Guidelines

For

Competency Based Training Programme

In

DNB- Respiratory Diseases

NATIONAL BOARD OF EXAMINATIONS

Medical Enclave, Ansari Nagar, New Delhi-110029, INDIA
Email: mail@natboard.edu.in Phone: 011 45593000

CONTENTS

PROGRAMME GOALS

The goal of Post graduation (DNB) course in Pulmonary Medicine and Chest is to produce a competent chest physician who:

1. Recognizes the health needs of patients having chest complaints and carries out professional obligations in keeping with principles of National Health Policy and professional ethics.
2. Has acquired the competencies pertaining to chest medicine that are required to be practiced in the community and at all levels of health care system.
3. Has acquired skills in effectively communicating with the patient, family and the community.
4. Is aware of the contemporary advances and developments in medical sciences as related to pulmonary medicine.
5. Is oriented to principles of research methodology.
6. Has acquired skills in educating medical and paramedical professionals.

PROGRAMME OBJECTIVES

At the end of the DNB course in Pulmonary Medicine and Chest, the student should be able to:

1. Recognize the key importance of pulmonary medicine in the context of the health priority of the country.
2. Practice the specialty of Pulmonary Medicine in keeping with the principles of professional ethics.
3. Identify social, economic, environmental, biological and emotional determinants of patient and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care to him.
4. Take detailed history, perform full physical examination and make clinical diagnosis.
5. Perform relevant investigative and therapeutic procedures for the patient.
6. Interpret important imaging and laboratory results.
7. Diagnose illness based on the analysis of history, physical examination and investigative work up.
8. Plan and deliver comprehensive treatment for illness using principles of rational drug therapy.
9. Plan rehabilitation of patients suffering from chronic illness.
10. Manage respiratory emergencies efficiently.
11. Demonstrate skills in documentation of case details, and of morbidity and mortality data relevant to the assigned situation.
12. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.
13. Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.

14. Develop skills as a self-directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze relevant published literature in order to practice evidence-based medicine.
15. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
16. Develop skills in using educational methods and techniques as applicable to the teaching of medical/ nursing students, general physicians and paramedical health workers.
17. Function as an effective leader of a health team engaged in health care research or training.

ELIGIBILITY CRITERIA FOR ADMISSIONS TO THE PROGRAMME

(A) DNB Respiratory Diseases Course:

1. Any medical graduate with ***MBBS*** qualification ,who has qualified the ***Entrance Examination*** conducted by NBE and fulfill the eligibility criteria for admission to DNB ***Broad Specialty*** courses at various NBE accredited Medical Colleges/ institutions/Hospitals in India is eligible to participate in the Centralized counseling for allocation of DNB Respiratory Diseases seats purely on merit cum choice basis.

2. Admission to 3 years post MBBS DNB Respiratory Diseases course is only through ***Entrance Examination*** conducted by NBE and Centralized Merit Based Counseling conducted by National Board of Examination as per prescribed guidelines.

(B) DNB (Post diploma) Respiratory Diseases Course:

1. Any medical graduate with MBBS qualification who has successfully completed **DTCD** (and fulfill the eligibility criteria for admission to DNB (Post Diploma) Broad Specialty courses at various NBE accredited Medical Colleges/ institutions/Hospitals in India is eligible to participate in the Centralized counseling for allocation of **DNB (Post Diploma) Respiratory Diseases** seats purely on merit cum choice basis.

2. Admission to 2 years **post diploma DNB Respiratory Diseases** course is only through PDCET Centralized Merit Based Counseling conducted by National Board of Examination as per prescribed guidelines.

Duration of Course:

For Primary candidates : 3 years
For Secondary Candidates : 2 years

Every candidate admitted to the training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher for assigned period of the course.

TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

Theoretical: The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

Symposia: Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

Clinical: The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

Bedside: The trainee would work up cases, learn management of cases by discussion with faculty of the department.

Journal Clubs: This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

Research: The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

SYLLABUS

Milestones in the history of Pulmonary Medicine:

Structure & Functions of Respiratory System and mediastinum.

