CERTIFIED FELLOWSHIP IN PULMONARY ONCOLOGY

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

Programme Code	:	HLTH14A20
Programme Details	:	2-YEARS HBNI CERTIFIED FELLOWWSHIP IN PULMONARY ONCOLOGY
Programme Learning Outcomes (PLOs / PSOs)	:	MENTIONED [COMMON FOR ALL 2 YRS HBNI CERTIFIED FELLOWSHIPS OFFERED AT TMC]
Eligibility Criteria	:	MD/DNB IN (RESPIRATORY MEDICINE), (PULMONARY MEDICINE) OR DM (PULMONARY MEDICINE).
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. SANDEEP TONDON (***sptandon@gmail.com)***

CERTIFIED FELLOWSHIP (PULMONARY ONCOLOGY)

Programme Code: HLTH14A20

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:**

We recommend the following 4 publications to understand this field and its scope and necessity

- Laniado I, Velez A, Sterman DH. Onco-Pulmonology: Exploring a New Frontier in Pulmonary Medicine. Current Pulmonology Reports. 2024 Feb 21:1-5.
- Tandon S, Biraris P, Bhaskar M. Pulmonary Oncology—Scope of the Pulmonologist. Indian Journal of Medical and Paediatric Oncology. 2022 Feb;43(01):029-33.
- Tandon S, Biraris P, Bhaskar M. Pulmonary oncologist—an idea whose time has come?. Indian Journal of Medical and Paediatric Oncology. 2022 Feb;43(01):095-6.
- Dhir AA, Tandon SP, Sawant SP, Bhaskar MA, Daddi AD, Iyer A. Comorbidities in the Cancer Patient. In Tata Memorial Centre Textbook of Oncology 2024 Aug 30 (pp. 1019-1029). Singapore: Springer Nature Singapore.

- **Aims:**

To generate and fulfill the growing unmet need and demand across the country for Pulmonologists trained in Onco-Pulmonology to work as a vital part of a Multi-Disciplinary Lung Cancer Team, as well as diagnosis and management of pulmonary complications arising as a result of all cancers and cancer therapy.

- **Minimum Eligibility Criteria:**

MD/DNB in (Respiratory Medicine), (Pulmonary Medicine) OR DM (Pulmonary Medicine). Candidates awaiting their results may also apply, however shortlisting would be subject to successful completion of the Postgraduate qualifying exam.

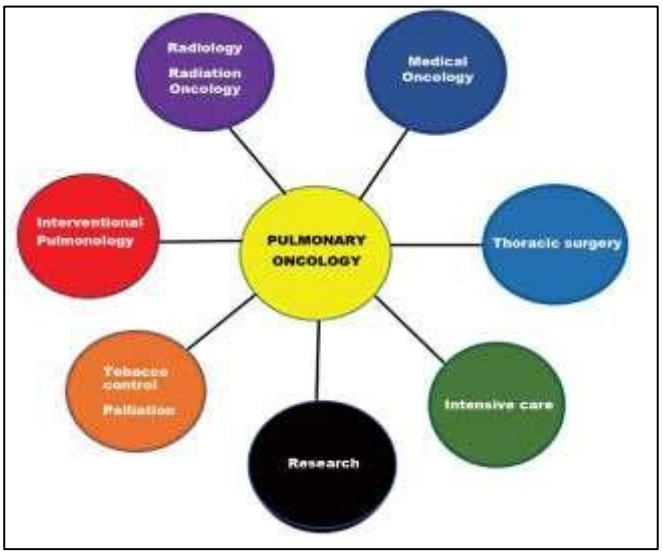
- **Course Duration :** 2 years

- **Academic Course Curriculum**

- The curriculum attempts to not only cover the HERMES ERS Syllabus for Lung Cancer diagnosis, staging and therapy related complications but also cover important issues like immunesuppressive lung infections, paraneoplastic syndromes, management of patients on cancer therapy with respiratory comorbidities, side effects of various cancer therapies and their management, drug interactions on chemotherapy, Tuberculosis and Cancer

management in the cancer patient on cancer therapy, interventional pulmonology, CT Thorax proficiency, Thoracic Ultrasound apSart from the routine pulmonology curriculum reinforcement of pre existing knowledge of the primary MD training.

