

Finalized in the meeting of the Committee for Courses & Studies, Department of Pulmonary Medicine meeting held on 5th March, 2008

MD (PULMONARY MEDICINE) CURRICULUM/SYLLABUS - REVISION 2008

This syllabus supersedes and replaces all previous versions

The primary goal of the MD course in Pulmonary Medicine is to produce postgraduate clinicians able to provide health care in the field of pulmonary medicine. It is expected that a physician qualified in pulmonary diseases at the end of the course should be able to diagnose and treat pulmonary diseases, take preventive and curative steps for these diseases in the community at all levels of health care and qualify as future consultant and teacher in the subject. Evolution of critical care medicine makes it imperative that the post-graduates are trained in the basic principles of pulmonary medicine as applied to critical care. The person shall be abreast with the recent advances and developments in the speciality of pulmonary medicine. It is expected that the person will develop a spirit of enquiry and get oriented to apply recent advances and medical evidence to the practice of pulmonary medicine. He would also grasp the fundamentals of research methodology.

Medical Science is dynamic with a continuous enhancement of knowledge. Therefore, there can be no limits to knowledge. The process of acquiring knowledge and skills continues even after formal education. The syllabus to be covered during postgraduate training in Pulmonary Medicine given below is designed to develop a sound and scientific foundation. It is intended to serve as a guide to impart basic knowledge and develop skills and is does not impose any limits to expansion beyond the areas listed.

Objectives

(a) Knowledge

At the end of the course of Pulmonary Medicine, the students shall be able to:

- (1) demonstrate sound knowledge of common pulmonary diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis
- (2) demonstrate comprehensive knowledge of various modes of therapy used in treatment of pulmonary diseases
- (3) describe the mode of action of commonly used drugs, their doses, side-effects / toxicity, indications and contra-indications and interactions
- (4) describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National tuberculosis Control Programme
- (5) manage common pulmonary emergencies and understand the basic of intensive care in patients with pulmonary diseases
- (6) practice the field of pulmonary medicine ethically and assiduously, show empathy and adopt a humane approach towards patients and their families

- (7) recognize the national priorities in pulmonary medicine and play an important role in the implementation of National Health Programmes including tuberculosis
- (8) demonstrate competence in medical management
- (9) should inculcate good reading habits and develop ability to search medical literature and develop basic concept of medical research

(b) Skills

The students shall be able to:

- (1) interview the patient, elicit relevant and correct information and describe the history in chronological order
- (2) conduct clinical examination, elicit and interpret clinical findings and diagnose common pulmonary disorders and emergencies
- (3) perform simple, routine investigative and office procedures required for making the bed side diagnosis, especially sputum collection and examination for etiologic organisms especially Acid Fast Bacilli (AFB), interpretation of the chest x-rays and lung function tests
- (4) interpret and manage various blood gases abnormalities in various pulmonary diseases
- (5) develop management plans for various pulmonary diseases
- (6) assist in the performance of common procedures, like bronchoscopic examination, pleural aspiration and biopsy, pulmonary physiotherapy, endotracheal intubation and pneumothoracic drainage / aspiration etc.
- (7) recognize emergency situations in intensive care, respond to these appropriately and perform basic critical care monitoring and therapeutic procedures
- (8) collect, compile, analyse, interpret, discuss and present research data

Duration and eligibility

The duration of the course prescribed by the Medical Council of India is 3 years. Persons possessing an MCI recognized MBBS degree having completed the compulsory internship and registered with the Medical Council of India/State Medical Council are eligible.

Syllabus and course contents

Each student is required to know and cover the following domains during the period of training:

1. Theoretical knowledge of different aspects of Pulmonary Medicine including the status in health and disease.

2. Acquire clinical skills
3. Acquire practical skills
4. Management of Emergencies including intensive care
5. Preparation of thesis as per University guidelines

The above domains are to be covered through a well-designed teaching and training programme. It involves patient management in the outpatient, inpatient and emergency situations, case presentations, didactic lectures, seminars, journal reviews, clinicopathological conferences and mortality review meetings and working in the laboratories. The different areas in pulmonary medicine to be covered are described below:

I. Basic Sciences

A. Anatomy and Histology of Respiratory System

1. Development and Anatomy of Respiratory System
2. Applied embryology of lungs, mediastinum and diaphragm
3. Developmental anomalies

B. Physiology and Biochemistry

1. Assessment of pulmonary functions
2. Control of ventilation; pulmonary mechanics
3. Ventilation, pulmonary blood flow, gas exchange and transport
4. Non-respiratory metabolic functions of lung
5. Principles of electrocardiography
6. Inhalation kinetics and its implication in aerosol therapy, and sputum induction etc.
7. Acid-base and electrolyte balance
8. Physiology of sleep and its disorders
9. Pulmonary innervation and reflexes
10. Pulmonary defence mechanisms
11. Principles of exercise physiology and testing
12. Physiological changes in pregnancy, high altitude, aging
13. Physiological basis of pulmonary symptoms