1. Anatomy
2. Development & aging of respiratory system
3. Physiology
    - Respiratory Mechanics
    - Physiology of Respiration & Ventilation
    - Molecular Regulation of Lung development
    - Pulmonary Surfactant and disorders of Surfactant Homeostasis
    - Mucociliary clearance
    - Physiological basis of pulmonary function testing & arterial blood gases.
    - Acid base disturbances
    - Physiology aspects related to mechanical ventilation
    - Physiology related to endocrine aspects of lung
    - Sleep physiology
4. Patho-Physiology of all disorders pertaining to pulmonary medicine.
5. Microbiology
6. Genetics
7. Pharmacology
8. Pathology
9. Immunology & defense mechanisms
10. Molecular biology
11. Biochemistry

Symptoms and Signs

1. Dyspnoea
2. Wheeze
3. Stridor
4. Hoarseness
5. Cough
6. Sputum production
7. Chest Pain
8. Haemptysis
9. Snoring
10. General symptoms of disease including fever, weight loss, oedema, Nocturia and
11. Day time somnolence
12. Abnormal findings on general examination including cyanosis, clubbing, superior vena cava syndrome and Horners syndrome.
13. Abnormal findings on inspection should include abnormal breathing patterns, chest wall deformities.
14. Abnormal findings on palpation and percussion
15. Abnormal findings on auscultation

Diseases of Airways

1. Asthma
2. Acute Bronchitis
3. Chronic bronchitis/ COPD
4. Bronchiolitis
5. Bronchiectasis
6. Airway Stenosis, megaly & malacia
7. Tracheooesophageal Fistula
8. Upper airway disease
9. Vocal cord Dysfunction
10. Foreign body aspiration
11. GERD

Neoplasms of the Lung and Thorax

1. Pathogenesis
2. Approach to the patient with Pulmonary nodules
3. Pathology of Bronchogenic Carcinoma
4. Clinical evaluation and diagnosis
5. Natural history
6. Genetic and Molecular changes
7. Prospects for a Personalized Pharmacological Approach to treatment
8. Epidemiology of the lung cancer
9. Clinical evaluation, diagnosis & staging of lung cancer
10. Treatment of non-small cell lung cancer: Surgery
11. Treatment of Non-Small cell lung cancer: Chemotherapy
12. Small Cell Lung Cancer: Diagnosis,Treatment, and natural history.
13. Primary lung tumors other than Bronchogenic Carcinoma: Benign and Malignant.
14. Extrapulmonary Syndromes associated with Lung Tumors
15. Metastatic Pulmonary tumours: The role of Surgical Resection
16. Mesothelioma
17. Metastatic & Other pleural tumours
18. Benign intrathoracic tumours
19. Mediastinal tumours
20. Chest wall tumours
21. Sarcoma

Lymphoproliferative and Hematologic Diseases Involving the lung and Pleura

Lung Immunology

1. Innate and Adaptive Immunity in the lung
2. Lymphocyte- and Macrophage-Mediated Inflammation in the lung
3. Mast cells and Eosinophils
4. Leukocyte Accumulation in Pulmonary Disease
5. Antibody- Mediated Lung Defenses and Humoral Immunodeficiency

Lung Injury and Repair

1. T Lymphocytes in the lung
2. Chemokines, Adipokines, and growth factors in the lung
3. Redox Signaling and Oxidative Stress in Lung Diseases
4. Fibroblasts in Lung Homeostasis and Diseases

Non Tubercular Infectious Diseases of the Lungs

1. Pulmonary clearance of Infectious agents
2. Approach to the patient with Pulmonary Infection
3. Pulmonary Infection in Immunocompromised hosts
4. Microbial Virulence factors in Pulmonary Infections
5. Principles of Antibiotic Use and the Selection of Empiric therapy for Pneumonia
6. HIV, AIDS and pulmonary disorders
7. Upper Respiratory Infections
8. Lower respiratory infections
9. Community acquired pneumonia
10. Nosocomial pneumonia
11. Pneumonia in the immunocompromised host
12. Other pneumonias
13. Parapneumonic effusion & Empyema
14. Lung abscess
15. Fungal infections
16. Parasitic infections
17. Epidemic Viral infections
18. Others infections

Tuberculosis

1. Pulmonary TB
2. Extrapulmonary TB
3. TB in the immunocompromised host
4. Latent TB infections
5. Non tuberculous mycobacterial diseases
6. Drug resistant Tuberculosis
7. Tuberculosis control programme, including Programmatic management of drug resistant Tuberculosis (PMDT).

