescribe area and the patient will be called accordingly.

Radiographer will verify the name, ID no. and test details in the Requisition form and enters the same in the Computer.

An informed consent will be taken if any procedure is done under contrast.

Gives clear instructions to patients regarding preparation whenever X-Ray spine, abdomen, KUB, Barium Studies are done and issue Patient Preparations Instruction brochures where ever necessary.

Instruct the patients to take 2 tablets of a laxative (Dulcolax) and an ant flatulent (Gasex) drug the previous night for taking the above X Rays.

Gives priority to elderly, children and sick patients

The radiographer checks conformity of preparation of the patient to the concerned procedure as per the instructions provided earlier at the time of appointment.

The Radiographer will enquire the female patients coming for X-Ray, as and when it is relevant, if they are pregnant, before exposing them to X-Ray. If the patient is doubtful, the radiographer will advise them to contact their doctor for pregnancy testing (urine or blood).

Confirm the parts to be X-rayed and the views to be taken.

The radiographer ensures that sufficient information is available in the Doctor's Requisition/Test requisition form taking the X-ray viz. part, position, view, and patient preparation.

Do not allow children & pregnant women to wait in front of the X-Ray department.

Follows only the specific methods approved by the international/ national bodies.

Remove all external metallic and radio opaque objects like wrist watches, belt, coins, and chains from the part to be X-rayed and hand it over to the attendants.

Request the patient to change the dress & put on the new lab gown in privacy.

While taking X-Rays for female patients, ask the patient's attender as accepted by the patient to stay inside the room behind the lead screen if, a sister or approved lady attendant is not available from hospital services.

Fix the lead badge containing the ID number of the patient, the date and the side marker 'R' /'L' on the cassette.

Load the cassette into the Bucky of the X-ray machine & ensure it is properly locked.

Select the proper size of film and operating parameters namely kV, mA, exposure time etc. as per the departmental protocols and position the patient as required for the procedure.

Use a divider on one half of film to prevent exposure of both halves when one film is used for two views & after exposure, place the divider on the exposed half of the film.

Align the part to be X-rayed with the light & then instruct the patient not to move from position. For X-ray chest, instruct the patient to hold his breath in deep inspiration during exposure.

Wear lead apron shields whenever a patient is being exposed to x-rays or when close to the patient being exposed.

Record the details i.e., name, age, sex, ID No., x-rays taken, number of films used and film size, wastage of films and reason for the same, in the Daily X ray log Register (INH/RAD/R/05).

Wear personal pocket dosimeter badges (TLD Badge) on the chest level under clothing while inside the x-ray room.

Switch on the red light on the door leading to the X ray room indicating `X-ray in progress' to prevent entry of persons while X-rays are being taken.

Keep the X-ray room door closed while x-ray is being taken.

Performs X-ray procedures with recommended exposure time.

Place barrier screens of 1-2 mm of lead in a plywood sandwich as close to the Radiation source as possible.

- **Skull X ray Exposure:**
  - *For Skull X-ray, arrest the movements of the head by placing binders.*
- **Spine x-ray Exposure:**
  - *Position the patient such that the spine is straight.*
  - *Centre the spine exactly to the aligning hairline.*
  - *While taking lateral view of X-ray cervical spine, ask the patient to hold weights in both the hands to pull down the shoulder & to expose the whole length of spine.*
  - *Ask the patient to sit for some time to check the quality of the developed film.*
  - *Perform a repeat X-ray, if the quality of the developed film is found to be unsatisfactory by the radiographer in charge.*
  - *Process the films.*
  - *Analyze at the end of every month the number of films wasted and the reasons for the same and take suitable corrective and preventive action to prevent their recurrence.*

- *Enter the Patient name, age, sex, Identification number, number of films, Part X-rayed, referral doctor's name and date on the x-ray cover & hand it over at the reception desk to enable them to add the concerned report and issue the same to the patients.*
- *Store the X-ray films.*
- *The Radiology-HOD ensures that only qualified & competent radiographer carries out the process & only qualified competent radiologist interprets the x-ray film.*
- *The management of the Hospital ensures that the infrastructure, equipment necessary to meet the customer requirements & also the safety of radiographers & the patient is available.*
- *Record the details of Equipment breakdown maintenance and preventive maintenance carried out in the Machine in the concerned register (INH/RAD/R/20)*

GENERAL GUIDELINES OF THE DEPARTMENT FOR X-RAY EXPOSURE PARAMETERS OF VARIOUS TYPES OF X-RAY PROCEDURES.

Part	View	KVP	mA	mAS	Type
Skull	*AP*	*60-65*	*100*	*50*	*Bucky*
Skull	*LAT*	*55-60*	*100*	*50*	*Bucky*
PNS	*PA*	*65-70*	*100*	*60*	*Non Bucky*
Mastoids	*LAT*	*55-60*	*50*	*16-20*	*Non Bucky*
Mandible	*OBL*	*55-60*	*50*	*16-20*	*Non Bucky*
Shoulder	*AP/AXIAL*	*50-53*	*50*	*8-12*	*Non Bucky*
Chest - Adult	*PA*	*48-52*	*100*	*8-12*	*Non Bucky*
	LAT	*60-65*	*100*	*12-16*	*Non Bucky*
Chest - Children	*PA,AP*	*45-48*	*100*	*4-8*	*Non Bucky*
	LAT	*50-55*	*100*	*8-12*	*Non Bucky*
Abdomen	*AP (Supine)*	*65-70*	*50*	*50-60*	*Bucky*
Abdomen Erect	*PA*	*70 - 75*	*50*	*50 - 60*	*Bucky*
KUBU & Pelvis	*AP (Supine)*	*60-65*	*50*	*50-60*	*Bucky*
C.Spine	*AP*	*55-60*	*100*	*12-16*	*Bucky*

C.Spine	*LAT*	*50-55*	*100*	*8-12*	*Non Bucky*
D.Spine	*AP*	*60-65*	*25*	*50-60*	*Bucky*
D.Spine	*LAT*	*70-80*	*25*	*50-60*	*Bucky*
L.S.Spine	*AP*	*60-65*	*50*	*50-60*	*Bucky*
L.S.Spine	*LAT*	*70-80*	*50*	*50-60*	*Bucky*
Upper Extremities	*AP/LAT*	*42-50*	*50*	*4-12*	*Non Bucky*
Lower Extremities	*AP/LAT*	*45-55*	*100*	*4-12*	*Non Bucky*
Humerus	*AP/LAT*	*45 - 50*	*50*	*4 - 6*	*Non Bucky*
Elbow	*AP/LAT*	*45 - 50*	*50*	*3 - 5*	*Non Bucky*
Forearm	*AP/LAT*	*45 - 50*	*50*	*3 - 5*	*Non Bucky*
Hand Wrist	*AP/OBL*	*45*	*50*	*10 - 12*	*Non Bucky*
Femur	*AP/LAT*	*50 - 55*	*50*	*10 - 12*	*Non Bucky*
Knee Joint	*AP/LAT*	*50 - 55*	*50*	*6 - 8*	*Non Bucky*
Leg	*AP/LAT*	*50 - 55*	*50*	*6 - 8*	*Non Bucky*
Ankle	*AP/LAT*	*45 - 50*	*50*	*3 - 4*	*Non Bucky*
Foot	*AP/OBL*	*45 - 50*	*50*	*2 - 3*	*Non Bucky*

INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-9 (b), NABH Standards requirements-4th Edition-DEC 2015.*

INH/RAD/R/05

1. **PURPOSE:** *The purpose of this work instruction is to enable the radiographer/staff nurse to execute the work operations effectively without any confusion and to ensure that it is done under controlled conditions.*
2. **SCOPE:** *Obstetrical & General Ultrasonography.*
3. **RESPONSIBILITY:** *Consultant Radiologist.*
4. **PROCEDURE:**

4.1. *The patient case history is studied by the radiologist before performing the scan.*

4.2. *The patient is explained about the scan and brought to confidence. An informed consent is taken from the patient/attendant as per statutory & regulatory requirement.*

4.3. *The patient is prepared for ultra sonogram of various areas as per the following. The patient is asked to change the scan dress.*