- The uniqueness of this Fellowship is the fact that the care is not just be limited to lung cancer but the pulmonologist is able to provide comprehensive pulmonary care to every oncologist, every Disease Management Group and every cancer patient in need of pulmonology opinions and management of respiratory issues.

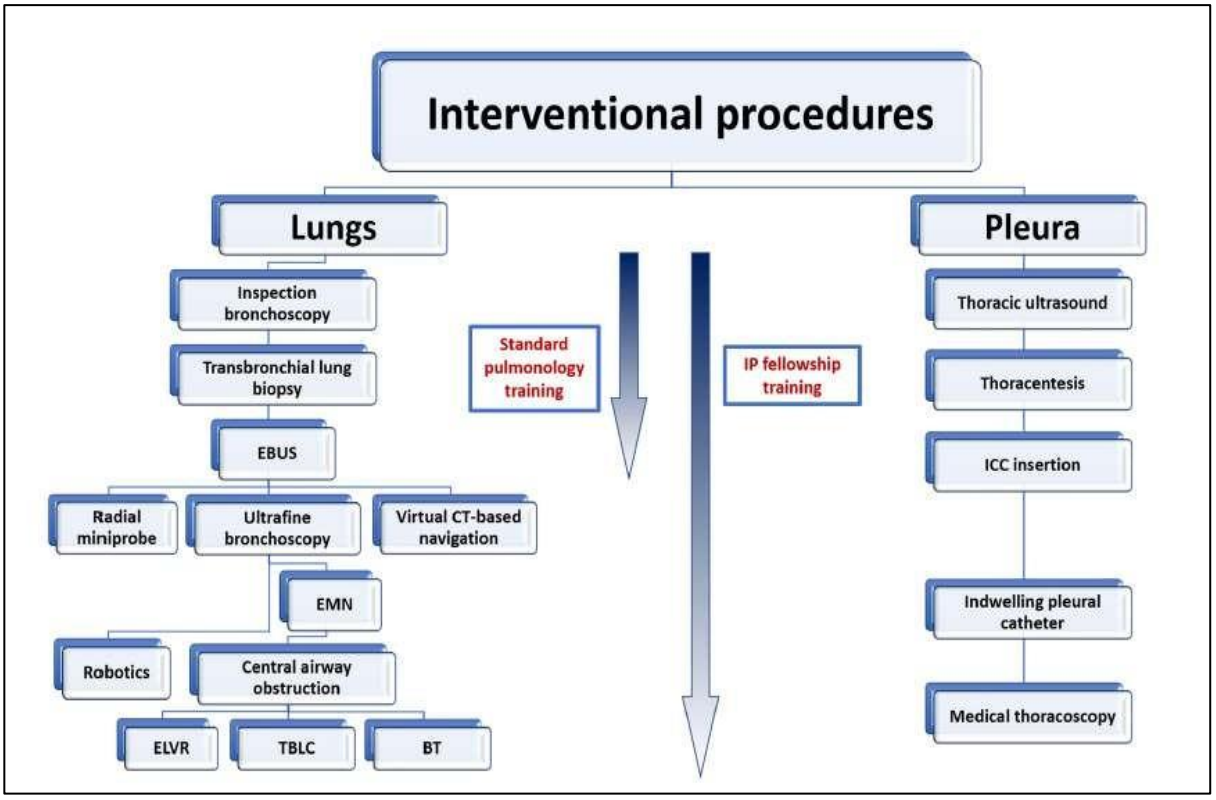


Ref : Tandon S, Biraris P, Bhaskar M. Pulmonary Oncology—Scope of the Pulmonologist. Indian Journal of Medical and Paediatric Oncology. 2022 Feb;43(01):029-33.