C. Microbiology

1. Mycobacterium tuberculosis and other mycobacteria
2. Bacteria causing pulmonary diseases
3. Atypical organisms and respiratory tract infections
4. Anaerobes in pleuropulmonary infections
5. Laboratory diagnosis of nontubercular infections of respiratory tract
6. Laboratory diagnosis of TB including staining, culture and drug sensitivity testing
7. Virulence and pathogenicity of mycobacteria
8. Respiratory viruses: Viral diseases of the respiratory system and diagnostic methods
9. Respiratory fungi: (i) Classification of fungal diseases of lung; candidiasis, Actinomycosis, Nocardiosis, Aspergillosis, Blastomycosis etc. (ii) Laboratory diagnostic procedures in pulmonary mycosis
10. Opportunistic infections in the immunocompromised individuals
11. HIV and AIDS. Virological aspects, immunopathogenesis, diagnosis

12. Parasitic lung diseases

D. Pathology

1. Acute and chronic inflammation: Pathogenetic mechanisms in pulmonary diseases
2. Pathology aspects of Tuberculosis
3. Pathology aspects of Pneumonias and bronchopulmonary suppuration
4. Chronic bronchitis and emphysema, asthma, other airway diseases
5. Occupational lung diseases including Pneumoconiosis
6. Interstitial lung diseases including sarcoidosis, connective tissue diseases, pulmonary vasculitis syndromes, pulmonary eosinophilias
7. Tumours of the lung, mediastinum and pleura

E. Epidemiology

1. Epidemiological terms and their definitions
2. Epidemiological methods
3. Epidemiology of tuberculosis, pneumoconiosis, asthma, lung cancer, COPD and other pulmonary diseases
4. National Tuberculosis Control Programme and RNTCP; Epidemiological aspects of BCG
5. Epidemiological aspects of pollution-related pulmonary diseases
6. Research methodology, statistics and study designs

F. Allergy and Immunology

1. Various mechanisms of hypersensitivity reactions seen in pulmonary diseases
2. Diagnostic tests in allergic diseases of lung – in vitro and in vivo tests, bronchial provocation test
3. Immunology of tuberculosis, Sarcoidosis and other diseases with an immunological basis of pathogenesis

G. Pharmacology

1. Pharmacology of antimicrobial drugs
2. Pharmacology of antitubercular drugs
3. Pharmacology of antineoplastic and immunosuppressant drugs
4. Bronchodilator and anti-inflammatory drugs used in pulmonary diseases
5. Drugs used in viral, fungal and parasitic infections
6. Other drugs pharmacokinetics and drugs interaction of commonly used drugs in pulmonary diseases
7. Pharmacovigilance

II. Clinical Pulmonary Medicine

Clinical pulmonary medicine covers the entire range of pulmonary diseases. All aspects of pulmonary diseases including epidemiology, aetiopathogenesis, pathology, clinical features, investigations, differential diagnosis and management are to be covered.

A. Infections

1. Tuberculosis

1. Aetiopathogenesis
2. Diagnostic methods
3. Differential diagnosis
4. Management of pulmonary tuberculosis
5. Complications in tuberculosis
6. Tuberculosis in children
7. Geriatric tuberculosis
8. Pleural and pericardial effusion and empyema
9. Mycobacteria other than tuberculosis
10. Extra pulmonary tuberculosis
11. HIV and TB
12. Management of MDR and XDR tuberculosis

2. Non-tuberculous infections of the lungs

- Approach to a patient with pulmonary infection
- Community- acquired pneumonias
- Hospital-associated pneumonias
- Unusual and atypical pneumonias including bacterial, viral, fungal and parasitic and rickettsial, anerobic
- Bronchiectasis, lung abscess and other pulmonary suppurations
- Acquired immunodeficiency syndrome and opportunistic infections in immuno-compromised host
- Principles governing use of antibiotics in pulmonary infections
- Other pneumonias and parasitic infections, Zoonosis

B. Non-infectious Lung Diseases

3. Immunological disorders

- Immune defence mechanisms of the lung
- Sarcoidosis
- Hypersensitivity pneumonitis and lung involvement
- Eosinophilic pneumonias and tropical eosinophilia
- Pulmonary vasculitides
- Connective tissue diseases involving the respiratory system
- Interstitial lung disease of other etiologies
- Reactions of the interstitial space to injury, drugs
- Occupational and environmental pulmonary diseases

4. Other non-infectious disorders of the lungs and airways

- Aspiration and Inhalational (non-occupational) diseases of the lung
- Drug induced pulmonary diseases
- Bullous lung disease

- Uncommon pulmonary diseases (metabolic, immunological, unknown etiology), pulmonary haemorrhagic syndromes
- Other Pulmonary diseases of unknown etiology including PLCH, LAM, PAP, alveolar microlithiasis
- Cystic fibrosis and disorders of ciliary motility
- Obesity-related pulmonary disorders
- Upper airways obstruction syndromes
- Occupational lung diseases and pneumoconiosis
- Air-pollution induced diseases, toxic lung and other inhalational injuries
- Health hazards of smoking
- Drug-induced lung diseases