4.4 COMPLETE ABDOMEN: *The patient should be fasting for four hours before the scan.*

4.5 UPPER ABDOMEN:

- *The patient should be fasting for four hours before the scan.*
- *The patient is allowed to take*
  - *Water.*
  - *Coconut water.*
  - *Fresh fruit juice.*

4.6 LOWER ABDOMEN:

- *The patient is asked to take plenty of water.*
- *The patient is asked not to pass urine for three hours before the scan i.e., the bladder should be full.*
- *The patient is asked to take normal diet.*

4.7 KUB SCAN:

- *The patient is asked to drink plenty of water.*
- *The patient is asked not to pass urine for three hours before the scan i.e., the bladder should be full.*

- *The patient is asked to take normal diet.*

4.8 GALL BLADDER SCAN:

- *The patient is asked to take fat free diet on the previous day of the scan.*
- *The patient should be on fasting for four hours before the scan.*

4.9 DOPPLER STUDIES:

- *Renal Doppler study.*
- *Prior appointment is mandatory with 8 Hours fasting and preparation which will be explained at the time of appointment*

4.10 OBSTETRICS-3 MONTHS (1st Trimester-From 1 – 12 Weeks):

- *The patient is asked to take plenty of water.*
- *The patient is asked not to pass urine for 3 hours before the scan.*
- *The patient is asked to take normal diet, after 3 months no preparation is required.*

4.11 FOLLICULAR STUDY (FOR INFERTILITY):

- *The patient is asked to take plenty of water.*
- *The patient is asked not to pass urine for 3 hours before the scan.*
- *The patient is asked to take normal diet.*
- *Instruct the patient is asked to come for the repeat scan for alternative days or continuously as specified by the radiologist.*
- *The patient is made to lie down on the examination table***.**
- *The transducer is selected depending on*
  - *Type of investigation to be performed.*
  - *Physical size of the patient.*
  - *The anatomic area involved.*
  - *The type of tissue to be encountered.*
  - *The depth of structure to be studied.*
- *The patient details are entered into the computer by selecting the new patient option.*
- *Select the part to be studied from the format available in the system.*
- *Select the mode in which the patient to be examined***.**

4.12 A-Scan (Amplitude Mode): *This is a graphic display showing the distances between the tissue interfaces. It is used for the purpose of measuring the distances. A one dimensional image displaying the amplitude (strength) of the returning echo signals along vertical axis and time (the distance from the transducer) along horizontal axis is A-Mode image. This mode is used the following circumstances.*

- *To determine whether an echo free structure is fluid filled with*
- *Strong back wall reflection.*
- *Structure with homogeneous material with a weak back wall reflection.*
- *Structure with complex mass having both solid and fluid.*
- *All the above are checked for Gall bladder, Urinary bladder, Simple cyst.*
- *To determine the movement of arterial wall in the heart.*
- *To aid in cyst puncture.*
- *To determine any tumor in the eye.*
- *To determine any tumor in the Brain.*

4.13 B-Mode (Brightness Mode): *This display provides a two dimensional image representing a specific plane of section through the body. Different types of tissues are distinguished using grey scale representation. The real time images on screen are frozen for detail study. This mode is used for the following.*

- *Abdomen study.*
- *Obstetric monitoring.*
- *Cardiology*

4.14 M-Scan (Motion Mode): *This mode is used to find the positions of tissues interfaces with time. Stationary interface generates straight line and moving interface produces wavy lines. This mode is used for the following.*

- *Movement of flaps of heart valves.*
- *Movement of heart walls.*
- *Fetal heart movements in early pregnancy.*

4.15 DOPPLER MODE: *Ultra sound waves reflected from a moving interface suffer Doppler shift. Change in frequency compared with original ultra sound pulse. The Doppler shift is*

super imposed onto a real time B-Scan and displayed in color. This mode is used for the following.

PURPOSE: *The purpose of this procedure is to specify the manner in which patients coming for CT are to be prepared and various records to be maintained in the department.*

SCOPE : *All types of CT scan with contrast and without contrast*

RESPONSIBILITY: *The radiologist and the radiographer in-charge of the CT unit are responsible for this procedure.*

PROCEDURE:

4.1. *The Coordinator on duty will collect the Test Requisition Form and the doctor's Prescription from the Patient and enter the data in Mediff PACS and ask the patient to wait in the prescribed area and calls the patient by name when his/her turn comes. The technician will take informed consent from the patients undergoing CT under contrast / Anesthesia.*

4.2. *Radiographer will verify the name, ID no. and test details in the Requisition form and selects the data in the Computer.*

4.3. *Give priority to elderly, children and sick patients.*

4.4. *As per the requisition in the contrast indicated cases 1) The CT Technologist checks for the serum, creatinine report of the patients & then a contrast media (commonly called "dye") is given either by mouth, rectally, or by IV to help make the CT images as clear as possible and to distinguish between different parts of the body. All the cases and the reactions if any, will be recorded in the Contrast Reaction register (INH/RAD/R/16). Contrast materials used in CT usually contain iodine (a clear substance) or barium (a white chalky substance). The most commonly used is iodine.*

4.5. *When the patient is scheduled for a CT that requires an iodine injection, a Radiology Nurse will ask the patient several questions and insert a small IV catheter that will be used to deliver the iodine. If any reaction occurs, the patient will be taken care of the same as per the departmental procedures.*

4.6 GENERAL PATIENT PREPARATION:

- *Patients are often asked to avoid food and drink and come on empty stomach when having a CT that requires either oral or IV contrast media depending upon the type of the scan.*
- *Patients may also be asked to remove any metal objects and certain clothing from the area to be scanned to prevent interference with the quality/clarity of the images.*
- *If you are a woman of child bearing age, always inform your technologist if you might be pregnant.*

4.7 CT PREPARATION: *Preparation instructions vary depending on the part of your body being scanned. The patient is asked to follow the appropriate instructions mentioned below.*

- **Brain:** *No special preparation, unless the CT includes IV contrast. In that case, the patient is asked not to eat or drink for 6 hours beforehand.*
- **Sinuses:** *No special preparation, unless the scan is having IV contrast. In that case, the patient is asked not to eat or drink for 6 hours beforehand.*
- **Abdomen:** *No special preparation, unless the procedure include contrast. In that case, the patient is asked not to eat or drink for 6 hours beforehand.*
- *Similar procedures will be followed for all types of CT Scans performed in the department.*

4.8 DURING CT:

- *An actual scan takes only seconds, although it may seem longer due to the time it takes to position and complete your preparation.*
- *When the procedure begins, the table will move toward the scanner opening or gantry to the starting position, then pause, and move to the end position.*
- *The gantry houses the X-ray tube and computer components that generate the X-ray beam and the information that creates the "picture."*
- *The patient may hear very little noise from the machine or may hear a humming noise, which is the X-ray tube rotating inside the gantry.*
- *During the scan, the patient will be asked to lie very still without any movement.*

- *In the case of children, an attendant is given a lead apron and asked to stay in the scan room during the scanning.*
- *The patient is instructed to call the technician/nurse if he/she feels any discomfort during the scan and speaker is provided for the same.*
- *Once the scan is over the patient will be removed from the couch and asked to wait in the waiting area.*
- *The technician verifies the images of the scan for the artifacts if any, and reconstructs the images.*
- *If the scan of the patient is obtained as per the requisition, then the patient is instructed to leave the area and collect the concerned reports at the reception desk.*
- *While taking CT for female patients, ask the patient's attender as accepted by the patient to stay inside the room behind the lead screen if, a sister or approved lady attendant is not available from hospital services.*

4.9 REPORT PREPARATION*:*

- *The radiologist on duty will verify all the images of a scan of a patient and dictates the report on the scan.*
- *The report is prepared as per the dictated notes in a computer and the HOD/another Radiologist will check the report along with the images before signing the report.*
- *Once the report is prepared and signed by the concerned radiologist, it will be handed over in the reception area for issue of the same to the concerned patients.*

INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-10 (b), NABH Standards requirements-4th Edition-Dec 2015.*

INH/RAD/R/13

PURPOSE : *The purpose of this procedure is to specify the manner in which patients coming for MRI are to be prepared and various records to be maintained in the department*

SCOPE: *All types of MRI test*

RESPONSIBILITY: *The radiologist and the radiographer in-charge of the MRI unit are responsible for this process.*

