The Arab League
Council of Arab Health Ministers
The Arab Board of Health Specializations
General Secretariat

جامعة الدول العربية
مجلس وزراء الصحة العرب
المجلس العربي للاختصاصات الصحية
الأمانة العامة

المجلس العلمي للأمراض الباطنة

Scientific Council of Internal Medicine

دليل اختصاص أمراض الجهاز التنفسي

Guidebook of Respiratory Medicine

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Scientific Council of Internal Medicine
Arab Board Fellowship in Respiratory Medicine
Fellowship Program

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شروط التسجيل

- أن يكون الطبيب حاصلاً على شهادة المجلس العربي في الأمراض الباطنية العامة أو ما يعادلها من البوردات المحلية والشهادات الأخرى.
- مدة التدريب ثلاث سنوات.

شكل الامتحان:

يتكون من:

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Overview

With the rapid development of health care in the region, there is an increasing demand for qualified respiratory physicians. The pulmonologist has to be highly specialized physician qualified through well-structured fellowship programs, enabling him/her to provide continuous, safe, effective care for patients suffering from respiratory problems.
The Respiratory Medicine Fellowship Program is a structured postgraduate training program that will help fulfill the regional needs for trained physicians in this field. This program is designed to prepare physicians for practicing competently and independently in Respiratory Medicine.
The purpose of the Respiratory Medicine Fellowship Program is to enable trainees to gain access to structured training and in active clinical environments, with a view to enhancing and improving the individual's medical training and learning and, in the medium to long term, the health services in their society.
The program will teach the trainees the fundamental skills, knowledge, and humanistic qualities inherent to Respiratory Medicine practice and provides progressive responsibility and experience in the application of these principles to enable effective management of clinical problems.
Equal opportunities must be provided to trainees, under the guidance and supervision of qualified faculties, to develop an excellent level of clinical maturity, judgment, and technical skills, upon completion of this program.

Competencies:

After the completion of this program trainees should be capable of practicing Respiratory Medicine, learning new skills and gaining knowledge during their training program, and monitoring both patient's physical and mental well-being.
The Respiratory Medicine should be considered as sub-specialty of Internal Medicine.
The Respiratory Fellowship program should utilize all resources which presently reside at each recognized center.
This fellowship program in adult respiratory medicine has the aim to define the educational objectives, the body of knowledge and practical skills required by physicians specializing in this subspecialty.
The core program is centered in a medical department / respiratory division, Medical Intensive Care Unit, Outpatient Respiratory (Ambulatory) Clinics, inpatient services and Emergency Room.
Medical knowledge in the basic biomedical, behavioral and clinical sciences, medical ethics and medical jurisprudence and application of such knowledge in patient care.

Professionalism

Medical professionalism is a core element of being a good doctor. Good medical practice is based on a relationship of trust between profession and society, in which doctors are expected to meet the highest standards of professional practice and behavior. It involves partnership between patient and doctor that is based on mutual respect, confidentiality, honesty, responsibility and accountability.

e-Portfolio logbook

Each trainee is responsible for maintaining an up-to-date record of progress through training and compiling a portfolio of achievements for presentation at each annual assessment review. The trainee also has a duty to maximize opportunities to learn, supplementing the training offered with additional self-directed learning in order to fulfill all the educational goals of the curriculum.

The training records will be countersigned as appropriate by the trainers to confirm the satisfactory fulfillment of the required training experience and the acquisition of the competencies set out in the training plan. They will remain the property of the trainee and must be produced at their assessment review.

Rotations

The core rotations are in:

- Respiratory Clinic.
- Bronchoscopy unit.
- Medical floor.
- Medical intensive care unit (MICU).
- Sleep Laboratory.
- Pulmonary Physiology laboratory and respiratory therapy.
- Respiratory Consultations.
- Clinical Imaging.
- ENT and Thoracic surgery.
- Electives in: Pathology, Echocardiography

Objectives

The goals of this fellowship program are:

- To provide an educational environment optimized for the development of clinician basic science leaders in respiratory medicine.
- To allow trainees to build mastery in diagnosis and management of complex problems in patients with acute and chronic respiratory diseases.
- To allow trainees to acquire an appreciation for the depth and breadth of the specialty of respiratory medicine including:
  1. Scientific principles.
  2. Medico-legal issues.
  3. Ethical dilemmas.
  4. Administrative duties.
  5. Education responsibilities.
- To gain basic principles of research study design and statistical analysis and provide trainees with clinical and basic science research opportunities.
- To develop effective skills in handling various electronic medical informatics and related tools.

