

CERTIFIED FELLOWSHIP IN CANCER IMAGING

[Syllabus Approved by Board of Studies, Medical & Health Sciences]

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|-------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------|
| Programme Code | : | HLTH14A03 |
| Programme Details | : | 2-YEARS HBNI CERTIFIED FELLOWSHIP IN CANCER IMAGING |
| Programme Learning Outcomes (PLOs / PSOs) | : | MENTIONED [COMMON FOR ALL 2 YRS HBNI CERTIFIED FELLOWSHIPS OFFERED AT TMC] |
| Eligibility Criteria | : | MD (RADIO-DIAGNOSIS) OR EQUIVALENT PG DEGREE WITH 1- YEAR EXPERIENCE. |
| Duration of the Course | : | 2 YEARS |
| Programme Structure (Credit-Based) | : | NA |
| Detailed Course Syllabus | : | ATTACHED |
| Teaching–Learning Methodologies | : | 2 YEARS PROGRAM |
| Examination & Evaluation System | : | ANNUAL APPRAISAL FOLLOWED BY UNIVERSITY FINAL EXAMINATION |
| Internship / Project / Dissertation Guidelines | : | NA |
| Program In Charge | : | PROF. SUYASH KULKARNI (suyashkulkarnitmh@gmail.com) |

CERTIFIED FELLOWSHIP (CANCER IMAGING)

Programme Code: HLTH14A03

Programme Outcome:

- The HBNI Fellowship Programmes at Tata Memorial Centre are designed to develop competent, ethical, and academically oriented healthcare professionals with advanced knowledge and skills in their respective specialties and subspecialties.
- At the completion of the fellowship, candidates are expected to demonstrate excellence in clinical practice, patient-centered care, multidisciplinary teamwork, communication, professionalism, and evidence-based decision-making.
- Fellows shall acquire the ability to independently evaluate, diagnose, plan, and manage patients while adhering to institutional protocols, quality standards, patient safety practices, and ethical principles in healthcare delivery.
- The fellowship programmes also aim to foster academic growth, research aptitude, lifelong learning, and leadership qualities among trainees.
- Fellows are expected to actively participate in teaching, seminars, journal clubs, conferences, audits, and research activities, thereby contributing to the advancement of medical science and institutional development.
- Upon successful completion of the programme, the fellow should be capable of functioning independently as a skilled specialist/subspecialist with competence in clinical services, academics, research, and collaborative healthcare practice in tertiary care and oncology-focused settings.

DETAILED SYLLABUS

▪ **Background:**

An explosion has occurred in the imaging-related technologies that support cancer diagnosis and image guided tumor therapy. Increasing imaging sensitivity is allowing earlier detection of most solid neoplasms, and more precise assessment of therapeutic response. Strategies for determining tumor volume, capabilities for functional and molecular imaging, and improved databases utilization are impacting our understanding of tumor biology while contributing to optimized patient care.

The Tata Memorial Centre (Tata Memorial Hospital & Cancer Research Institute) is the national comprehensive cancer centre for the prevention, treatment, education and research in Cancer and is recognized as one of the leading cancer centres in this part of the world. The Tata Memorial Centre is a recognized training centre for cancer education and research by national and international organizations such as WHO, IAEA and UICC. It's an eminent centre in diagnosis and management of cancers of all sites, across the age groups. It has one of the nation's largest clinical trials programs with approximately many clinical trials currently in effect. Here we follow, 'Evidence Based Medicine' focused and site specific approach by designated members of site specific working groups. The TMC and the Department of Radiology offer a unique setting for this effort. Hence TMC is ideal institute for learning the basis and advances in cancer diagnosis and management.

In response to these opportunities, a Fellowship in Cancer Imaging has been implemented which will be to provide post-residency training that will more effectively translate advances in imaging technology to cancer patient management. This fellowship program is designed to train experts in the management of cancer with specific focus on clinical management, research skills and critical evaluation of data, in an interdisciplinary academic setting at the TMC.

▪ **Equipment and resources:**

State-of-the-art equipment includes 16-slice and 4-slice CT, 3-T and 1.5-T MRI, PET/CT, Digital Radiography, US, Color Doppler, Digital Mammography, Fully equipped DSA lab, Radiofrequency Ablator and Gamma Camera systems. The TMC also serves as a core imaging analysis laboratory for imaging studies performed in the context of local, national, and global

clinical trials, and has a dedicated research institute , ACTREC which oversee all pre-clinical and clinical imaging research performed at the TMC.

▪ **Program Content:**

During this Fellowship a trainee will gain practical expertise, and will become proficient in conventional and developing technologies of cross sectional imaging and nuclear medicine as they relate to detecting, to staging, and to evaluating therapeutic efficacy. The Fellow will also be trained in image guided diagnostic and therapeutic procedures. Expertise in image-guided biopsies of all neoplasms will be gained. The fellow will learn the interventional techniques of abdominal and thoracic radiofrequency ablations, chemoembolization, of persistent hepatic artery and portal vein infusion ports and venous and arterial infusion port placement.