Box 1 Thoracic oncology curriculum modules

1 General principles of the biology of thoracic cancers
2 Aetiology and epidemiology
3 Clinical presentations
4 Diagnostic procedures
5 Imaging
6 Diagnostic and interventional bronchoscopy techniques and medical thoracoscopy
7 Clinical and pathological staging
8 Pathology of intrathoracic tumours
9 Prognostic factors/predictive markers
10 Principles of thoracic surgery
11 Management of surgical complications
12 Principles of radiation therapy
13 Principles of systemic therapy
14 Side-effects of systemic therapy and their management
15 Combined modality treatments
16 Management of particular groups of patients
17 Treatment evaluation and follow-up
18 Supportive care
19 Methodologies for clinical practice and research
20 Ethics
21 Cancer-related immunology
22 Quality and economic considerations in lung cancer treatment

(Ref: Gamarra F, Noël J-L, Brunelli A, et al. Thoracic oncology HERMES: European curriculum recommendations for training in thoracic oncology. Breathe 2016;12: 249–255.)



Ref: Colt HG, Williamson JP. Training in interventional pulmonology: what we have learned and a way forward. Respirology.
2020 Sep;25(9):997-1007.

▪ Subject specific practical competencies

- **A. Pulmonary Oncology:**
  - o To evaluate all patients referred to the Pulmonary Medicine OPD in a tertiary Oncology Centre, for respiratory symptoms or radiological abnormalities.
  - o To diagnose and manage pulmonary comorbidities in cancer patients.
  - o Diagnosis and management of pulmonary complications of cancer therapies.
  - o 4. To stage and diagnose Lung Cancer and be well versed, as a Pulmonary Oncologist, with the clinical diagnosis, staging and management of Lung Cancer
  - o Understand the indications and manage complications of chemotherapy and radiotherapy as well as management of Lung Cancer
  - o To diagnose and manage respiratory distress and respiratory failure in critically ill

cancer patients in the ICU

- Diagnosis and management of respiratory Infections in the Immunocompromised Cancer patients including the Bone Marrow Transplant population.
- Train in the indications and interpretation of Thoracic Imaging and Bio-imaging modalities.
- Develop expertise in Interventional Pulmonology procedures like diagnostic and therapeutic adult and pediatric Bronchoscopy, Rigid Bronchoscopy, Medical Thoracoscopy, EBUS and management of Central Airways Obstruction.
- Develop expertise in diagnosis and management of pleural pathologies related to malignancies including diagnostic pleurocentesis, medical thoracoscopy, insertion of intercostal drains, pig-tail catheters and indwelling pleural catheters, pleurodesis
- Develop expertise in Point of Care Ultrasound with special emphasis on Thoracic Ultrasound and Critical Care USG.
- Develop experience and skills in the pre-operative pulmonary evaluation of high risk patients for major lung resection surgery. Understand the principles and role of surgical management of lung cancer and work in tandem with thoracic surgeons in assisting peri-operative respiratory care
- Gain a good understanding and expertise of palliative and pain management of lung cancer and also ethical and end of life issues.
- Candidate should be independently able to counsel patients and relatives and manage all palliative issues related to lung cancer and chronic NCD
- Tobacco cessation.

- **B. Interventional Pulmonology:**

  Candidate will be trained in a number of basic and some advanced interventional pulmonology procedures as hands on and high fidelity simulation based training on virtual reality simulators and manikins followed by supervised hands-on training.

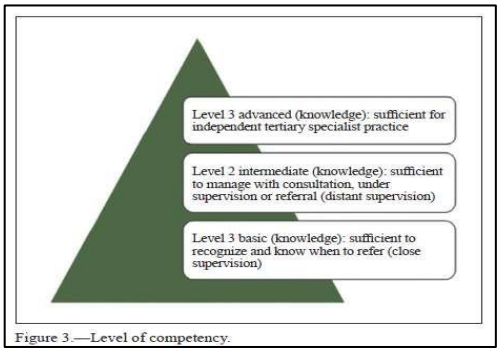


Figure 3.—Level of competency.