PROGRAM STRUCTURE

Admission Requirements

The following requirements must be fulfilled by all candidates accepted into the training program:

1. All candidates must hold a medical degree such as an M.B.B.S. or its equivalent from a university recognized by the training program.
2. All candidates must have completed 12-month rotating internship.
3. All candidates must have a License (permanent or temporary) to practice medicine in the country of the training center.
4. All candidates must hold Arab Board Certificate in internal medicine or equivalent qualification in internal medicine from other approved boards.
5. For those who hold local subspecialty in respiratory medicine without holding internal medicine board certificate**,** should be studied separately by the respiratory committee in the Arab Board.
6. All candidates must provide a comprehensive CV with references from two (2) consultants, preferably from the field of Respiratory Medicine, who should provide recommendation letters stating the suitability of the candidate for training in respiratory medicine.
7. All candidates must be registered as training in respiratory medicine at the Arab Council for Health Specializations (Arab Board).
8. All candidates must have certificate in advanced cardiac life support**,** if they don't have**,** the training center should conduct similar training course.

General Training Requirements

1. Trainees shall abide by the training regulations and obligations set by the training center and Arab Board council for health specialties (ACHS).
2. Training is a full-time commitment. Trainee will be enrolled in full-time, continuous training throughout the program's duration.
3. Training is to be conducted at a recognized hospital by the ACHS, which is accredited for training in Respiratory Medicine.
4. The training will comprehensively cover the specialties related to Respiratory Medicine.
5. Trainees should be actively involved in patient care with gradual progressive responsibility.

Structure of the Training Program

1. The program is a 3-year (36-month) postgraduate structured training program in Respiratory Medicine and is divided into two parts:
Junior Fellows (the 1st 18 months) and (2nd 18 months) as senior Fellows.
2. The junior fellowship period (1st 18 months) is designed to provide training in basic respiratory physiology, respiratory clinics, medical floor and provides elective rotations inside and outside the respiratory practice.
3. The senior fellowship period is designed to provide training in bronchoscopy, respiratory consultation, sleep medicine unit, respiratory clinics and other related rotations.
4. Research activities can be practiced throughout the training period.

Rotations:

1st 18 months	Rotations	Duration
	Medical floor -Respiratory Medicine	**8 months**
	Respiratory OPD, Consultation.	**3 months**
	Annual leave	**one month**
	Basic thoracic radiology	**one month**
	Critical care medicine	**2 months**
	Sleep medicine and pulmonary function lab	**one month**
	ENT, Thoracic surgery	**one month**
	Respiratory therapy	**one month**
2nd 18 months	**Rotations**	**Duration**
	Medical Respiratory floor	**8 months**
	Annual leave	**one month**
	Critical care medicine	**2 months**
	Multi-disciplinary sessions in radiology, pathology and rheumatology	**one month**
	Respiratory OPD, Consultation, interventional bronchoscopy	**3 months**
	Sleep medicine management	**one month**
	Pulmonary HTN clinic, Echocardiography	**one month**
	Annual leave	**one month**

Curriculum:

Formal educational program includes:

- Lectures or Seminars series that covers an extensive list of respiratory medicine topics related to:
    1. Respiratory Physiology.
    2. Respiratory Pharmacology.
    3. Respiratory diseases patients' management.
    4. Pulmonary function testing.
    5. Chest radiology.
    6. Sleep Medicine and sleep studies scoring and interpretation.
    7. Pleural tap and biopsies.
    8. Diagnostic plus some therapeutic bronchoscopies.
    9. Monthly performance improvement (formative assessment).
    10. Clinical research forums.
    11. Multidisciplinary case conferences in internal medicine to further enhance the educational environment.
    12. Respiratory clinic training and teaching.
    13. Teaching rounds.
    14. Respiratory case discussion seminars.

Research:

Candidates participating in this program should have a strong interest in clinical or basic science research. The involvement of the candidates in the respiratory research team should be mandated.