5. Pulmonary Circulatory disorders

- Pulmonary hypertension and cor pulmonale
- Pulmonary edema
- Pulmonary thromboembolic diseases and infarction
- Cardiac problems in a pulmonary patient and pulmonary complications produced by cardiac diseases

6. Obstructive diseases of the lungs

- Asthma including Allergic bronchopulmonary aspergillosis, specific allergen immunotherapy and immunomodulation
- Chronic obstructive lung disease and diseases of small airways
- Special aspects of management including Long term oxygen therapy, Inhalation therapy and Pulmonary rehabilitation

7. Tumors of the lungs

- Neoplastic and non-neoplastic diseases of lung
- Solitary pulmonary nodule

8. Diseases of the mediastinum

- Non-neoplastic disorders
- Benign and malignant (primary and secondary) neoplasms and cysts

9. Disorders of the pleura

- Pleural dynamics and effusions
- Non-neoplastic and neoplastic pleural diseases
- Pneumothorax
- Pyothorax and broncho-pleural fistula

10. Critical Care Pulmonary Medicine

- Management of emergency problems of different pulmonary diseases

- Adult respiratory distress syndrome
- Respiratory failure in the patient with obstructive airway disease
- Respiratory failure in other pulmonary diseases
- Management of sepsis
- Respiratory and haemodynamic monitoring in acute respiratory failure
- Noninvasive and Mechanical ventilation
- Principles of critical care, diagnosis and management of complications
- Ethical issues in critical care

11. Extrapulmonary manifestations of pulmonary diseases

12. Sleep-related pulmonary diseases

- Polysomnography
- Sleep apneas
- Other sleep-disordered breathing syndromes

13. Miscellaneous aspects

- Diseases of the diaphragm
- Disorders of chest wall
- Oxygen therapy
- End-of-life care
- Aerospace Medicine
- Pulmonary problems related to special environments (high altitude, diving, miners)

14. Preventive Pulmonology

- Principles of smoking cessation
- Cardiopulmonary rehabilitation
- Preventive aspects of pulmonary diseases
- Vaccination in pulmonary diseases

III. Surgical aspects of Pulmonary Medicine

- Pre and post-operative evaluation and management of thoracic surgical patients
- Chest trauma/trauma related lung dysfunction
- Lung transplantation

IV. Specific Clinical and Practical Skills in Pulmonary Medicine

Students are to be exposed and trained in the following tests and procedures

1. Diagnostic tests: Performance and interpretation

- Sputum and other body fluids examination with ZN stain for AFB, culture methods for pathogenic bacteria, fungi and viruses

- FNAC of lung masses
- Arterial blood gas analysis and pulse oximetry
- Imaging: Interpretation of plain radiography, ultrasound examination, Computed tomogram
- Sputum cytology
- Simple haematological tests
- Immunological and Serological tests
- Polysomnography including CPAP titration
- Cardiopulmonary exercise testing
- Pulmonary function tests and interpretation (Spirometry, lung volume, diffusions, body plethysmography, other lung function tests)
- Bronchoprovocation tests
- BCG vaccination
- Mantoux testing
- Bronchoscopy: fiberoptic/rigid, diagnostic and therapeutic
- ECG, Echocardiography
- Skin tests for hypersensitivity
- Sputum induction and non-invasive monitoring of airway inflammation
- Medical thoracoscopy

2. Therapeutic procedures

- Fine needle aspiration and other guided procedures
- Tube thoracostomy
- Cardiopulmonary rehabilitation exercises
- Postural drainage
- Pleural biopsy, lymph node biopsy
- Administration of inhalation therapy
- Administration of oxygen therapy
- Monitoring and emergency procedures in intensive care

Thesis

MD (Pulmonary Medicine) students are required to write a thesis as per the guidelines of the Faculty of Medical Sciences, University of Delhi. Thesis is written during the second year of the course and submitted at the end of the same. After assignment to a recognized supervisor, the thesis protocol is to be written by the student and approved by the Ethics Committee of the Institution and the Board of Research in Medical Studies, Faculty of Medical Sciences, University of Delhi.

The topic of thesis is decided under the guidance of the supervisor and co-supervisors, if any. The protocol should recognize a problem to be addressed through a detailed methodology. Data is to be collected and compiled by the student followed by analysis, interpretation and discussion under the guidance of supervisor/cosupervisor. Presentation of thesis should follow the format prescribed by the Faculty of Medical Sciences, University of Delhi.

The thesis is examined by two referees and acceptance by both is required before the announcement of the results of the examination for the degree. No marks are awarded at present. However, the thesis are graded and the final opinion of the reviewer is accepted/not accepted.

If and when the University adopts a new system of evaluation of thesis through marks/grades for disciplines under the Faculty of Medical Sciences, the same shall apply automatically.