Pulmonary Vascular diseases

1. Pulmonary Embolism
2. Pulmonary edema
3. Primary Pulmonary Hypertension
4. Secondary Pulmonary Hypertension, Cor Pulmonale
5. Vasculitis and Diffuse pulmonary hemorrhage
6. Abnormal A-V communication
7. Hepatopulmonary Syndrome

Community and Social Pulmonary Medicine

1. Prevention and cure of tuberculosis under RNTCP including Programmatic management of drug resistant Tuberculosis (PMDT).
2. Implementation of DOTS
3. Prevention of HIV (VCTC) as it increases prevalence of tuberculosis.
4. Investigation of adverse events following anti tubercular therapy
5. General principles of prevention and control of tuberculosis and nosocominal infection (pneumonia).
6. Prevention of drop let infection.

Occupational and Environmental Diseases

1. Occupational Asthma
2. Reactive airway dysfunction syndrome
3. Pneumoconiosis and Asbestos related Disease
4. Hypersensitivity pneumonitis
5. Dust and Toxic gas inhalation disease
6. Indoor pollution related diseases
7. Outdoor pollution related diseases
8. Smoking related disease
9. High altitude Disease
10. Diving related disease, Aviation and sports related pulmonary disorders.
11. Disability evaluation and compensation.

Diffuse Parenchymal (interstitial) Lung Diseases

1. Sarcoidosis
2. Idiopathic Interstitial pneumonias including Idiopathic Pulmonary Fibrosis (IPF)
3. NSIP,COP, AIP, RB-ILD, DIP, LIP
4. Interstitial lung diseases specific to Infancy

Iatrogenic diseases

1. Drug induced lung diseases
2. Complications of invasive procedures
3. Radiation induced Disease

Acute Injury

1. Inhalation Lung Injury
2. Traumatic thoracic injury

Respiratory Failure

1. Acute Lung Injury and Acute Respiratory Distress Syndrome
2. Obstructive Lung disease

3. Neuromuscular Disease
4. Chest Wall Diseases
5. Other restrictive lung Disease

Pleural Diseases

1. Pleurisy
2. Pleural Effusion
3. Chylothorax
4. Haemothorax
5. Fibrothorax
6. Pneumothorax/Hydropneumothorax/Pyopneumothorax
7. Empyema

Diseases of the chest wall and respiratory muscles including the diaphragm

1. Chest wall deformities
2. Neuromuscular disorders
3. Phrenic Nerve Palsy
4. Diaphragmatic hernia
5. Chest wall and diaphragmatic tumours

Mediastinal Diseases excluding tumours

1. Mediastinitis
2. Medistinal Fibrosis
3. Pneumomedistinum

Pleuropulmonary manifestations of systemic/ Extrapulmonary disorders

1. Collagen vascular disease
2. Cardiac disease
3. Abdominal disease
4. Haematological disease
5. Obesity
6. Hyperventilation syndrome

Genetic and Developmental Disorders

1. Cystic Fibrosis
2. Primary Ciliary Dyskinesia
3. Alpha-1 antitrypsin deficiency
4. Agenesis, Aplasia and Hypoplasia
5. Sequestration
6. Anomalies of Tracheo-bronchial tree and Fissures
7. Others

Respiratory Diseases and Pregnancy

1. Asthma
2. Bronchiectasis/ Cystic fibrosis etc.

3. Tuberculosis
4. Sarcoidosis
5. Restrictive Lung diseases
6. Pregnancy induced respiratory diseases
7. Others

Pulmonary changes in autoimmune disorders

Allergic Diseases

1. Upper airway diseases
2. Asthma
3. Allergic Bronchopulmonary aspergillosis
4. Anaphylaxis
5. Others

Eosinophilic Diseases

1. Tropical pulmonary Eosinophilia
2. Non-asthmatic eosinophilic bronchitis
3. Acute and chronic eosinophilic pneumonia
4. Hypereosinophilic syndrome
5. Churg-strauss syndrome
6. Polyarteritis Nodosa
7. Others

Sleep related disorders

1. Obstructive sleep apnoea
2. Central sleep apnoea
3. Upper airway resistance syndrome
4. Obesity hypoventilation syndrome
5. Others

Immunodeficiency disorders

1. Congenital immunodeficiency syndrome
2. Acquired immunodeficiency syndrome
3. HIV related diseases
4. Graft versus host diseases
5. Post-transplantation immunodeficiency
6. Others