Application Process:

- Candidates may apply at any time at the recognized centers for this training program, in accordance with Arab Board regulations.
- The program in all recognized centers for the training should preferably start at the 1st July each year.

Initial steps for candidates interested in applying are as follows:

- Complete the respiratory medicine Fellowship Application Form (RMF) provided by the training center.
- Submission of the application (electronic copies and hard copies are accepted) and the following supporting documents to the Respiratory Medicine Fellowship program:
    - Current photograph (passport size or similar)
    - Current curriculum vitae
    - Copy of all certificates needed for registration and program entry.
- All applications for Respiratory fellowship program in Arab Board should be provided by the recognized centers and should include all the documents needed for registration including registration fees.

Evaluation

- Candidates are required to satisfactorily complete the allocated rotations for each year and pass the end-of-year evaluation before proceeding from one year to the next.
- The recognized training center is responsible for the end year evaluation.
- The sequence of rotations will be determined by the training committee and the Program Director in the recognized centers for the training program.

After successfully completing all 3 years of training, the Arab Board will conduct the final examination.

The exam should include:

Final written exam (one paper) include: 100 (80 single best multiple answer choices, 20 Slides).

- The pass mark of the exam is 60% or more.
- Durations exam three hours.
- Candidates who pass the final written exam are eligible to enter the clinical exam.

The clinical exam should include:

- One long case, one short case and two data interpretation stations.
- The clinical exam has the form of objective structured exam.
- To pass the exam the candidate should:
  Score pass mark of 60% or more and should pass at least three out of four stations.

Stations	CPA	Clinical skills	Data interpretation I	Data interpretation II
Weight (%)	40	20	20	20
Time (minutes)	20	10	10	10

Passing the OSCE exam will depend on scoring a total of 60% or more as well as passing at least three out of four stations.

Candidates to be eligible for certification as specialist in Respiratory Medicine should meet all the following requirements:

1. Successful completion of training.
2. Passing the final written exam.
3. Passing the clinical exam.
4. The candidate published at least one paper either as principal investigator or co-author.

Syllabus

The syllabus should include the following activities in the following areas:

Respiratory Failure

- Definitions
- Types
- Physiology
- Diagnosis
- Treatment options of respiratory failure:
  - ✓ Oxygen therapy
  - ✓ High flow oxygen therapy
  - ✓ Hyperbaric oxygenation

✓ Mechanical ventilation:
- Non-invasive ventilation (CPAP/ BiPAP)
- Invasive mechanical ventilation
- Negative pressure ventilation
- Complications of mechanical ventilation
- Weaning from mechanical ventilation

Common Respiratory Diseases

1. **Airways diseases**
   - Asthma
   - COPD (chronic obstructive pulmonary diseases)
2. **Other Obstructive Airways Diseases**
   - Bronchiolitis Obliterans
   - Bronchiectasis
   - Cystic Fibrosis
   - Primary ciliary dyskinesia
3. **Interstitial Lung Diseases**
   - Idiopathic pulmonary fibrosis (IPF)
   - Other types (UIP, NSIP, LIP, DIP…. etc.)
4. **Pneumonias**
5. **Suppurative lung diseases**
6. **Pleural diseases**
7. **Unusual infectious diseases**
   - Tuberculosis
   - Fungal Diseases
8. **Occupational Lung Diseases**
9. **Adult respiratory distress syndrome (ARDS)**
10. **Sleep Disordered Breathing**
    - Obstructive sleep apnea (OSA)
    - Central sleep apnea (CSA)
    - Mixed Sleep Apneas
    - Obesity hypoventilation syndrome
11. **Pulmonary Vascular diseases**
    - Venous Thromboembolism (VTE)
    - Pulmonary arterial hypertension (PAH), primary and other types
12. **Pulmonary vasculitidies**
13. **Lung cancer**
14. **Lung transplantation**

Other acute respiratory conditions

1. Acute respiratory failure:
    a. Hypoxemic respiratory failure (type I)
    b. Hypercapnic respiratory failure (type II)
2. Status asthmaticus
3. Smoke inhalation and airway burns
4. Aspiration and chemical pneumonitis
5. Flail chest and chest trauma
6. Bronchopulmonary infections
7. Upper airway obstruction
8. Near drowning
9. High altitude disorders