PROCEDURE:

4.1. *The Coordinator on duty will collect the Test Requisition Form and the doctor's Prescription from the Patient and enter the data in Mediff PACS and ask the patient to wait in the prescribed area and calls the patient by name when his/her turn comes. The technician will take informed consent from the patients undergoing MRI under contrast / Anesthesia*

4.2. *Radiographer will verify the name, ID no. and test details in the Requisition form and enters the same in the Computer.*

4.3. *Give priority to elderly, children and sick patients.*

4.4. *Magnetic Resonance Imaging combines a strong magnetic field and radio waves to produce highly detailed images of the body's anatomy that can be used to diagnose a variety of conditions.*

4.5. *MR images allow Radiologists to make a diagnosis based on the differences between healthy and diseased tissues. MRI is a good way to visualize the brain, spine, joints, soft tissues, blood vessels, abdomen, and pelvis.*

4.6 BEFORE THE MRI SCAN

- *The patients are required to fill out an MRI screening form at once they arrive in the department. We use this form to identify any metal, implants, or devices that may not be safe to go inside the scanner's magnetic field.*
- *Some of the questions asked are:*
- *If the patient had metal in their eyes or other parts of the body (i.e. shrapnel, slivers from grinding or welding). Any previous surgery. Whether she is pregnant or nursing.*
- *If the patient has:*

  - A cardiac pacemaker

  - other implanted control devices

- Middle ear implants

- Stents

- Heart valves

- Metal implants.

4.7 MRI PREPARATION:

- *Patients' preparation varies depending on the part of the body being scanned.*
- *It is important to always take regular medicines before the MRI scan, unless doctor has instructed otherwise.*
  - **Head Scan, Brain, Neck, Cervical spine, Thoracic spine, and Lumbar spine, Joints/extremities***: No special preparation required.*
  - **Abdomen, Liver, Kidneys, pelvis, Uterus, Prostate:** *Do not eat or drink anything for 6 hours beforehand.*
- *After the Scan the patient get back to their normal diet and activities right away. If they were given contrast, it will pass naturally through the body with in 18 to 24 hours. It will be colorless and odorless.*
- *Briefing the patient regarding the sound/noise of machine during the procedure and counsels them not to get panic.*

4.8 DURING THE SCAN:

- *The scan is painless, simple and safe.*
- *An MRI generally last 30 minutes to 1 hour, depending on the type of scan.*
- *A Technologist will escort the patient from the changing area to the scan room.*
- *The Technologist will help the patient lie as comfortable as possible on the table.*
- *The table will slide slowly into the center of the magnet.*
- *The magnet has a light inside and stays open at both ends.*
- *The patients will hear gentle thumping, whirring, and knocking noises while in the machine. Ear plugs or ear phones with music will be provided.*
- *The Technologist will stay in constant communication with the patient by talking in between scans.*

- *In some cases, for better images, a contrast agent (Gadolinium) is used. It is a clear fluid injected into the vein of the arm.*
- *The patients are asked to remain motionless and relaxed during the entire scan.*
- *While taking MRI for female patients, ask the patient's attender as accepted by the patient to stay inside the room behind the lead screen if, a sister or approved lady attendant is not available from hospital services.*

4.9 **REPORT PREPARATION***:*

- *The radiologist on duty will verify all the images of a scan of a patient and dictates the report on the scan.*
- *The report is prepared as per the dictated notes in a computer and the HOD/another Radiologist will check the report along with the images before signing the report.*
- *Once the report is prepared and signed by the concerned radiologist, it will be handed over in the reception area for issue of the same to the concerned patients.*

INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-9 (b), NABH Standards requirements-4th Edition-Dec 2015.*

INH/RAD/R/12

5. **PURPOSE:** *The purpose of this procedure is to ensure effective maintenance of the Equipment and to assess their performance levels.*

6. **SCOPE :** *Maintenance department ensures smooth functioning of the hospital equipment by performing activities like routine, preventive & break down maintenance of the equipments including AMC & Warranty periodical servicing etc*

7. **RESPONSIBILITY :** *Bio-Medical Engineering department will maintain/supervise the following maintenance programme & records*

8. **PROCEDURE:**

8.1 DAILY MAINTENANCE

- *Cleaning of each equipment room.*
- *Cleaning of couch/table and control panels of each equipment.*
- *Checking of functioning of the optical fields and collimators of all X-Ray units.*
- *Checking of availability of all accessories pertaining to the concerned unit.*
- *Checking for the functioning of all exposure parameters.*
- *Checking for the functioning of automatic processor.*
- *Checking for the integrity of screens and cassettes.*
- *Checking for the functioning of computer and other accessories of the unit.*
- *Checking for the availability of all the registers of the concerned units.*

8.2 WEEKLY MAINTENANCE:

- *Repeat the daily cleaning programme.*
- *Put splashguard between the developer and fixer tanks to prevent contamination from splashes and then remove the deep racks. Rinse and wipe with cloth using a different cloth for developer and fixer.*
- *Operate each rack manually to check for correction tension on chains / gears, that they move freely, and that all rollers rotate correctly. Check gear wheels for missing teeth, broken or missing springs, and any other evidence of trouble.*

- *Re – install racks, being very careful to:*
  - *Allow them to drain to prevent dilution of chemicals;*
  - *Use splashguard and lower racks in slowly to prevent contamination of solutions.*
- *Replace cross – over assemblies. Check that each component is correctly positioned.*
- *Inspect and change , if necessary, any filters in :*
- *The water supply:*
- *The re circulation system.*
- *Remove drier section air tubes and clean by vigorous agitation in warm water. Take care to replace correctly.*
- *Clean drier rollers with a damp cloth.*

8.3 MONTHLY MAINTENANCE:

- *Carry out weekly and daily maintenance schedules.*
- *Drain main tanks and clean with sponge and running water.*
- *Close drain valve.*
- *Turn off the processor and mains isolator. Remove the processor lid.*
- *Drain tanks and refill with fresh chemistry.*

8.4 START – UP PROCEDURE:

- *Open the water supply valve.*
- *Turn on the mains electrical power at the mains isolator, together with the process' power switch'. Check that the neon indicator lights come on.*
- *Feed two or three obsolete films through the processor to clean those rollers, which are above solution, level and which may have accumulated dirt particles during the shut – down period. Check the resultant films for surface damage. Check, at the same time, that replenisher pumps are functioning.*

8.5 SHUTTING DOWN THE PROCESSOR:

- *Check that there are no films in transit through the processor. (Wait a couple of minutes).*
- *Turn off the processor 'power switch' and the mains isolator.*

- *Turn off the water supply valve(s)*
- *Remove the processor cover.*
- *Remove the cross – over roller assemblies and clean the rollers with warm water and non – abrasive cloth. Wipe dry. Replace assemblies carefully.*
- *Remove any visible chemical deposits from inside the processor.*
- *Remove processor cover but leave slightly open to allow a free flow of air and thus help to prevent condensation problems.*

8.6 PREVENTIVE MAINTENANCE ACTIVITIES FOR X-RAY:

- *Cleaning the control with the brush/ vacuum cleaner.*
- *Checking for voltameter accuracy.*
- *Checking display boards function.*
- *Checking Fluoro Kvp display.*
- *Checking the O/L lamp Glows at 40<KVP>100.*
- *Setting 300 mA 100 KVP, 75 mAS O/L off at 90 MAS O/L ON.*
- *Rotor must not start of O/L is on even after pressing st- by switch.*
- *Check space charge compensation for 100m unit.*
- *Check that exposure terminates for short as well as long exposure (2 sec) timings.*
- *Checking output of filament stabiliser.*
- *Checking the collimator bulb voltage alignment.*
- *Checking for right value of fuses.*
- *Checking spinning tap and step wedge.*
- *Checking HV cables and jelly.*

8.7 PREVENTIVE MAINTENANCE ACTIVITIES – ULTRASOUND.

- *Control panel checking- System appearance.*
  - *Operator key board.*
  - *Track ball cleaning/movement*
  - *Functionality checking- Brightness/contrast checking*
  - *B- Mode*