Ref: Corbetta L. Training to competence in interventional pulmonology. Panminerva medica. 2019 Sep 1;61(3):201-2

▪ Syllabus / Curriculum for Onco-Pulmonology

(Ref: Gamarra F, Noël J-L, Brunelli A, et al. Thoracic oncology HERMES: European curriculum recommendations for training in thoracic oncology. Breathe 2016;12: 249–255.)

- **General principles of the biology of thoracic cancers:**
  - Carcinogenesis
  - Genetics, tumor suppressor and oncogenic genes and driver mutations in lung cancer
  - Tumor immunology
  - Tumor microenvironments
  - Mechanism involved in metastasis
- **Etiology and epidemiology**
  - Epidemiology of lung cancer, global and in context with Indian subcontinent
  - Tobacco use and lung cancer
  - Asbestos related lung disease and cancers, industrial/occupational carcinogens
  - Air pollution (outdoor and indoor) and lung cancer
  - Chronic pulmonary inflammation and Precancerous/CIS lesions
  - Genetic susceptibility, gene-environment interactions
- **Pathology of intrathoracic tumors**
  - Cytological and biopsy specimens for pathology/molecular analysis
  - Pre-invasive lesions for lung neoplasms
  - Pathology of lung neoplasm
  - Pathological classification and molecular pathology of non-small cell lung cancer
  - Pathology and molecular pathology of neuroendocrine & small cell lung cancer
  - Pathology and molecular pathology of mesothelioma
  - Mediastinal tumors
  - Interpretation of pathological reports
- **Clinical presentations**
  - Signs and symptoms
    - Performance status
  - Syndromes and symptoms of locally advanced lung cancer
  - Airway obstruction

- SVC syndrome, Pancoast tumors
- Pleural and pericardial effusions
- Chest wall involvement
- Lymphangitic spread
- Lymphadenopathy
- Paraneoplastic syndromes
- Metastases
- Co-existing / contributing diseases

- **Skills and Procedures**

  Curriculum for basic and advanced interventional pulmonology procedures in Pulmonary Oncology. Skills in the following diagnostic and operative procedures will be imparted

  - **Flexible bronchoscopy Flexible bronchoscopy and basic biopsy techniques:**
    - endobronchial biopsy, and basic biopsy transbronchial biopsy, TBNA, ROSE, BAL, brushing technique
  - **Endosonographic Interventional endosonography (EBUS, EUS-B):**
    - Mediastinal and hilar lymph node techniques sampling using convex endobronchial ultrasound Image-guided diagnostic bronchoscopy for evaluation of parenchymal opacities, of airway invasion vs compression, and to guide biopsy: fluoroscopy, EBUS-radial probe and cryobiopsy.
  - **ILD:**
    - Cryobiopsy for Interstitial Lung Disease (ILD)
  - **Operative bronchoscopy:**
    - Rigid bronchoscopy with the following associated procedures (assisting):
    - Rigid core and mechanical debulking
    - Endobronchial ablative techniques using one or more of the following devices:
    - Laser, Argon plasma coagulation, Electrocautery, Cryotherapy
    - Placement and removal of endo-bronchial stents
    - Rigid broncho-dilatation
    - Foreign body removal
    - Management of hemoptysis
  - **Pleural procedures:**
    - Medical thoracoscopy with parietal pleural biopsy and pleurodesis
    - Pleural catheter placement (chest tube, small bore catheter, and implantable tunneled catheters)