Pulmonary function tests:

- Pulmonary mechanics
- Peak expiratory flow rate
- Spirometry and reversibility test
- Maximum inspiratory and expiratory pressures
- Flow volume loop
- Lung volumes
- CO diffusion capacity (DLCO)
- Respiratory adequacy and arterial and venous blood gases interpretation
- Challenge testing (provocation/exercise)
- 6-minute walk test
- Cardiopulmonary exercise test

Common Pharmacology Groups

Antimicrobial therapy

1. Antibiotics
2. Anti-tuberculous agents
3. Antifungal agents
4. Antiviral agents
5. Agents for parasitic infections

Bronchodilators long and short acting
Anti-inflammatory agents / Immune suppressive agents
Biologic agents
Immunoglobulins and Plasma exchange

SYLLABUS IN DETAIL

Patient-Oriented Approach According to Symptoms and Signs

Objective: To develop an ability to interpret history, examination and investigation findings to arrive at a list of appropriate differential diagnosis related to respiratory signs and symptoms

- Potential causes of dyspnea, wheeze, stridor, hoarseness, cough, sputum production, hemoptysis, chest pain, snoring and general symptoms of disease
- Potential causes of abnormal examination findings, such as cyanosis, finger clubbing, chest wall deformities, abnormal breathing patterns, superior vena cava syndrome, Horner's syndrome and abnormal findings on inspection, palpation, percussion and auscultation
- Paraneoplastic syndromes
- Underlying pathological processes leading to abnormal respiratory symptoms and signs
- Appropriate approach to the investigations of patients presenting with abnormal respiratory and general symptoms and signs
- Interpretation of history, examination and investigation findings and ability to create a list of appropriate differential diagnoses
- Appropriate investigation of a patient with respiratory and general symptoms and/or signs and ability to interpret these investigations
- Ability to address patient concerns related to respiratory symptoms and signs

Asthma

Objective: To be able to carry out specialist assessment and treatment of asthma

- Definition, classification (including clinical forms, genotype, phenotypes, staging and level of control) and etiology of asthma
- Risk factors for asthma, including host and environment factors
- Knowledge of possible differential diagnoses, including occupational asthma, vocal cord dysfunction, gastro-esophageal reflux, upper respiratory tract disorders and COPD
- Patient education and self-management technique

Chronic Obstructive Pulmonary Disease (COPD)

Objective: To be able to carry out specialist assessment and treatment of COPD

- Definition, classification and etiology of COPD, chronic bronchitis and emphysema and awareness of its heterogeneity
- Risk factors for COPD, including tobacco smoke and anti-protease deficiency (including physiological role of alpha-1-antitrypsin and its genetic characteristics, role of other anti-protease inhibitors, liver disease in antiprotease deficiency)
- Knowledge of possible differential diagnoses /co-existent disorders, including asthma, upper respiratory tract disorders, gastro-esophageal reflux, obliterative bronchiolitis, bronchiectasis
- Relevant investigations including spirometry, other relevant lung function tests and arterial blood gas analysis
- Management of COPD including relevant therapeutic measures.
- Methods of oxygen supplementation including long-term oxygen therapy, non-invasive and mechanical ventilation, pulmonary rehabilitation and early discharge
- Management of related complications, including pneumothorax, respiratory failure, Pulmonary arterial hypertension and Cor pulmonale, as well as systemic effects of COPD
- Management of respiratory failure in patients with COPD
- Management of COPD in the outpatient and vaccinations
- Knowledge of pulmonary rehabilitation

Bronchiectasis

Objective: To be able to carry out specialist assessment and treatment of bronchiectasis

- Definition, classification and etiology of bronchiectasis, acute and chronic bronchitis, bronchiolitis, Primary ciliary dyskinesia, respiratory tract stenosis and tracheobronchomalacia, tracheo-oesophageal fistula, upper respiratory tract disorders, vocal cord dysfunction, foreign body aspiration, gastro- esophageal reflux
- Knowledge of possible differential diagnoses
- Relevant investigations, including X-ray, HRCT, arterial blood gas analysis
- Relevant microbiology
- Management including indications for hospitalization, relevant therapeutic measures and Physiotherapy
- Knowledge of surgical indications and referral