- *M-Mode*
- *ATO/ASO/DEPTH/REPORT PAGE/STORAGE FACILITY*
- *Probes checking- External wear and tear*
- *Probe calibration*
- *IQ check*
- *Hardware checking- System logs/power logs/temperature logs*
- *Running the service diagnostics.*
- *DC Power logs.*
- *Fan assay working status.*
- *CPU/DSC/TRBD/TRCTl/HV-PDB-L100.*
- *CPU/DSC/FEB/HV/PDB UNIT-Llog 100pro*
- *Physical checks- Mechanical fittings and physical connections.*
- *Grounding availability at the site.*
- *Presets available with the customer.*

- *The preventive maintenance activities of MRI and Mammogram are as per the checklist provided by the Company.*

8.8 ANNUAL MAINTENANCE AND CONTRACT:

- *The maintenance personnel maintain a list of activities of the AMC and monitor the visits of the contract people.*
- *When the contract personnel are servicing the equipment the presence of the maintenance technician is mandatory.*
- *The Radiology department personnel ensures that the equipment covered under AMC is serviced at regular intervals.*
- *The AMC details are recorded.*
- *Separate records are maintained for each equipment.*

9. PURPOSE*: The purpose of this procedure is to specify the radiation Quality control procedure to be followed by the staff in the radiology department.*

10. SCOPE: *Applicable to all the equipments used in radiology department.*

11. RESPONSIBILITY: *The HOD of the Radiology department is responsible for this process.*

12. Quality Control: *The main objective of quality control is to enhance the quality of x-ray/results by checking the precision, accuracy and consistency of tests done.*

Validation of examination procedure technically and clinically will be done by qualified and well trained radiologist.

Quality Assurance is done with the following monitoring

- **Tracking Turnaround time and waiting times**
  - *Methodology: Turnaround time is tracked by RIS PACS the in and out time of the patient for each modality in the department*
- **Confidentiality of Reports***: Confidentiality of patients and their test reports are ensured through the following:*
  - *In the course of Performing work responsibilities all information with regard to patient, their family, their physician and / or the hospital is kept confidential.*
  - *All the staff of the department is cautioned not to discuss any such information with others.*
  - *Personnel are expected and ensured to conduct themselves with professional dignity at all times.*
  - *Radiologists are the only persons authorized to inform reports to the doctors.*
- **Patient Education and Safety:**
  - *All patients are welcomed and explained about the process of the diagnostic investigation in detail before starting the process.*
  - *All Patients are explained when and how their reports can be collected.*
  - *While undergoing the investigation, all necessary precautions related to patient safety is explained & followed.*

- *Special care is taken while undergoing Investigations of infants/neonatal and Geriatric patients. The parent / next to the kin of such patients are kept informed of the process before investigations are started.*
- *Attention of the patient/ customers will be drawn to the hygiene and safety aspects before undergoing the Investigation.*
- *Consent will be taken whenever required in the appropriate forms.*
- *All necessary steps will be taken to reduce /minimize /eliminate discomfort /pain while conducting the Investigation.*

In the course of performing work responsibilities all information with regard to patient, their family, their physician and / or the hospital is kept confidential. The staffs of the department are cautioned not to discuss any such information with others.

➢ **Turnaround time for reports:**

- *For all modules:*
  - *All reports of imaging test conducted before 2:00 pm will be dispatched to the dispatch counter (for OPD cases) or to the respective inpatient wards (for IPD cases) at 4 pm on the same day.*
  - *All test reports conducted after 2:00 pm will be dispatched to the dispatch counter (for OP patients) or to the respected inpatient wards (for IP patients) at 6 pm in the same day.*
  - *All reports of imaging test conducted after 6:00 pm will be dispatched on the same day otherwise in the next morning.*
- **Reporting of Emergency Cases:**
  - *In case of an emergency report, the radiologist will see the film and give a verbal report to the referring consultant by phone.*
  - *If the patient is referred or wants to go to some other hospital (on request or against medical advice), Reports will be generated within 30 minutes (provided it is during Radiologist's office hours).*

X-RAY QUALITY CONTROL

PROCESS	DEVICE	SUGGESTED PERFORMANCE CRITERIA	MINIMUM FREQUENCY
Film and chemical Storage	*visual inspection thermometer, hygrometer*	*Fumes? Radiation? 655±F,50% ±10% Humidity*	**Monthly**
Film Processing	*Automatic processor*	*Clean 70%±5 F50%1±0%,Humidity*	**Monthly**
Film Artifacts	*CR Equipment*	*<0.05 Increase in Density in 2 min*	**Semiannually**
AUTOMATIC PROCESSING			
Daylight systems	*As suggested by Manufacturer*	*As indicated by Manufacturer*	**Daily**
Automatic chemical mix system	*As suggested by Manufacturer*	*As indicated by Manufacturer*	**Quarterly**
Silver Recovery efficiency	*Silver test paper, direct reading device*	*±10% of estimated weight*	
Filter (HVL)	*Dosimeter ,type 1100 aluminum sheets semi log paper*		**Annually**
Light field and X-ray field alignment	*Alignment template or nine pennies and tape measures*	*±2%of source –to – image distance*	**Semi-annually**
Automatic collimation or positive beam limitation and accuracy of X-rays scales	*Alignment template or nine pennies and tape measures*	*±3%of source –to – image distance*	**Semi-annually**
X-ray beam,bucky motion and centering	*Homogenous phantom and lead strips*	*Lead strips should be centered. Density uniform to 0 ±.10 perpendicular to anode –cathode axis*	**Annually**
Focal spot size	*Polecamera,lead star pattern, or*		**Acceptance Test**

	slit		
Visual checks	*Visual check list*	*Pass -fail*	**Annually**
Overload protection	*Single exposure rating chart*	*prevent exposure that exceed 80% of tube maximum rate load*	**Annually**
kVp	*kVp cassette or direct reading kVp device*	*±5%: less over limited range ±2% kVp for 60 to 100 kVp*	**Annually**
Timers	*Timing device*	*single phase, three phase (±5%*	**Annually**
mR/mAs	*Dosimeter, homogenous phantom*	*±10%*	**Annually**
Linearity	*Dosimeter*	*±10% over clinical range*	**Annually**
Exposure reproducibility	*Dosimeter*	*±5%*	**Annually**
Photo timers Abbreviated tests sensor panel function	*Lead sheets and dosimeter*	*±10% in Exposure*	**Annually**
kVp correction circuit	*Homogenous phantom*	*Density of 1.20+0.30*	**Annually**
Proper exposure at various mA stations	*Homogenous phantom and dosimeter*	*±10% in exposure*	**Annually**
Proper exposure for various field sizes	*Homogenous phantom and dosimeter*	*Density f 1.20± 0.10*	**Annually**
Phototimer Reproducibility	*Homogenous phantom and dosimeter*	*± 5% in exposure*	**Annually**
Density control function	*Homogenous phantom and dosimeter*	*Steps of 25% in exposure verify button function,i.e. + gives increase,- gives decrease*	**Annually**
Complete tests ALL of abbreviated test plus			**Annually**
sensor panel location	*Lead sheets*	*Pass-fail*	**Annually**
Minimum exposure time	*Exposure timing device*	*<10ms*	**Annually**
Back up exposure time	*Exposure timing device and lead sheets*	*<600mAs*	**Annually**