        - Point of Care Ultrasound
    - **Thoracic Ultrasound:**
        - Thoracic ultrasound to assess and guide interventions in the pleural space
    - **Bronchoscopy in ICU, anesthesiology, and thoracic surgery:**
        - Bronchoscope intubation in difficult airways
        - Management of endotracheal tubes
        - Airway management: Double lumen tubes, laryngeal mask
        - Diagnosis of pulmonary infiltrates, VAP and ARDS in ICU
        - Clinical and surgical staging of lung cancer, Diagnosis and treatment of surgical complications: management of chest drainage, tracheobronchial/esophageal fistula, broncho-pleural/alveolar-pleural fistula
        - ICU bronchoscopy in intubated patients and on Non Invasive Ventilation
    - **Emergency in Interventional Pulmonology**:
        - Bronchoscopic management of massive hemoptysis, foreign body, central airway obstructions and lesions, surgical complications
    - **Paediatric bronchoscopy:**
        - BAL , TBLB
- **Imaging and bio-imaging/ nuclear medicine**
    - Interpretation of Chest radiograph, Computed tomography, PET and PET-CT, Ultrasound, Bone scanning, Magnetic resonance imaging
- **Clinical and pathological staging**
    - TNM description
    - T description
    - N description
    - M description
    - Stage grouping
- **Functional and pre-operative respiratory evaluation**
    - Interpretation of pulmonary function tests, spirometry, diffusion capacity, lung volumes and their role in pre-operative respiratory fitness
    - 6 minute and shuttle walk tests
    - Ventilation –perfusion scan
    - Cardio-pulmonary exercise tests
    - Optimization of respiratory functions pre-operative and management of respiratory co-morbidities

- **Prognostic factors /predictive markers**
  - Clinical and staging
  - Histopathological factors
  - Molecular markers
  - Co-morbidities
- **Principles of thoracic surgery**
  - Oncologic principles of surgery for lung tumors and surgery in the context of multi-modality treatment
  - Indications, contra-indications and pre-operative evaluation for lung cancer surgery
  - Surgical procedures and techniques
  - Peri-operative management of patients undergoing thoracic surgery
  - Management of complications of lung surgery
  - Palliative surgical procedures
  - Surgery for synchronous and metachronous cancers,
  - Surgery for oligo-metastatic lung cancer
  - Diagnostic, curative and palliative surgery for mediastinal tumors
  - Curative and palliative surgery of malignant mesothelioma
  - Pulmonary metastases from other sites and its management
- **Management of surgical complications**
  - Pain control
  - Post-operative pneumonia: diagnosis, treatment and prevention
  - Empyema, space infections and broncho-pleural fistula
  - Prolonged air leak
  - Post- operative bleeding
  - ARDS
  - Cardiac complications
- **Principles of radiation therapy**
  - Radiotherapy planning and techniques
  - Indications and contraindications for radiotherapy
  - Thoracic radiotherapy with curative intent for lung cancer
  - Thoracic palliative radiotherapy
  - Prophylactic, therapeutic and palliative cranial irradiation
  - Stereotactic ablative radiosurgery
  - Palliative radiotherapy for other metastatic sites