Cystic Fibrosis

Objective: To be able to carry out specialist assessment and treatment of cystic fibrosis

- Definition, classification and etiology of respiratory and non-respiratory manifestations of CF (including massive haemoptysis, pneumothorax, gastrointestinal disease, diabetes, problems of fertility and pregnancy and psychosocial problems)
- Relevant investigations including microbiological investigations, genetic study
- Imaging modalities, Chest X-ray and HRCT
- Related complications such as haemoptysis, pneumothorax, respiratory failure
- Pharmacology of inhaled, oral and systemic drugs
- Genetic therapy
- Chest physiotherapy techniques, Nutrition
- Indications for lung transplantation

Pulmonary Infections

Objective: To be able to carry out specialist assessment and treatment of pulmonary infections including the common cold, influenza, pneumonia, bronchitis

- Definition, classification and etiology of NTBRI: upper respiratory tract infections (URTI), lower respiratory tract infections (LRTI) including pneumonias – community acquired Pneumonia (CAP), nosocomial pneumonia (NCP), pneumonia in immunocompromised host and ventilator associated pneumonia (VAP)
- Relevant investigations: non-invasive (sputum induction, chest X-ray, fluoroscopy, CT, ultrasound), invasive (bronchoscopy, needle aspiration for microbiological sampling)
- Differential diagnosis of URTI, LRTI, pneumonias of viral, bacterial, fungal and parasitic Origin including typical versus atypical pneumonia
- Related complications such as lung abscess, empyema and sepsis
- Criteria for hospitalisation and referral to ICU in CAP
- Relevant therapeutic measures including antibiotics and other antimicrobials and Susceptibility testing
- Prognosis, predictive factors for high risk of death

Tuberculosis (TB)

Objective: To be able to carry out specialist assessment and treatment of tuberculosis

- Definition, classification and etiology
- Epidemiology, pathophysiology, risk factors for developing TB and transmission of mycobacterium
- Clinical and radiological features of pulmonary TB
- Bacteriological evaluation including molecular techniques, PCR and GeneXpert
- Treatment of TB (general principles, drugs, combination regimens)
- Special problems in treatment (multidrug resistant TB, extensively resistant TB, pregnancy and breast feeding, TB and HIV infection, conditions interfering with or increasing the risk of Potential adverse events of anti-TB drugs, latent TB infection and chemotherapy of (LTBI)

Non-tuberculous mycobacterial disease

- Bacteria causing NTMD (M.avium complex, M. Kansasii, other rapidly growing Mycobacterium)
- Epidemiology of NTMD and its relation to HIV infection
- Criteria for diagnosis
- Therapeutic regimens used in NTMD

Interstitial Lung Disease (ILD)

Objective: To be able to carry out specialist assessment and treatment of interstitial lung disease

- Definition, classification and aetiology of ILD
- Basic biology and immunology of ILD, including humoral and cellular mechanisms
- Relevant investigations: non-invasive (chest X-ray, high resolution CT-scan, lung Function tests), invasive (broncho-alveolar lavage (BAL), lung biopsy and VATS biopsy.
- Pharmacology and interactions of drugs used in the treatment of ILD
- Complications e.g. respiratory failure
- Indications for transplant

Lung Cancer

Objective: To be able to carry out specialist assessment and treatment of lung cancer

- Definition, classification and aetiology of Thoracic Tumor (TT), lung cancer (LC), mesothelioma (M), metastatic TT (MTT), benign intrathoracic tumors, chest wall tumors, sarcoma and mediastinal tumors (MT): lymphoma (L), germ cell tumor, Thymoma, Ganglioma, and retrosternal thyroid.
- Risk factors for LC, M and L / emphasis on smoking cessation.
- Clinical symptoms, syndromes and physical signs of TT including paraneoplastic syndromes
- Relevant investigations: non-invasive (chest X-ray, ultrasound, fluoroscopy, CT, MR, nuclear Techniques, PET-CT) and invasive (sampling methods for cytology and histology)
- Histological and TNM classification of TT
- Prognosis (survival, functional consequences, disability)
- Understanding of role of surgeons, physicians, radiologists, chemotherapists, and the multi- Disciplinary team in management.