Proper exposure with change I patient size	*Homogenous phantom*	*Density of 1.20 ±0.30*	**Annually**
Grid uniformity Bucky grids	*Homogenous phantom*	*Uniform films, no grid lines, density of 1.20 ±0.10 perpendicular to anode-cathode axis*	**Annually**
Grid cassettes and clip on cars grids	*Homogenous phantom*	*Uniform films, no grid lines, density of 1.20 ±0.10 perpendicular to anode-cathode axis*	**Semi-annually**
Grid Alignment	*Homogenous phantom*	*Uniform films, no grid lines, density of 1.20 ±0.10 perpendicular to anode-cathode axis*	**Annually**
Screen film cassette speed matching	*Standard Cassette*	*Densities within± 0.05 for all the cassettes used in one area*	**Annually**
Screen film contact	*coarse copper mesh*	*No significant areas of poor contact*	**Annually**
Exposure per film	*Homogenous phantom and dosimeter*	*Film densities within ±0.15 for AP lumbar spine technique and appropriate phantom. Exposure for lumbar spine in 100 to 160 Uc KG(-1a) range for less*	**Every quality control check**
Matching images and exposure	*Homogenous phantom and dosimeter*	*Film densities within± 0.15 of average for all rooms. Enterance exposure within +10%for identical rooms*	**Every quality control check**
X-ray out put Wave from	*X-ray detector and oscilloscope*	*Check for spikes aberrant wave shapes etc.*	**Annually**
X-ray tubes, collimators and generators			**Semi-Annually**
Maximum fluoroscopic exposure rates	*Lead sheets and Dosimeter*	*<1.3mCkg (-1a)/min for manual system;<2.6 mCkg (-1a) min for automatic exposure control system*	*Semi-Annually*
Standard fluoroscopic	*Homogenous*	*0.5 to 0.8 mCkg (-1a),6-*	**Semi-Annually**

exposure rates	*phantom and dosimeter*	*inch mode, without grid;0.4to 0.7 mCkg (-1a)/min,9 inch mode, without grid. Automatic exposure control should set 80 to 90kVp.*	
Spot film and spot film camera exposure	*Homogenous phantom and dosimeter*	*13 to 50 nCkg (-1a)/image at intensifier ;film density of 1.20 +0.15*	**Semi-Annually**
Cine film exposure	*Homogenous phantom and dosimeter*	*Approx.4nC (-1A)/frame at intensifier for 9-inch mode;approx 7nCkg (-1a)/frame at intensifier for 6 inch mode.*	**Semi-Annually**
Automatic brightness exposure and gain control systems	*Homogenous phantom and dosimeter*	*ABC-AEC systems should function similar to same installation and other similar systems .AGC should be able to compensate from 3 to 9 inches of acrylic*	**Semi-Annually**

Quality control for Mammography Equipment

Test	**Device**	**Suggested Performance Criteria**	**Minimum Frequency**
Kvp accuracy	*Mammographic Kvp device*	*±2Kvp*	*Semi annually*
Entrance exposure	*Low energy ionization chamber*	*±10%*	*Semi annually*
Mammographic low and high contras resolution	*Resolution Phantom*	*No noticeable deterioration in performance*	*Semi annually*

ULTRASOUND QUALITY CONTROL

TEST	DEVICE	SUGGESTED PERFORMANCE CRITERIA	Minimum Frequency
Depth calibration accuracy	*Phantom or test object*	*±1%*	*Monthly*
Digital caliper accuracy	*Phantom or test object*	*± 1%verical ±3% horizontal*	*Monthly*
Compound Scan Misregistration	*Phantom or test object*	*5mm maximum separation*	*Quarterly*
Externally refrenced measurement accuracy	*Phantom or test object*	*Tolerance varies with the clinical need*	*Annually*
System sensitivity	*Tissue-mimicking phantom*	*Max.visualization depth within ±1 cm*	*Monthly*
Gray scale display and photography	*Tissue phantom-patient image*	*Same gray bars visualized :all parenchymal scatterers detected*	*Daily*
M-Mode depth and calibration and time markers	*Phantom or test object*	*±1% depth calibration :time markers ±10%*	*Quarterly*
Spatial resolution	*Phantom*		*Annually*
Gray scale dynamic range	*Gray scale phantom :electronic burst generator*	*within±5 dB*	*Annually*
Air filters	*Examination*	*Clean*	*Monthly*
Cables	*Examination*	*Intact*	*Monthly*

13. INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-10, NABH Standards requirements-4th Edition-Dec 2015.*

INH/RAD/R/24

1. PURPOSE:

The purpose of this procedure is to ensure the Quality of the equipment for its proper functioning to give desired output for quality images. Radiology has a Quality Assurance Program which addresses all the issues related to Quality of the equipment and images.

2. SCOPE:

This is applicable to all the equipment used in the Radiology Department.

3. RESPONSIBILITY:

HOD of Radiology & Biomedical department

4. PROCEDURE:

4.1 *The Department is using digital / computerized Radiography system. The procedure of image acquisition in the department is as follows.*

- *Kodak direct view CR Cassette/DX cassette will be used for computed radiography.*
- *The cassette contains storage phosphor screen and when exposed it creates a latent image on the screen.*
- *The exposed cassette is placed in Kodak CR system/ DX system in which the cassette will be scanned with laser beam and a digital image will be formed and stored in a computer.*
- *The digital image from the computer can be copied on the X-Ray films by master view(direct) Kodak (direct view 8900) / Dry View 6850 image processors.*
- *The X-Ray films will be issued to the patients along with the reports.*
- *The phosphor screens of the cassettes will be cleaned periodically to obtain clear images without any artefacts.*
- *In the department the Quality Assurance of all the X-Ray machines, CT Scanner and MRI Scanner is done periodically using the following proformas*
- *If any defect is noted during the QA assessment immediate necessary corrective measures are undertaken for the same to upkeep the maintenance of the units.*

The following proformas are used for the Quality assurance of the equipment.

4.2 Quality assurance of a X-Ray Unit

Date:

Name of the Institute:

Make & Model of the X-Ray machine:

Max kV: *Max mA:*

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1. *Collimator: X- diaphragms* : *Moving properly/ not moving properly*
   Y- Diaphragms : *Moving properly/ not moving properly*
2. *Field Light* : *Working/ not working*
3. *Al equivalent thickness of the filter* : *(mm) Available/ Not available*
4. *Mobile lead barrier at Control panel* : *Available/ Not available*
5. *Lead apron* : *Available/ Not available*
6. *Gonad shield* : *Available/ Not available*
7. *Radiation warning Symbol* : *Displayed/ Not displayed*
8. *Beam ON/OFF warning lights* : *Working/ Not working*
9. *Focal spot size* :
10. *Optical field and radiation field* : *with in the limits/ out of limits.*
    Congruence for 10x10 cm^2 field size : *(max shift in ±X direction= mm)*
    (max shift in ±Y direction= mm)
11. *Output consistency* : *Stable/ Varying with in the limits*
12. *Radiation Survey by operating the machine at max. kV and max.mA, fully opening the diaphragms by directing the beam towards the floor:*

Name of the Survey meter used :

a) Leakage from tube housing at 1meter distance : mr/hr

a) In front of the door : mr/hr

b) Behind the left side wall : mr/hr

c) Behind the right side wall : mr/hr

d) Behind the back side wall : mr/hr

e) Behind the movable lead barrier : mr/hr
(at the control panel)
f) At the patient waiting area : mr/hr
g) Behind the wall, when beam is : mr/hr
directed towards the Chest stand
Remarks of the QA-result: Unit can be used/ stopped for corrections
QA test conducted by (Name & Designation):
Checked by (Name & Designation):

4.3 Quality assurance of a CT-Scanner

Date:

Name of the Institute:
Make & Model of the CT-Scanner:
Max kV: Max mA:

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1. Beam limiting devices : Moving properly/ Not moving proper
2. Bow-tie filter : Provided/ Not provided
3. Scan plane visualiser : Available/ Not available
4. Lead apron : Available/ Not available
5. Gonad shield : Available/ Not available
6. Radiation warning Symbol : Displayed/ Not displayed
7. Beam ON indicators on Gantry : Working/ Not working
8. Beam ON indicators on Console : Working/ Not working
9. All visual indicators on console : Working/ Not working
10.Beam ON/OFF warning lights : Working/ Not working
11.Timers : Working properly/ Not working properly
12.Couch position accuracy : (± mm) with in the limits/ out of limits.
13.Output consistency : Stable/ Varying with in the limits
14.Radiation Survey by operating the machine at max. kV and max. mA,

Name of the Survey meter used :

a. *Leakage from tube housing at 1meter distance : mr/hr*
b. *In front of the door : mr/hr*
c. *Behind the left side wall : mr/hr*
d. *Behind the right side wall : mr/hr*
e. *Behind the back side wall : mr/hr*
f. *At control panel : mr/hr*
g. *the patient waiting area : mr/hr*
h. *With in the room, when beam is ON : mr/hr*

Remarks of the QA-result: Unit can be used/ stopped for corrections

QA test conducted by (Name & Designation):

Checked by (Name & Designation):

4.4 Quality assurance of a MRI-Scanner

Date:

Name of the Institute:

Make & Model of the CT-Scanner:

Max kV: Max mA:

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1 *Allignment light check*

SGT Head Quick Check

2 *For the following procedures, refer to either PM Assist (for 11.1& 12.x) or PM Assist (for E2, 11.0 &G3)*

a. *LV Shim*
b. *Eddy Current Check*
c. *Coherent noise*
d. *Signal to noise check*

e. Spike noise check

f. PM check (Service Contract Customer Only) : *Completed/ Non checked*

3 Magnet Room

a. Oxygen Monitor Operation : *Working/ Not Working*

b. Cardiac Gating Cable : *Working/ Not Working*

c. Patient blower & Filter : *Working/ Not Working*

d. Pneumatic Patient Alert System : *Working/ Not Working*

4 RF/ System Cabinet

a. Fan & Filter for MKS : *Working/ Not Working*

b. Fan & Filter for SRFD : *Working/ Not Working*

c. Check RF Output Power : *Working/ Not Working*

5 Patient Handling

a. Patient Table Checks : *Working/ Not Working*

6 Gradient

a. Check Fluid Levels and Valve of Heat

b. Exchanger : *Working/ Not Working*

c. Fans & Filter : *Working/ Not Working*

7 TAC Cabinet

a. Filter Replacement : *Working/ Not Working*

8 Computer

a. Storelog : *Working/ Not Working*

9 Magnet

b. Verify Cryogen Meter Calibration-

c. GE Magnets : Completed/ Not Completed

d. Test GEMagnet Rundown Unit (MRU) : Working/ Not Working

e. Phantom tests : Working/ Not Working

4.5 QUALITY ASSURANCE PROGRAM

In the department all the equipment are included in the PMS (Preventive Maintenance Services) and PMS reports of periodic checks were maintained by the department of Bio medicals.

- **The programme addresses verification and validation of imaging methods:**

All the technicians are well versed with every procedure carried in the department. The details of each procedure and corresponding techniques are documented in a folder and available for all the staff members during the working hours of the department. However the procedure to be carried out will be entered in the case sheet of the patient.

- **INTERNAL QUALITY ASSURANCE**
  - *Internal Quality Assurance can be done by the following way*
  - *The Radiologist verifies the procedures done by the technicians and validates the result and the same will be validates internally with the other radiologist.*
  - *The validation is done in structured manner as follow for each modalities*

Sl No	*Modality*	*Sample size*	*Frequency*
1	*X-Ray*	*2%*	*Monthly*
2	*CT Scan*	*5%*	*Monthly*
3	*MRI*	*5%*	*Monthly*

The result of such review is documented and the corrective and preventive actions are taken the purpose is to prevent errors in future and continue quality improvement process.

- **The programme addresses surveillance of imaging results:**

The HOD verifies the typical/critical cases reports everyday and all other reports of the images once in a week. He assess the results and takes appropriate steps to improve the reporting methods.

- **The programme ensures appropriateness of the investigations and procedure for the clinical indication:**
  - *INH Hospital has defined first line of Investigation for various clinical findings. Similarly second line of Investigation for various clinical findings are requested if first line of investigation requires further evidence to support the clinical findings.*

SL.NO	CLINICAL CONDITIOL	FIRST LINE OF INVESTIGATION	SECOND LINE OF INVESTIGATION
1.	*RENAL/UTERIC STONE*	*X-RAY,USG*	*CT PLAIN*
2.	*BENIGN/ CANCEROUS PROSTRATE*	*USG,DRE,UROFLOW*	*DSA,BIOPSY*
3.	*STRICTURE URETHRA*	*UROFLOW,AUG*	*CYSTOSCOPY*
4.	*ACUTE RENAL FAILURE*	*USG*	
5.	*CHRONIC RENAL FAILURE*	*USG*	
6.	*PELVIC TUMOUR*	*USG*	*CT PLAIN /CONTRAST/MRI*
7.	*KUB INFECTION*	*USG*	*MRI*
8.	*CONGENITAL ANOMALIES*	*USG*	*IVP/ISOTOPE*
9.	*TRAUMA*	*USG*	*CT PALAN/CONTRAST*
10.	*TORSION TESTIS*	*USG*	*CT PALAN/CONTRAST*

- **The programme includes periodic calibration and maintenance of all equipment:**
  The engineers from the supplier's company visits the department periodically under the annual maintenance contract and conduct all the calibration tests for each equipment and also performs the preventive maintenance service. (INH/RAD/SOP/07).
- **The programme includes the documentation of corrective and preventive actions:**
  All the equipment rooms are provided with log books. During the evaluation of QA programme, calibration of the equipment and procedures of the department, if any error is found, it will be corrected immediately and appropriate necessary steps will be taken to prevent them in the future. All the errors found and actions taken to correct them are documented in the log books.

5. INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-10,(a,b,c,d,e) NABH Standards requirements-4th Edition-Dec 2015.*

INH/RAD/R/24

PURPOSE*: The purpose of this procedure is to specify the radiation protection policy to be followed by the staff in the radiology department.*

SCOPE*: Applicable to Radiology department.*

RESPONSIBILITY: *The Radiological Safety Officer/HOD of the Radiology department is responsible.*

PROCEDURE:

Radiation Safety Policies:

4.1. Statutory Requirements:

The Atomic Energy Regulatory Board (A.E.R.B) is entrusted with the responsibility of developing and implementing appropriate regulatory measures to ensure radiation safety. Statutory requirements with regard to radiation safety are as follows:

- *Commissioning and Decommissioning of X-ray Equipment has to be registered with AERB.*
- *Direct assistance to the patient while being X-rayed has to be avoided. If assistance is required, appropriate precautions have to be taken by the person who will assist by making use of appropriate protective material and devises which are available.*
- *Fetal protection measures to be used.*
- *Periodic inspection of X-ray equipment and shielding features is conducted regularly.*
- *Personnel monitoring facility be provided to all radiation workers.*
- *Presence of uninvolved staff, patients and persons in any X-ray room must be avoided.*
- *Regular maintenance and calibration of the unit must be carried out.*
- *Reproductive organs must be particularly shielded.*
- *Services of qualified radiologists and X-rays technologists to be used.*
- *Servicing and calibration of X-rays equipment should be undertaken by qualified, trained and authorized service engineer.*
- *There should be transfer of radiographs and reports to avoid repeated X-rays examinations.*

- *X-rays equipment meeting design certification and type approval requirement by AERB only shall be used.*
- *X-ray examination of pregnant women and children should be avoided as far as possible.*

4.2. Personal Protective Equipments:

- **Policy:**
  - *No person shall operate or permit the operation of certified or uncertified medical radiographic equipment systems unless the following conditions are met:*

a. Only individuals required for the medical procedure, for training or for equipment maintenance shall be in the radiographic room during an exposure.

i. Individuals who are present in a radiographer room during any exposure shall wear protective aprons of at least 0.25 mm lead equivalent during every exposure.

b. When a patient must be provided with auxiliary support during a radiation exposure and

Mechanical holding devices are insufficient; the following procedures shall be followed:

i. The person holding the patient shall be protected with a lead apron of at least 0.25 mm lead equivalent;

ii. The person holding the patient shall be protected with lead gloves of at least 0.25 mm lead equivalent if the hands must be placed in the useful beam.

iii. Radiographers not to hold the patient during a radiation exposure, except in a life-threatening situation.

iv. No person shall be employed, routinely assigned, or required to hold a patient during radiographic and fluoroscopic procedures;

v. If a patient must be held during the x-ray exposure, non-radiation workers such as nurses or members of the patient's family may be asked to perform this duty.

c. Gonad shielding of not less than 0.5 mm lead equivalent shall be used on a patient during Radiographic procedure, except for cases in which this would interfere with Diagnostic procedure.

d. *The operator shall collimate x-ray beam limitation to ensure that the x-ray field does not extend beyond the Region of interest.*
e. *The Radiographic field shall be restricted to the areas of clinical interest as far as practical;*
f. *A method to observe the patient during the x-ray exposure (Lead glass) shall be provided for all units.*
g. *During radiographic exposure, the operator shall stand behind the protective barrier.*
h. *The department incharge shall provide safety rules to each individual operating x-ray equipment including any restrictions as to the operating technique required for the safe operations of the particular x-ray apparatus, and require that the operator sign a form acknowledging that the safety manual was read.*
i. *No person shall permit or arrange for the intentional irradiation of a human being except for the purpose of medical diagnosis or treatment;*
j. *No person shall deliberately expose an individual to the useful beam for the sole purpose of training or demonstration.*
k. *No person shall operate an ionizing –radiation-producing machine unless that person understands and uses the principles of radiation safety to keep radiation exposure as low as reasonably achievable (ALARA).*

Radiology department has a established radiation safety program which is integrated with the Organizations safety program (Refer safety manual).