- Management of pulmonary side-effects of radiation therapy

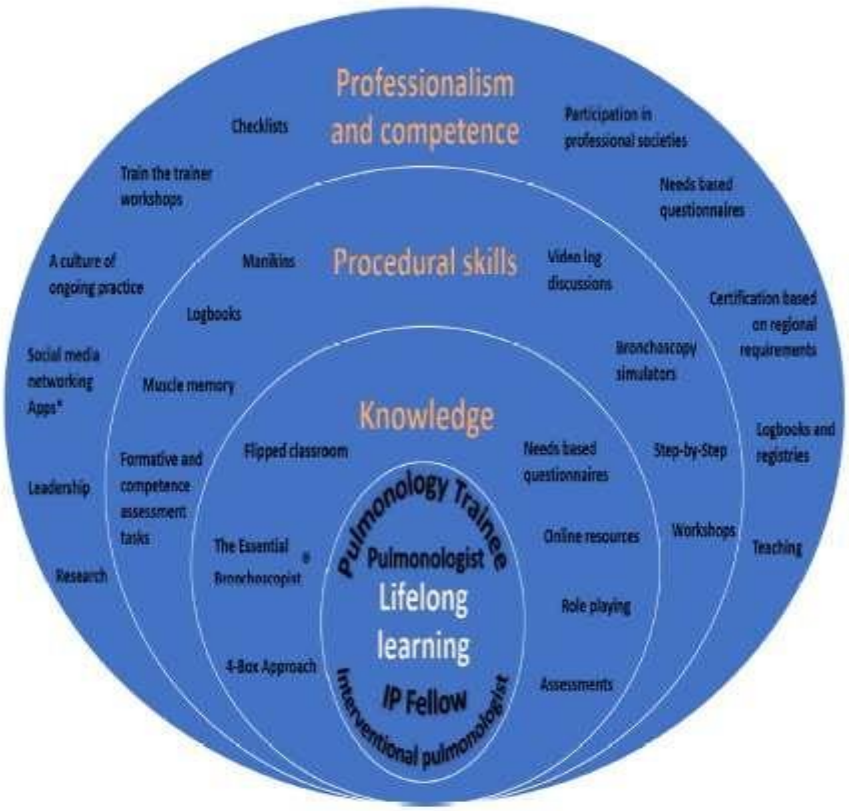
- **Principles of systemic therapy**
  - Basis and principles of cytotoxic and biological therapy for lung cancer
  - Indications and contraindications for systemic therapy including chemotherapy & targeted agents
  - Chemotherapy and immuno / targeted therapy for NSCLC
  - Chemotherapy and immuno/targeted therapy for SCLC
  - Systemic therapy of mesothelioma
  - Systemic therapy for mediastinal tumours
  - Newer/novel agents
- **Side-effects of systemic therapy and their management**
  - Side- effects of chemotherapy for lung cancer
  - Side effects of targeted agents
  - Quantification of side –effects and their management
  - Diagnosis and management of pulmonary complications of chemotherapy/targeted therapy in patients with cancers other than lung
- **Opportunistic infections**
  - Symptomatology and clinical and radiological presentations of pulmonary opportunistic infections in the immunocompromised host in relation to cancer and cancer therapy
  - Performance and interpretation of diagnostic tests for opportunistic respiratory infections
  - Treatment and management of respiratory infections in lung and other cancer patients
- **Combined modality treatments**
  - Adjuvant chemotherapy for early NSCLC
  - Neo-adjuvant chemotherapy for early NSCLC
  - Combined radio-chemotherapy for locally advanced NSCLC
  - Combined radio-chemotherapy for limited SCLC
  - Combined treatment for mesothelioma
- **Management of particular groups of patients**
  - elderly
  - poor performance status
  - co-morbidities
  - co-existent HIV infection
  - Pre-cancerous and pre-invasive lesions

- **Treatment evaluation and follow-up of Solitary Pulmonary Nodule**
  - definition and radiological features
  - Evaluation, diagnostic and risk algorithm
  - Management of SPN
- **Treatment evaluation and follow up**
  - Survival/progression-free survival
  - Response assessment
  - Quality of life/symptom improvement
  - Follow up protocols
- **Management of specific condition in lung cancer**
  - Management of dyspnoea and respiratory failure
  - Management of malignant airway obstruction
  - Management of superior vena cava syndrome
  - Management of paraneoplastic syndrome
  - Malignant pleural effusion
  - Malignant pericardial effusion
  - Management of bone metastases
- **Supportive care**
  - Pain management
  - Nutritional support.
  - Indications and management of intravascular catheters
  - Psychological support for the patient and family
  - Rehabilitation
  - End-of-life care
  - Communicating with the patient
  - Patient education
- **Intensive care**
  - Management of the critically ill lung cancer patient
  - Assessment, diagnosis and management of respiratory conditions requiring critical care support in cancer patients
- **Preventive pulmonary oncology**
  - Tobacco awareness, patient education and Tobacco cessation clinics
  - Industrial and occupational health and safety
- **Methodologies for clinical practice and research**

- Study design and phases
- Statistical analysis
- Evidence based decision
- Guidelines assessment and application

- **Ethics**
  - Ethical issues and conflicts of interest
- **Economic considerations in lung cancer treatment**
  - Quality-adjusted life-year (QALY)
  - Principles of cost-effectiveness of chemotherapy, targeted therapy, surgical therapy and radiotherapy c. Cancer registries
- **Primary Palliative Care for Pulmonologists**
- **All relevant respiratory issues relevant to cancer therapy**
- **Respiratory comorbidities and cancer**
- **Tuberculosis and Cancer Therapy**