Pulmonary Rehabilitation

Lung Transplantation

Bioterrorism

Pediatric Pulmonology

Respiratory response to exercise in health

Aging of the respiratory system

Pulmonary diseases in Geriatrics population

Infection control practices in healthcare settings

Other Areas

1. Acute Responses to Toxic Exposures
2. Trauma and Blast Injuries
3. High Altitude
4. Diving Medicine
5. Pulmonary Complications of HIV Infection
6. Pulmonary Complications of stem cell and solid organ transplantation
7. Pulmonary Complications of primary Immunodeficiencies
8. Pulmonary Complications of Abdominal Diseases
9. Pulmonary Complications of Hematologic Diseases
10. Pulmonary Complications of Endocrine Diseases
11. The lungs in Obstetric and Gynecologic Diseases
12. The respiratory System and Neuromuscular Disease
13. Acute Ventilatory failure
14. Acute Hypoxemic Respiratory failure and ARDS
15. End-of-Life Care in Respiratory Failure

Biostatistics and Research methods

Public Health & Epidemiology

1. Epidemiological aspects of major respiratory and public health problems like Asthama,COPD,Interstitial lung disease
2. Occupational & Environmental disorders
3. Smoking related disorders
4. Infective diseases of lung
5. Tuberculosis and Pneumonias.

Surgical Aspects

Surgical interventions in various pulmonary disorders including trauma, tuberculosis and other infections & lung transplantation & minimally invasive interventions.

Medico-Legal Aspects

1. Compensation (occupational lung disorders) Fitness & disability evaluation.
2. Personal Protective measures for occupational health, biosafety guidelines for medical equipment & waste disposal.
3. Human Rights, ethical aspects, consent for procedures/newer drug development.

4. Aspects related to medical procedures & interventions performed in various pulmonary disorders.

Orphan Lung diseases

1. Langerhans cell histiocytosis
2. Lymphangioleiomyomatosis
3. Pulmonary alveolar proteinosis
4. Amyloidosis

Pulmonary Function Testing

1. Spirometry performance and interpretation
2. Static and Dynamic Lung Volumes- Interpretation and Performance
3. Body Plethysmography – Interpretation
4. Gas transfer- Interpretation
5. Blood gas assessment and Oximetry-Interpretation and Performance
6. Bronchial provocation testing- Interpretation and performance
7. Cardiopulmonary exercise testing- Interpretation and performance
8. Assessment of respiratory mechanics- Interpretation
9. Compliance measurements - Interpretation
10. Respiratory muscle assessment – Interpretation
11. Ventilation perfusion measurement – Interpretation
12. Shunt measurement – Interpretation
13. Sleep studies- Interpretation and performance
14. Measurement of regulation of ventilation- Interpretation

Imaging in Chest Medicine

1. Chest X-ray
2. Ultrasound
3. CT Scan
4. MRI
5. PET Scan
6. Others

Nutrition in Respiratory medicine

Medical Emergency Management

1. Management of acute asthma, Pneumothorax/Hydropneumothorax, hemothorax, acute exacerbation of COPD, hemoptysis
2. Cardiopulmonary resuscitation
3. Endotracheal intubation
4. Management of acute respiratory failure and ARDS
5. Pulmonary thromboembolism

Critical care in Pulmonary Medicine

1. Hemodynamic and respiratory monitoring

2. Principles of mechanical ventilation
3. Nutrition in critically ill patients
4. Management of pain and sedation in critical care medicine
5. Ethics and palliative care in ICU settings
6. Organization of intensive care setting

Recent Advances:

1. Recent diagnostic techniques for Tuberculosis
2. Drug development in respiratory medicine.
3. Sleep Medicine
4. Invasive diagnostic techniques
5. Lung in extreme conditions.
6. Role of mechanical Ventilator and setting up of I.R.C.U.
7. Major indications of Surgery in Lung Diseases.
8. Modern concepts of Heart Lung Transplantation.
9. Promotion of Lung functions through exercise and Oxygen supplementation.
10. Recent diagnostics and therapeutic interventions in Lung cancer.

Miscellaneous

1. Approach to Important Clinical Problems
2. Oncology. Lung cancer, benign and malignant with pleural metastasis with primary pleural malignancy
3. Connective tissue disorder, drug induced pulmonary diseases, HIV related pulmonary disease and tuberculosis.

Topics to be included in all subjects:

- **Biostatistics, Research Methodology and Clinical Epidemiology**
- **Ethics**
- **Medico legal aspects relevant to the discipline**
- **Health Policy issues as may be applicable to the discipline**

Training and Practicals

A. Training in Pulmonary Function Testing

Understanding of performing and interpretation of Spirometry, lung volume and diffusion test. A clear understanding of the indications and potential pitfalls in the performance and the limitations of interpretation of pulmonary function testing including reversibility test of airway obstruction and bronchial provocation test.