For this process.

The Radiology departments has a

- *Medical practitioners*
- *CT / MRI Technicians*
- *X-Ray Technicians/Radiographers*
- *Radiation Safety Officer*
- *Staff for Maintenance of radiology Equipment (from the suppliers).*

All radiology personnel involved with radiation is qualified people and well versed with the safety rules pertaining to the ionizing radiation.

- *Valid education and training in radiation protection for all Employees are documented.*

Acquisition of X-ray/CT Scan equipment

- *Diagnostic X-ray machines are purchased basing on their Type approval from the AERB.*
- *Design of installations where X-rays are used is submitted to the Head of Radiological Safety Division (RSD), AERB, and Mumbai.*
- *All the equipment installed in the department have got approval from AERB. The layout plans of the equipment rooms are approved by AERB and the equipment are registered with AERB.*

Safety Responsibilities of the Radiation Safety Officer (RSO):

- *The Radiology department has the Radiation Safety Officer to act, in collaboration with the RSD, AERB, Mumbai, as a supervisor on all radiation protection issues.*
- *RSO ensures that the installation complies with all safety requirements.*
- *The safe working conditions according to AERB rules and regulations are established.*
- *The safety procedures are reviewed periodically and updating the same.*
- *The Radiology personnel are instructed about the in proper radiation protection practices.*
- *Routine checks of equipment and facility safety measures are documented.*
- *The records of radiation surveys including the corrective measures are maintained and recorded.*
- *Organizing participation, where necessary, in a personnel radiation monitoring services are recorded.*
- *Occupationally exposed workers who routinely participate in radiological procedures are identified.*
- *Records of occupational exposures received by personnel are maintained.*
- *Investigating each known or suspected case of excessive or abnormal exposure to determine the cause and to take remedial steps to prevent its occurrence and document it.*
- *The approval of all phases of the training program for operations and /or for personnel is documented.*

- *The required radiation surveys are performed and documented including the corrective measures.*
- *The personal dosimeters are used properly by occupational exposed personnel and that records are kept of the monitoring results.*

Training in Radiation protection

All employees who work in Radiology attend radiation protection courses conducted by the Radiation Safety Officer/ Radiologist and it is documented.

Posting and Signals:

- *Caution High Intensity X-ray Beam on the X-ray housing*

- *Pregnancy warning: Signaling danger to pregnant workers.*
- *Caution When X-rays produced during exposure: A visible external light indicating whether X-ray beam is ON (Red Light) or OFF (Green light).*

Occupational Safety*: protection against X-rays and monitoring of radiation Levels.*

- *Stationary units:*
- *All individuals in the X-ray room during an exposure is protected by at least 0.5 mm lead equivalency.*
- *Use of lead aprons, lead shields,Gonald Sheilds,Lead gloves, Lead glasses and thyroid Shielding*
- *Lead Apron*

Lead Drapes

Lead Shields

Lead Gloves

Lead Glasses

Thyroid Shield

Declared Pregnant Worker:

- *When an employee in radiology learns of her pregnancy or suspects .She is required to inform her supervisor immediately that she is pregnant, so that precautionary measures can be taken in her work assignment.*
- *The Head of the Radiology Department shall ensures that precautionary measures are taken to protect the declared pregnant employee.*
- *The radiation safety officer shall provide the declared pregnant employee with all necessary radiation protection information and takes all necessary measures to prevent her from getting excessive dose.*

Radiation Control Measures:

- *The principal objective of radiation protection is to ensure that the dose received by any individual is as low as reasonably achievable (ALARA), while not exceeding the maximum permissible limit.*
- *Time: Limit time of exposure.*
- *Distance: Maintain distance from the x-ray tube and remember the inverse Square law.*
- *Shielding: Absorbing materials or shields can be incorporated to reduce exposure levels.*

Radiation Safety precautions:

- *Radiology Department Personnel:*
- *The maximum permissible occupational dose to whole body radiation is 30 msv per year. But an effective dose limit of 100msv averaged over 5 consecutive years.*
- *An effective dose to the lens of the eye of 150 mSv in any single year.*
- *Radiation protection policy for Wearing the Personal protective Equipment.*

The Radiation Protection Unit should have following responsibilities:

- *Deciding which members of staff shall wear personal dosimeters.*
- *Issuing of TLD badges to all staff in regular intervals.*
- *Informing staff about proper use of badges.*
- *Evaluating Average Exposures for radiological investigation purposes*
- *Keeping a record of results*
- *Updating of staff on the recorded personal dose if requested*

- *Film badges are worn at all times while in the department.*
- *TLD badges are changed every 2 – 3 months*
- *Loss of a badge is reported immediately.*
- *When a protective apron is worn, the badge is worn inside the apron at the collar level.*

Handling of Dosimeters:

- *TLD cards should be used inside the holder supplied.*
- *TLD badges are worn on the upper part of the body at the chest level facing forward.*
- *TLD badge should not be damaged (Poles, water pressure, chemicals and heat can damage).*
- *TLD badges are not stored near radiation sources*
- *TLD badges are returned promptly.*
- *TLD badges are worn under the Lead apron*

Protection of Patients against Excessive X-ray Exposure

- *A licensed medical Doctor will specifically and individually order all exposures.*
- *Humans must not be exposed for training, demonstration, or any un-justified purposes.*
- *Appropriate measures should be used to keep exposure at a minimum while still obtaining the necessary diagnostic information.*
- *The useful beam must be collimated to focus only on the area of clinical interest.*
- *The film screen combination must be the fastest speed possible for the specific exam, yet be consistent with the diagnostic purpose.*
- *The radiation exposure to the patient must be minimum required to produce good diagnostic images.*
- *The source to patient distance must be at least 38cm for image intensified fluoroscopic units*
- *Gonad shielding of at least 0.25 mm lead equivalency must be used on patient of protective age. Shields are placed so as not to interfere with the examination being done and yet protect the patient.*
- *Check for pregnancy before taking X-ray of the abdominal or pelvic area of the fertile women.*

- *Aluminum filtration must be placed in the primary beam to reduce the quantity to the patient.*
- *Collimation: The primary beam is collimated to the minimum field necessary for the study being performed. Under No circumstances does the beam exceed the dimensions of the field.*

RADIATION MONITORING:

- *The thermo luminescent personnel monitoring devices (TLD badges) must be worn during working hours by all faculty and staff who regularly use x-ray equipment.*
- *Dosimetry reports on each employee must be kept as a permanent record available for inspection by the employee.*
- *No employee should receive more than 20 mSv (2REM) of radiation exposure each year. This is the radiation protection guide value. For added precaution, quarterly readings above 10 percent of the radiation protection guide (0.5 mSv, or 50 mREM) should be investigated.*
- *All radiation workers should receive as little radiation as reasonably possible. Any operator who is pregnant shall not be exposed to more than 2 mSv (200 mREM) during the entire term of her pregnancy.*

4.15 **Lead Apron inspection /radiation protective device**

- *Lead aprons must be used to protect staffs and patients from unnecessary radiation exposure from diagnostic radiology procedures.*
- *Health care organization must perform inspections on medical equipment, including lead aprons, lead protective devices etc.*

Inspection Frequency

- **Monthly:** *The Inspection consists of visual check to look for obvious tears, cuts, or etc.*
- **II. Bi annually:** *Apron must be placed on the table and checked using the automatic brightness control (fluoroscopic method)*
  - *Aprons must be stored properly in hangers.*
  - *Do not fold or pile up.*
  - *Check for cracks.*

5. Ultrasound Scan Safety Guidelines:

Policy:

- **Patient safety:**

  Always include proper identification with all patient data and verify the accuracy of the patients name or ID numbers when entering such data. Make sure correct patient ID is provided on all recorded data and hard copy prints.