Teaching and Learning Methods



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THEORETICAL/PRACTICAL TRAINING METHODS IN INTERVENTIONAL PULMONOLOGY
• Handbooks and atlases on the mediastinal anatomy, including instructions on tissue sampling procedures
• Theoretical lessons (using Flipped classroom and Case discussion methods) on: indications, contraindications, instrumentarium, organization of the endoscopy room, description of procedures
• Live sessions
• e-learning and e-mobile learning: Multimedia resources
• Theoretical/practical course on methods organized in the centres that implement the methods being taught and which can offer trainees practice on simulator systems
• Training supported by virtual reality simulation on: knowledge of anatomy, acquiring manual dexterity in bronchoscopy and tissue sampling procedures, examination of clinical cases (GI BronchMentor, BronchPilot i-Pad, Simbionix Express, EndoVR Accurate, Ultrasonic Bronchoscopy Simulator)
• Use of manikins and plastic models in simulating procedures in order to learn and improve coordination (using video systems for tutoring and the most recent disposable bronchoscopes)
• Simulation on artificial lymph nodes
• Simulation on animal models in vivo or on individual organs, such as porcine lung, fresh, frozen or preserved under plastic lamination.
• Training on patients under supervision, until trainees have achieved both quantitative and qualitative competency
• Attending sessions in the endoscopy room
• Continuing education by means of national and international publications
• Online training
• Taking part in clinical risk audits

Ref: Arru L, alla Salute A, Sardegna R, Bosio G, Pneumologia UO, di Cremona IO, Calabro S, di Pneumologia SC, del Grappa OD, Candoli P, Pesaro UP. Consensus Conference on “Training and

Competence Standards in Interventional Pulmonology".

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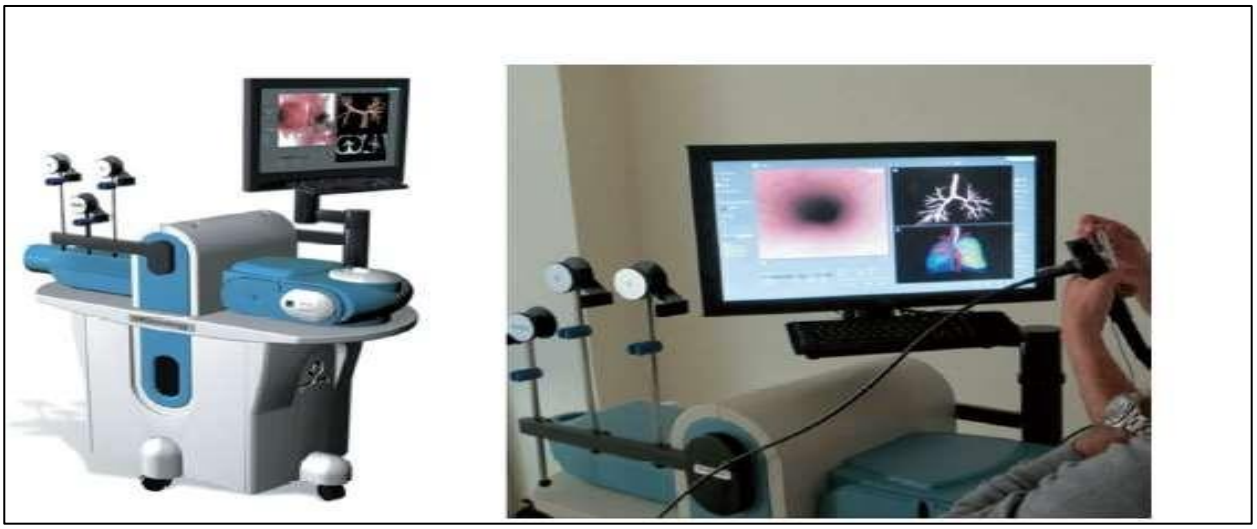