B. Training in Critical Care Medicine

Trainees will be expected to master the cognitive skills and develop knowledge and understanding of the following:

1. Pathophysiology of Respiratory Failure.
2. Indications and Interpretation of Arterial Blood gas and Electrolytes analysis.
3. Indications and management of invasive and non-invasive mechanical ventilation.
4. Thorough knowledge about Ventilator associated complications.
5. The pharmacology, adverse reactions, efficacy and appropriate use of drugs used in Pulmonology. These include Oxygen, Nebulisations, Bronchodilators, Antibiotics, anti-Tuberculosis drugs, antifungal agents and various cytotoxic drugs.
6. Bronchoscopic procedures in critically ill patients.

C. Training in Asthma & COPD

Clinical Training

1. To identify patients suffering from asthma & COPD.
2. Common diagnostic tests for diagnosis of asthma and COPD
3. To acquire clinical skills in managing exacerbations of asthma and COPD.
4. Training on primary and secondary prevention of asthma.
5. Training of patient education program.
6. Indication and delivery of long term oxygen therapy.

Training Procedure

Use and maintenance of nebulisers, spacers, peakflow meter, Meter Dose Inhalers, CPAP, BIPAP, Humidifier and other appliances.

D. Training in Respiratory Infections

Trainees must master in basic knowledge regarding respiratory infections, including:

1. The mechanisms of inflammation.
2. Elements of the Respiratory defense system (including the mucosal immuno system and the components of mucosal barrier function).
3. The prevalence, clinical presentation of respiratory pathogens (viral, bacterial, fungal, and protozoal).
4. The Pathophysiology of pneumonia, Tuberculosis & other infectious diseases.
5. The indications and contraindications of antimicrobial therapy, mechanisms of microbial drug resistance, and risk of infections from enteric organism.
   Clinical exposure of respiratory infections should include the diagnosis and management of patients with common infectious presentations such as Pneumonias (bacterial, viral, fungal); Tuberculosis & its various presentations (including appropriate antitubercular chemotherapies; in relation to emergence of drug Resistant cases); infections in immunocompromised hosts (e.g., transplantation patients, patients with AIDS).

E . Training in Respiratory Malignancy

Throughout the entire period of training, trainees should participate in the outpatient screening for and diagnosis of all types respiratory malignancy and the outpatient and inpatient management of patient with respiratory cancers. Endoscopic training in the diagnosis and management of respiratory malignancy.

F . Training in Respiratory Endoscopy (Bronchoscopy)

At the completion of training, the trainee should have achieved the following:

1. The ability to recommend bronchoscopic procedures based on findings of a personal consultation and in consideration of specific indications, contraindications, and diagnostic / therapeutic alternatives.

2. The ability to perform a specific procedure safely, completely, and expeditiously.

3. The ability to interperet most bronchoscopic finding correctly.

4. The ability to integrate bronchoscopic findings or therapy into the patient management plan.

5. The ability to understand the risk factors attendant to bronchoscopic procedures and to be able to recognize and manage complications.

6. The ability to recognize personal and procedural limits and to know when to request help.

Guidelines for Bronchoscopic Training in Routine Procedures

The P.G. Students should able to perform Fiberoptic bronchoscopy Including endobronchial biopsy, bronchoalveolar lavage, therapeutic bronchial toileting, transbronchial biopsy, Needle aspiration, Pulmonary rehabilitation and Physiotherapy, RNTCP-OP, Operational Research, Clinical Research & Epidemiology.

The trainee must be exposed to a sufficient number of new and follow-up inpatients and outpatients of varied age(Pediatric, adult and geriatric) and of both sexes and with a variety of common and uncommon Respiratory disorders to permit a broad endoscopic experience. All trainees should have a clear understanding of the indications, limitations, complications, and medical and surgical implications of the findings of respiratory Endoscopy. Essential components of patient safety during endoscopic procedures must be mastered, including the intravenous administration of medications that produce conscious sedation and the application and interpretation of noninvasive patient monitoring devices. Trainees should be familiar with the care, cleaning, and proper maintenance of respiratory equipment. After suitable supervision, the trainee should be capable of independently performing routine respiratory procedures.

Postings:

It is recommended that postings should be undertaken in the following departments:

Intensive Care	: 2 Months
Emergency	: 1 Month
PFT Lab	: 15 Days
Bronchoscopy Lab	: 1 Month
Radiology	: 1 Month
Pathology	: 15 Days
Microbiology & Mycobacteriology	: 15 Days
Sleep Lab	: 15 Days
RNTCP and PMDT	: 1 Month

Competencies

- **History and examination.** History taking and complete physical examination including general examination.