  - *Use condoms when using Transvaginal probe and scanning infectious patients*
  - *Discard condoms safely.*

- **Diagnostic Information:**

  Equipment or incorrect settings ca result in measurement errors or failure to detect details within the image.

- **Mechanical Hazards:**

  Damaged probes or improper use and manipulation can result in injury or increased risk of infection.

- **Electrical Hazard:**

  A damaged probe can also increase the risk of electrical shock if conductive solutions come in contact with internal live parts. Inspect probes often for cracks or openings.

INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-11(a, b, c, d, e, f, g), NABH Standards requirements-4th Edition-Dec 2015.*
INH/RAD/R/24

PURPOSE: *The purpose of this procedure is to explain the activities related to maintaining the confidentiality, integrity and availability of data in Radiology department of INH.*

SCOPE: *The procedure is applicable to maintaining the electronic records in Radiology Department.*

RESPONSIBILITY : *The Radiology HOD is responsible for ensuring all controls are in place to ensure data security*

4. PROCEDURE

13.1 Storage of clients data on electronic medium

- *In the Radiology department, PACS networking system is installed. This software stores all the images produced in the department and enables to view them from various viewing*

systems installed in the department.The server of the system automatically create the backups as per the schedule and maintains the data of the department.

- **Picture archiving and communication systems** *(PACS) is a combination of hardware and software dedicated to the short and long term storage, retrieval, management, distribution, and presentation of images.*
- *The format for PACS image storage and transfer is DICOM (Digital Imaging and Communications in Medicine)*
- *The EDP department takes daily backups of the PACS and the media containing the Backup data is stored at a safe distance from the source of data with adequate protection.*
- *The details of the backup taken are updated in the Server Back Up Register [INH/EDP/R/4]*
- *Restoration checks of the backup data is carried out periodically and the details of the same are updated in the Backup Restoration checks Register [INH/EDP/R/12]*

13.2 Confidentiality of information

- *An undertaking shall be taken from all the employees to maintain confidentiality of the information related to the organization and the patient known to them, while working in the organization.*
- *The report to the investigations carried out in INH shall be delivered only after producing proper identification.*
- *No report shall be sent by Fax or email unless the customer requests for the same and should provide necessary information at the time of establishing the contract.*
- *No information related to the results of investigations done in INH shall be passed through telephone by any staff unless the concerned doctor from a hospital / Clinic caller on for emergency treatment and in such situation only the Radiologists shall brief the report to only the calling doctor.*
- *All the staff using, accessing & editing the electronic patient data at various levels are provided with a password to ensure that only authorized persons have access and edit options to staffs.*

- *The password is strictly kept confidential by the employee and the password shall be changed by the concerned person if any suspicion of knowing the password to other staffs.*
- *Any editing of data on papers / work sheets/ registers shall be clearly marked and an initial shall put by the person editing the data and no correction fluid shall be used.*

14. PURPOSE: *The purpose of this procedure is to address the safe disposal of films and other consumables in Radiology department.*

15. SCOPE: *This covers disposal methods for films in the Radiology.*

16. RESPONSIBILITY: *All Radiographers are responsible for implementing the Activities detailed out in this procedure.*

17. PROCEDURE:

Radiology wastes are disposed as mentioned below:

17.1 *General Wastes are discarded into the dust bin lined with prescribed polythene bag.*

17.2 *The Department is having CR Digital System. Therefore there will not be any processing chemicals waste generated.*

17.3 *X-ray film is disposed of as solid waste.*

17.4 *The department does not handle any radioactive isotopes and any other hazardous material. It provides only the diagnostic services.*

18. PURPOSE: *The purpose of this procedure is to address the critical alert findings in Radiology Department.*

19. SCOPE: *This covers the reporting of critical alert findings in the Radiology department*

20. RESPONSIBILITY: *All radiologists are responsible for implementing the activities detailed out in this procedure***.**

21. PROCEDURE:

1.1 Critical alert findings are imaging study results that indicate a life-threatening situation for the patients where immediate medical intervention is required, these reports must be communicated immediately and delivered to a clinician in charge immediately.

1.2 In cases of emergency the communication of imaging findings that may need action immediately are to documented in the patient case sheet with details of the named clinician contacted when emergency action is required as soon as possible.

1.3 INH ensures that radiological imaging report of all patients are communicated to and received by the clinician in charge where necessary action is taken in a manner appropriate to their clinical urgency.

1.4 INH ensures that the reporting radiologist marks a report urgent for unexpected or urgent findings at the time of reporting.

1.5 Documentation of the ID of the person that the findings were given to along with the date and time on the report form is done.

1.6 Ensure that the Imaging service personnel delivers the radiology report and receives the signature from the person who receives the report

1.7 Radiology department maintains critical report register (INH/RAD/R/18) including all of the above mentioned details.

2 **INTERFACE:** *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-9(g), NABH Standards requirements-4th Edition-Dec 2015*

22. PURPOSE: *To address the laws applicable to Imaging Services.*

23. SCOPE: *AERB, BARC GUIDELINES.*

24. RESPONSIBILITY : *RSO*

25. PROCEDURE: *Acts, Rules and Surveillance Procedures Related to Radiation Protection in Medicine in India.*

25.1 *Atomic Energy Act, 1962(4).*

25.2 *Radiation Protection Rules, 1971(5).*

25.3 *Constitution of Atomic Energy Regulatory Board, 1983*

25.4 *Safe Disposal of Radioactive Waste Rules, 1987(6)*

25.5 *Radiation Surveillance Procedures for Safe Transport of Radioactive Materials, 1987(7).*

25.6 *Radiation Surveillance Procedures for Medical Applications of Radiation, 1989(8).*

25.7 *Pre-natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, 1994.*

26. INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-9 (a), NABH Standards requirements-4th Edition-Dec 2015.*

1. **PURPOSE:** *The purpose of this procedure is to ensure the recall at all levels, whenever there is a particular report, withdrawal from clinical area/ Medical records.*

2. **SCOPE***:*

2.1. *These guidelines are applicable to all quality defective test/test report.*

2.2. *These guidelines are expected to be followed by Radiology in charge and the recall could be voluntary or a error is reported*

2.3. *The procedure may also be used by Clinician when urgent action is required to protect patient health.*

2.4. *These guidelines would help in adapting to stepwise procedures to be followed in recall strategy and also help in recall evaluation at every level and achieve compliance within the time frame.*

3. DEFINITIONS:

3.1. **Recall:** *Removal or correction of Radiology Report for the reasons relating to deficiencies in Reporting quality, Typographical error, Machine error, incomplete examination, inadequate coverage of the area of interest , protocoling errors , poor imaging quality, absence of additional imaging to clarify a finding, insufficient contrast visualization, and incorrect patient information.*

3.2. **Voluntary Recall:** *A recall initiated by the Radiology oratory In-charge /Clinician as a result of abnormal observation in any test result with no clinical co-relation*

4. PROCEDURE:

FOR RAPID ALERT & RECALL SYSTEM*:*

4.1. *As soon as the individual report/batch(es) of report to be recalled is/are identified, Radiologist/Radiology in-charge shall review the information related to the defective individual report/batch(es) and decide about recall as per the procedure established.*

4.2. *The decision on recall of the defective individual report /batch shall be made within 24 Hours up to maximum of 72 Hours upon receipt of the intimation.*

4.3. *Within 24 Hours of the decision taken for the recall of the individual report /batch(es) the communication shall be sent stating the severity of the error in using the fastest mode of communication which may include email, telephone, SMS etc to the Concern people /department who use the test report which includes Doctor, Nurses, and Patient.*

4.4. *In case patient report has only typing error new report are typed and verified and final amended report released for Hospital and patient use.*

4.5. *In case the reporting error are due the machine fault the machines are repaired and calibrated and re test done on patient and reports are verified for its accuracy and then released.*

4.6. *Once the amended reports are released the old reports are removed from Case sheet and from Medical record.*

4.7. *In case the report is delivered to OPD patient he is informed over phone regarding the error in the report and new reports are handed to them.*

5. INTERFACE: *This procedure is with reference to Chapter 1- Access, Assessment and Continuity of Care, AAC-09 (i), NABH Standards requirements-4th Edition-D*