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Methods of Training

- Teaching and learning methodology given below includes but not limited to Lecture, discussion, student directed learning and Case Based Learning.
  - 1. Clinical Case Discussion
  - 2. Morbidity-Mortality Discussion
  - 3. Audit presentation
  - 4. Lectures, Seminars and Journal Clubs
  - 5. Presentation of progress report on the research projects
  - 6. Pulmonology Simulation Laboratory
  - 7. Joint inter-departmental academic meets
  - 8. Departmental Clinical Meetings, Grand Rounds and Clinico-Pathological Meetings
  - 9. Multi-departmental Combined Grand Rounds / Joint Academic Activities of the Institution

- Every candidate will be expected to read and discuss with seniors about cases seen in OPD, Wards and ICU in the form of the Pulmonary Medicine MDTs or Joint Clinics (JCs). Such discussions will form the basis of practical teaching rather than solely a theoretical knowledge.
- Every candidate will be required to participate in the teaching and training programme of junior trainees, senior residents, fellows and observers.
- They would also attend the relevant topics of Thoracic Oncology DMG academic lectures conducted by the various Departments or specialities for their trainees.
- Procedural skills will be imparted through demonstration, simulation, manikins followed by assisting with seniors, supervised procedures and then independent procedures.
- The Pulmonology Simulation Lab would be a necessary part of their training with training being imparted on the Symbionix BronchMentor as well as various manikins like AirSim Advance Bronchi
- X, Bronchboy etc as featured in the photos above which are all available at Tata Memorial Centre Pulmonary Medicine Department.
- Clinical teaching in OPD, ward rounds, during diagnostic and therapeutic procedures
- A trainee for the course in Onco-Pulmonology would be encouraged to present at least one abstract at a National or International Conference and at least one paper to be submitted for publication during the period of the Fellowship programme.

- The trainee would be encouraged to additionally enroll and self-learn by e-learning teaching modules and courses on various other supportive aspects of Oncology like Palliative Care, Pain management,
- Good Clinical Practice, Clinical Research Methodology etc as also training modules of reputed Pulmonary Medicine Societies like ACCP, ERS etc

Monitoring progress of studies:

- Work diary / Log Book: Trainees shall maintain a prospective log book of the work carried out by them and the training programme undergone during the period of training including details of procedures attended and observed, assisted or done independently or under supervision.
- Log book shall be checked and assessed periodically by the faculty members imparting the training.

Assessment

Assessment shall be carried by supervising faculty with focus on:

- Acquisition and application of knowledge and skills
- Clinical reasoning and judgment in uncertain situations
- Problem solving skills - Situation/Problem Based Learning
- Skill development for diagnostic and therapeutic procedures

Formative Assessment

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system. It may be carried out but does not carry weightage.

- **General Principles**

  Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

  Trainees will be evaluated continuously for their performance in all areas such as clinical and investigative work, case presentations, seminars, journal clubs, procedures etc.

- **Periodic Assessments and Grading**

  Every 3 months, there will be a review of student progress in the form of Student-Thoracic

DMG representative interaction to ascertain if the quarterly Fellowship teaching and learning goals have been achieved to satisfaction.

Every 6 months there will be a formal assessment in the form of case discussions and a viva will be conducted by TMC faculty to assess student academic progress and logbook scrutinised. A formal evaluation and grading will be done.

At the end of the first year a written examination with a Viva would be conducted by TMC faculty for progress assessment.

These 6 monthly evaluations will be considered as internal assessment and will be proportionately incorporated in the final grading at the exit exam constituting 20 % of the same.

The final fellowship certification will be issued after the successful completion of a theory and practical exit exam conducted at the end of 2 years and final scores would carry 80% weightage and remaining 20% would be internal assessment based as mentioned above. A minimum score of 50% in the theory paper as well as a minimum 50% in the viva/practical would be essential to be declared successful in the examination. External examiner (s) would be invited for the assessment.