- **Bedside procedures**
  Monitoring skills: Temperature recording, capillary blood sampling, arterial blood sampling.

1. Chest X-ray and interpretation
2. Blood test and serology relevant to Respiratory medicine
3. Sputum induction
4. Sputum analysis
5. Tuberculin skin testing
6. Allergy skin testing
7. Thoracic ultrasound imaging
8. Thoracentesis
9. Closed needle pleural biopsy
10. Medical thoracoscopy
11. Flexible bronchoscopy
12. Transbronchial lung biopsy
13. Transbronchial needle aspiration
14. Endobronchial ultrasound
15. Bronchalveolar lavage
16. Rigid bronchoscopy
17. Interventional bronchoscopic technique including fluorescent bronchoscopy,
18. Brachytherapy, endobronchial radiotherapy, afterloading laser and
19. Electrocoagulation cryotherapy, Photodynamic therapy and airway stents.
20. Transthoracic needle aspiration & biopsy
21. Fine needle lymphnode aspiration for cytology
22. Analysis of exhaled breath components including NO,CO and breath condensate
23. Cytology

Procedures performed collaboratively

1. Thoracic imaging (X-ray, CT, MRI)
2. Nuclear medicine techniques (Pulmonary and Bone scan PET)
3. Electrocardiogram
4. Echocardiography
5. Right heart catheterization
6. Flouroscopy
7. Ultrasound
8. Transoesophageal ultrasound
9. Oesophageal pH monitoring
10. Cytology/Histology
11. Microbiology testing

Treatment modalities and prevention measures

1. Systemic and inhaled drug therapy
2. Chemotherapy
3. Other systemic antitumour therapy
4. Immunotherapy for allergic disorders
5. Oxygen therapy
6. Vaccination and infection control
7. Ventilatory support (Invasive/ Noninvasive/CPAP)
8. Cardiopulmonary resuscitation
9. Assessment for Anaesthesia/Surgery
10. Smoking cessation
11. Endobronchial therapies
12. Intercostal tube drainage
13. Pleurodesis
14. Home care
15. Palliative care
16. Pulmonary rehabilitation
17. Nutritional interventions
18. Surfactant therapy
19. Gene therapy
20. Principles of stem cell therapy
21. Other preventive measures

Core generic abilities

1. Communication including patient education and public awareness
2. Literature appraisal
3. Research
4. Teaching
5. Audit/ quality assurance of clinical practice
6. Multidisciplinary teamwork
7. Administration and management
8. Ethics

Competencies in the fields shared with other specialties

1. RNTCP and Programmatic management of Drug Resistant Tuberculosis field experience
2. Intensive care
3. High dependency units

Knowledge of associated fields relevant to adult Respiratory medicine

1. Thoracic surgery
2. Radiotherapy
3. Paediatric respiratory medicine
4. Chest physiotherapy
5. Other relevant medical specialty.

Further areas relevant to respiratory medicine

1. Epidemiology
2. Research methods
3. Statistics
4. Evidence based medicine
5. Quality of life measures
6. Psychological factors in the development of respiratory diseases
7. Psychological consequences of chronic respiratory diseases
8. Public health issues
9. Organization of Health care
10. Economics of health care
11. Compensation and legal issues

- **Therapeutic skills:**

  - Nasogastric feeding
  - Endotracheal intubation
  - Cardiopulmonary resuscitation
  - Administration of oxygen
  - Venepuncture and establishment of vascular access, administration of fluids, blood, blood components
  - Paranetal nutrition
  - Abscess drainage and basic principles of rehabilitation.

- **Investigative skills:**

  - Sputum microscopy examination, gram stain, ZN stain, gastric aspirate.
  - Pleural, peritoneal, pericardial and lumbar puncture.
  - Pleural biopsy
  - Lung biopsy
  - Fine needle aspiration cytology
  - Trucut biopsy from lung
  - Bronchoscopic alveolar lavage
  - Pulmonary function test
  - Sleep study
  - Bedside investigations. Hemoglobin, TLC, ESR, peripheral smear staining and examination.

- **Interpretation of X-rays of chest, PFT, Ultrasound, CT chest, ECG, ABG findings etc.**

THESIS PROTOCOL & THESIS

The candidates are required to submit a thesis at the end of three years of training as per the rules and regulations of NBE.