There will be a great deal of flexibility in prospectively defining each individual's program of training, with effort made to match the interests, capabilities and career aspirations of the selected candidate.

▪ **Specific Objectives:**

1. The fellow will have rotation exposure to all site-specific diagnostic groups.
2. The fellow will have the opportunity to interpret and perform all studies under the supervision of the staff radiologists.
3. The fellow will serve as an active member of the Radiology Department, providing appropriate diagnosis and consultations with the referring clinical services.
4. The fellow will assist in the teaching of residents and elective students, during their weekly rotation assignments and will contribute to resident rounds, as scheduled.

▪ **Fellowship Make Up:**

• **Didactic coursework:**

This will include a core course in Cancer Imaging Science and an additional course in a specific focus area defined by the trainee.

• **Research and Teaching:**

Research in Onco-radiology will be encouraged. The fellow will be given 1 day each week for research, and can be given more time based upon the project and his/her interest. At least one

research project with preparation of a manuscript for submission has to be submitted. Minimum of two publications by the end of fellowship is a must.

The fellow will have the opportunity to teach residents. The fellow will be expected to give two one-hour noon conferences to the radiology residents as part of their fellowship training.

- **TMC Joint Clinics/ Conference Participation/ Journal club:**

Fellow will meet weekly to discuss the latest findings in cancer imaging and present at Joint Clinics/ Tumor Boards. Each fellow will be expected to read one current paper per week to be presented in brief, as well as 3 to 4 in-depth presentations per year. Opportunities include one-on-one instruction at readouts, and preparing and giving conferences (multidisciplinary and/or didactic).

- **Oncologic Imaging Emphasis:**

- Approximately 75% of the fellowship entails Body Imaging including MRI (25%), CT (20%), US & Doppler (20%) and Conventional Imaging (10%).
 - Approximately 15% of the time will include dedicated Onco-Intervention.
 - Approximately 10% of the time is divided between Nuclear Oncology.
 - Approximately 5% of the time will be dedicated in Mammography.
 - Approximately 5% of the time Oncoradiology Fellowship is designated elective time.
1. One - Two months of Clinical Cross Sectional Oncology Imaging using CT and MR; including Breast imaging, Chest, GI, GU, MSK, Neuroradiology, and Pediatric Radiology. Including Advanced CT imaging, Image processing volumetrics, MRI, including dynamic enhanced MRI and breast MRI.
 2. Two months on PET and Nuclear Medicine with Radionuclide based therapies.
 3. Four months of Interventional Radiology with an emphasis on Interventional Oncology (chemoembolization, Oncology related bland embolization, central venous/hepatic artery/portal vein infusion ports, biliary interventions, uterine artery embolization).
 4. One month of Body/Thoracic Biopsies, FNAC's and aspirations).
 5. One month elective.

▪ **Knowledge Based Objectives At the end of rotation, the fellow should be able to:**

- Understand the classification and pathology of tumors. Recognize the staging of common malignancies, as defined by imaging.
- Recognize various patterns of metastatic spread and give appropriate differential diagnosis
- Provide a clear and informative written radiologic report, including a precise diagnosis whenever possible, a differential diagnosis when appropriate, and a follow-up recommendation or additional studies when appropriate.
- Recognize the post-surgical appearances following resection of various tumors
- Identify the various complications in oncology related to chemotherapy, radiotherapy, and intervention
- Give appropriate differential diagnoses for treatment-related complications
- Submit the detailed statistical data of the cases reviewed
- Based on his observations, formulate the reporting protocol of the particular system.

▪ **Evaluation (frequency, method of evaluation, and report):**

Oncoradiology Fellows will receive continuous on-site training, teaching and feedback. Evaluations of the trainees will be performed once during the year, by means of a standardized form with comments. The program director will meet with the trainee informally to discuss his or her progress.

POSTING SCHEDULE

| SPECIALITY | DURATION |
|--------------------------------------------------------------------------|------------------|
| Breast (1 month Mammography, 2 months USG/ Doppler) | 3 months |
| Head And Neck (1 month MRI, 1 month CT, 1 month USG/Doppler) | 3 months |
| Thorax (1 month CT, 1 month PET/ SPECT,1 month Conventional) | 3 months |
| GI (2 months Intervention, 1 month CT) | 3 months |
| GU (2 months Intervention, 1 month CT) | 3 months |
| Musculoskeletal (1 months MRI ,1 month PET/ SPECT, 1 month Conventional) | 3 months |
| Neurology (3 months MRI) | 3 months |
| Pediatric (1 month MRI, 1 month USG/Doppler , 1 month Elective) | 3 months |
| TOTAL | 24 months |

POSTING SCHEDULE

| MODALITY | Duration |
|-------------------|------------------|
| MRI | 6 months |
| CT | 4 months |
| USG/ DOPPLER | 4 months |
| CONVENTIONAL | 2 months |
| ONCO-INTERVENTION | 4 months |
| PET/ SPECT | 2 months |
| MAMMOGRAPHY | 1 month |
| ELECTIVE | 1 month |
| TOTAL | 24 months |