Diseases of the chest wall, respiratory muscles and diaphragm (CW, RM, D)

- Definition, classification and etiology of chest wall diseases including kyphoscoliosis, ankylosing spondylitis, flail chest, pectus excavatum / carinatum and pathological effects of thoracoplasty.
- Definition, classification and etiology of diseases of the respiratory muscles (hemiplegia, poliomyelitis, and generalized neuromuscular diseases)
- Definition, classification and etiology of diseases of the diaphragm, including diaphragmatic paralysis, hiccups, hernia
- Differential diagnosis of acute chest pain
- Related complications such as respiratory failure
- Relevant investigations: non-invasive (chest X-ray, ultrasound, fluoroscopy, CT, pulmonary function tests)
- Indication for noninvasive ventilation
- Indications for surgical intervention

Disorders of Pleural and Mediastinum

Objective: To be able to carry out specialist assessment and treatment of pleura and mediastinal disease.

Pleural diseases (PD)

- Basic physiological and anatomical principles of plural diseases
- Definition, classification and etiology of pleural effusions (serothorax, chylothorax, haemothorax, empyema)
- Distinction between transudative and exudative pleural effusions
- Definition, classification and etiology of pleural thickening including pleural plaques
- Definition, classification and etiology of pneumothorax (primary (spontaneous)and secondary)
- Related complications such as tension pneumothorax
- Relevant investigations: non-invasive (chest X-ray, ultrasound, fluoroscopy, CT, MR, nuclear techniques, pulmonary function tests) and invasive (thoracentesis and biopsy techniques)
- Relevant therapeutic measures and procedures including antibiotics, fibrinolytics and Pleurodesis with different agents.
- Indications for surgical intervention

Mediastinal diseases (MD)

- Basic physiological and anatomical principles of mediastinal diseases
- Definition, classification and etiology of mediastinal diseases including tumors and cysts of the mediastinum, mediastinitis, mediastinal fibrosis, and pneumomediastinum
- Related complications such as superior vena cava syndrome
- Relevant investigations: non-invasive (chest x-ray, fluoroscopy, CT, pulmonary function tests) and invasive (bronchoscopy including transbronchial needle aspiration, and endobronchial ultrasound biopsy (EBUS).
- Relevant therapeutic measures
- Indications for surgical intervention (mediastinoscopy, mediastinotomy, VATS)

Pulmonary Vascular Diseases

Objective: To be able to carry out specialist assessment and treatment of pulmonary vascular diseases e.g. pulmonary embolism and infarction, pulmonary hypertension, pulmonary hemorrhage and pulmonary vasculitis

Venous thromboembolism (VTE)

- Basic physiological and pathological principles of venous thromboembolism
- Definition, classification and etiology of VTE.
- Genetic and acquired risk factors for VTE
- Relevant investigations (lab tests (D-dimer), scintigraphy, CT pulm angiography)
- Indication for surgical interventions, e.g., in pulmonary embolism (thrombectomy)
- Pharmacology and interactions of drugs used in the treatment of VTE

Pulmonary hypertension (PHTN)

- Basic physiological and pathological principles of pulmonary hypertension
- Definition, classification and etiology of Pulm HTN (Pulm venous HTN and Pulm arterial HTN)
- Relevant investigations (Echo, HRCT, Right heart catheterization)
- Complication and prognosis
- Pharmacology (drugs used in the treatment)

Sleep Related Disorders

Objective: To be able to carry out specialist assessment and treatment of sleep related disorders

- Basic physiological and pathological principles of Sleep Related Disorders
- Definition, classification and etiology of obstructive sleep apnoea syndrome (OSA), central sleep apnoea syndrome (CSA), periodic breathing (PB), obesity hypoventilation syndrome (OHS), periodic limb movement disorder, narcolepsy, parasomnias and insomnia.
- Relevant investigations (including screening over-night oximetry, sleep studies (screening or in-lab Polysomnography) and multiple sleep latency test.
- Complications of OSA, CSA, PB, and OHS
- Methods of treatment (including noninvasive ventilation (NIV) support (CPAP, BiPAP)
- Role of the ENT surgeons and dentists.

Lung Transplantation

Objective: To be aware of the patients that may benefit from lung transplantation. To carry out initial assessment and refer as appropriate to the lung transplant center. To be able to administer emergency care to an ill post-transplant patient prior to transfer to the transplant unit.