Guidelines for Submission of Thesis Protocol & Thesis by candidates

Research shall form an integral part of the education programme of all candidates registered for DNB degrees of NBE. The Basic aim of requiring the candidates to write a thesis protocol & thesis/dissertation is to familiarize him/her with research methodology. The members of the faculty guiding the thesis/dissertation work for the candidate shall ensure that the subject matter selected for the thesis/dissertation is **feasible, economical** and **original**.

Guidelines for Thesis Protocol

The protocol for a research proposal (including thesis) is a study plan, designed to describe the background, research question, aim and objectives, and detailed methodology of the study. In other words, the protocol is the 'operating manual' to refer to while conducting a particular study.

The candidate should refer to the NBE Guidelines for preparation and submission of Thesis Protocol before the writing phase commences. The minimum writing requirements are that the language should be clear, concise, precise and consistent without excessive adjectives or adverbs and long sentences. There should not be any redundancy in the presentation.

The development or preparation of the Thesis Protocol by the candidate will help her/him in understanding the ongoing activities in the proposed area of research. Further it helps in creating practical exposure to research and hence it bridges the connectivity between clinical practice and biomedical research. Such research exposure will be helpful in improving problem solving capacity, getting updated with ongoing research and implementing these findings in clinical practice.

Research Ethics: Ethical conduct during the conduct and publication of research is an essential requirement for all candidates and guides, with the primary responsibility of ensuring such conduct being on the thesis guide. Issues like Plagiarism, not maintaining the confidentiality of data, or any other distortion of the research process will be viewed seriously. The readers may refer to standard documents for the purpose.

The NBE reserves the right to check the submitted protocol for plagiarism, and will reject those having substantial duplication with published literature.

PROTOCOL REQUIREMENTS

1. All of the following will have to be entered in the online template. The thesis protocol should be restricted to the following word limits.

- Title : 120 characters (with spacing) page
- Synopsis [structured] : 250-300
- Introduction : 300-500
- Review of literature : 800-1000
- Aim and Objectives : Up to 200
- Material and Methods : 1200-1600
- 10-25 References [ICMJE style]

2. It is mandatory to have ethics committee approval before initiation of the research work. The researcher should submit an appropriate application to the ethics committee in the prescribed format of the ethics committee concerned.

Guidelines for Thesis

1. The proposed study must be approved by the institutional ethics committee and the protocol of thesis should have been approved by NBE.

2. The thesis should be restricted to the size of 80 pages (maximum). This includes the text, figures, references, annexures, and certificates etc. It should be printed on both sides of the paper; and every page has to be numbered. Do not leave any page blank. To achieve this, following points may be kept in view:

    a. The thesis should be typed in 1.5 space using Times New Roman/Arial/ Garamond size 12 font, 1" margins should be left on all four sides. Major sections viz., Introduction, Review of Literature, Aim & Objectives, Material and Methods, Results, Discussion, References, and Appendices should start from a new page. Study proforma (Case record form), informed consent form, and patient information sheet may be printed in single space.
    b. Only contemporary and relevant literature may be reviewed. Restrict the introduction to 2 pages, Review of literature to 10-12 pages, and Discussion to 8-10 pages.
    c. The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference(s) may be given.
    d. Illustrative material may be restricted. It should be printed on paper only. There is no need to paste photographs separately.

3. Since most of the difficulties faced by the residents relate to the work in clinical subject or clinically-oriented laboratory subjects, the following steps are suggested:
    a. The number of cases should be such that adequate material, judged from the hospital attendance/records, will be available and the candidate will be able to collect case material within the period of data collection, i.e., around 6-12 months so that he/she is in a position to complete the work within the stipulated time.
    b. The aim and objectives of the study should be well defined.
    c. As far as possible, only clinical/laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.
    d. Technical assistance, wherever necessary, may be provided by the department concerned. The resident of one specialty taking up some problem related to some other specialty should have some basic knowledge about the subject and he/she should be able to perform the investigations independently, wherever some specialized laboratory investigations are required a co-guide may be co-opted from the concerned investigative department, the quantum of laboratory work to be carried out by the candidate should be decided by the guide & co-guide by mutual consultation.

4. The clinical residents are not ordinarily expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected OR the use of chemicals or radioisotopes not readily available. They should; however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies should be feasible within the existing facilities.

5. The DNB residents should be able to freely use the surgical pathology/autopsy data if it is restricted to diagnosis only, if however, detailed historic data are required the resident will have to study the cases himself with the help of the guide/co-guide. The same will apply in case of clinical data.