- Indications of lung transplantation (IPF, CF, bronchiectasis, PPH, COPD, Sarcoidosis, and others).
- Types of lung transplant (single, double and heart-lung)
- Surgical considerations
- Criteria for patient selection (age, psychological /physical/nutritional status and prognosis)
- Pre-transplant preparation and monitoring (pulmonary rehabilitation and NIV)
- Donor selection
- Immunosuppressive regimens
- Diagnosis and treatment of acute and chronic complications, including rejection
- Diagnosis and treatment of opportunistic infections among transplanted patients.
- Legal, religious and medicolegal aspects.

Pulmonary Rehabilitation

Objective: To understand the organization of specialist pulmonary rehabilitation services

- Indications for pulmonary rehabilitation
- Components of a successful pulmonary rehabilitation program
- Personnel required to set up and run a successful pulmonary rehabilitation service
- Selection of patients who are most likely to benefit from pulmonary rehabilitation
- Smoking cessation methods
- Education/ vaccination

Procedures

Objective: To be fully competent to perform the procedures necessary during the practice of respiratory medicine.

List of procedures

- **Advanced Life Support**
- **Lung function testing:**
    - Office Spirometry (Peak, flow metrey, vitilogram)
    - Full Pulmonary function test including spirometry with and without reversibility, lung volumes, flow volume lope and DLCO
    - Fractional exhaled nitric oxide (FeNO)
    - Body plethysmography
    - Bronchial provocation tests
    - Respiratory Muscle Strength testing
    - Cardiopulmonary exercise test
- **Six-minute Walk test**
- **Exercise challenge test**
- **Arterial blood gas sampling and analysis**
- **Skin prick testing**
- **Bronchoscopy, Endobronchial ultrasound (EBUS)**
- **Sleep studies**
- **Pleural procedures:**
    - Pleural Ultrasound
    - Medical Thoracocentesis (diagnostic and therapeutic)
    - Medical Thoracoscopy
    - Pleural biopsy
    - Chest tube insertion
    - Fibrinolysis
    - Pleurodesis

Advanced Life Support:

- Causes of cardio-pulmonary arrest
- Principles of Cardio-pulmonary resuscitation (basic and advanced life support)
- Be competent in the use of defibrillators
- General emphasis on ethics and legal issues, breaking bad news and support of relatives, familiarity with "do not resuscitate orders"

Lung function testing

- How to perform lung function tests
- Interpretation and reporting of lung function tests

Bronchoscopy

- Normal and variant bronchial anatomy
- Technical aspects of the flexible and rigid bronchoscope
- Indications and contraindications for bronchoscopy and associated techniques
- Safe sedation and local anaesthesia

Pleural Ultrasound and thoracentesis

- Safely perform pleural ultrasound and thoracentesis
- Techniques of pleural biopsy
- Patient consent and explanation of risks and benefits

Intercostal (chest) tube placement

- Indications of intercostal tube placement
- Technique of intercostal tube placement
- Indications for other modalities including suction, closure of BPF
- Effective fixing of intercostal tube so it does not become displaced
- Patient consent and explanation of risks and benefits
- Safely perform intercostal tube placement

Sleep Studies

- Methods of screening for sleep related disorders
- Polysomnography
- CPAP and NIPPV - initiate and titrate
- Interpret sleep studies

Skin tests to demonstrate "allergy"

- How to perform skin tests
- Perform and read skin test to common allergies
- Indications for tuberculin and allergy tests
- Awareness of contraindications and precautions associated with tuberculin and allergy testing
- Protocols for treatment of anaphylaxis

Imaging Techniques

- Chest x-rays and CT scans relevant to the respiratory patient use and interpretation
- Magnetic Resonance scans indications, CT PET interpretation
- CT scan (HRCT, CT Pulmonary angiography)
- Screening with low dose CT
- Ventilation perfusion scans indications and interpretations
- Value of regular meetings with radiologists
- Radiological thoracic anatomy
- Indications for particular imaging techniques - for instance thin-slice CT for parenchymal lung disease, mediastinal window settings for central lesions and ultrasound for pleural effusions
- Contra-indications for CT with contrast
- Indications for CT/ultrasound-guided biopsies