6. Statistical methods used for analysis should be described specifically for each objective, and name of the statistical program used mentioned.

General Layout of a DNB Thesis:

- **Title-** A good title should be brief, clear, and focus on the central theme of the topic; it should avoid abbreviations. The Title should effectively summarize the proposed research and should contain the PICO elements.
- **Introduction-** It should be focused on the research question and should be directly relevant to the objectives of your study.

- **Review of Literature -** The Review should include a description of the most relevant and recent studies published on the subject.

- Aim and Objectives - The ‘Aim’ refers to what would be broadly achieved by this study or how this study would address a bigger question / issue. The ‘Objectives’

of the research stem from the research question formulated and should at least include participants, intervention, evaluation, design.

- **Material and Methods-** This section should include the following 10 elements: Study setting (area), Study duration; Study design (descriptive, case-control, cohort, diagnostic accuracy, experimental (randomized/non-randomized)); Study sample (inclusion/exclusion criteria, method of selection), Intervention, if any, Data collection, Outcome measures (primary and secondary), Sample size, Data management and Statistical analysis, and Ethical issues (Ethical clearance, Informed consent, trial registration).

- **Results-** Results should be organized in readily identifiable sections having correct analysis of data and presented in appropriate charts, tables, graphs and diagram etc.

- **Discussion–**It should start by summarizing the results for primary and secondary objectives in text form (without giving data). This should be followed by a comparison of your results on the outcome variables (both primary and secondary) with those of earlier research studies.

- **Summary and Conclusion-** This should be a précis of the findings of the thesis, arranged in four paragraphs: (a) background and objectives; (b) methods; (c) results; and (d) conclusions. The conclusions should strictly pertain to the findings of the thesis and not outside its domain.

- **References-** Relevant References should be cited in the text of the protocol (in superscripts).

- **Appendices -**The tools used for data collection such as questionnaire, interview schedules, observation checklists, informed consent form (ICF), and participant information sheet (PIS) should be attached as appendices. Do not attach the master chart.

Thesis Protocol Submission to NBE

1. DNB candidates are required to submit their thesis protocol within 90 days of their joining DNB training.

2. Enclosures to be submitted along with protocol submission form:
    a) Form for Thesis Protocol Submission properly filled.
    b) Thesis Protocol duly signed.
    c) Approval letter of institutional Ethical committee. *(Mandatory, non receivable of any one is liable for rejection)*

Thesis Submission to NBE

1. As per NBE norms, writing a thesis is essential for all DNB candidates towards partial fulfillment of eligibility for award of DNB degree.
2. DNB candidates are required to submit the thesis before the cut-off date which shall be 30th June of the same year for candidates appearing for their scheduled December final theory examination. Similarly, candidates who are appearing in their scheduled June DNB final examination shall be required to submit their thesis by 31st December of preceding year.
3. Candidates who fail to submit their thesis by the prescribed cutoff date shall NOT be allowed to appear in DNB final examination.
4. Fee to be submitted for assessment (In INR): 3500/-
5. Fee can be deposited ONLY through pay-in-slip/challan at any of the Indian bank branch across India. The challan can be downloaded from NBE website www.natboard.edu.in
6. Thesis should be bound and the front cover page should be printed in the standard format. A bound thesis should be accompanied with:
    a. A Synopsis of thesis.
    b. Form for submission of thesis, duly completed
    c. NBE copy of challan (in original) towards payment of fee as may be applicable.
    d. Soft copy of thesis in a CD duly labeled.
    e. Copy of letter of registration with NBE.

7. A declaration of thesis work being bonafide in nature and done by the candidate himself/herself at the institute of DNB training need to be submitted bound with thesis. It must be signed by the candidate himself/herself, the thesis guide and head of the institution, failing which thesis shall not be considered.

The detailed guidelines and forms for submission of Thesis Protocol & Thesis are available at www.natboard.edu.in.thesis.php.

LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book .

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.

Leave Rules

1. DNB/FNB Trainees are entitled to avail leave during the course of DNB/FNB training as per the Leave Rules prescribed by NBE.
2. A DNB/FNB Trainees can avail a maximum of 30 days of leave in a year excluding regular duty off/ Gazetted holidays as per hospital/institute calendar/policy. This leave shall be processed at the institutional level.
3. Any kind of study leave is not permissible to DNB/FNB Trainees.
4. Under normal circumstances leave of one year should not be carried forward to the next year. However, in exceptional cases such as prolonged illness, the leave across the DNB/FNB training program may be clubbed together with prior approval of NBE.
5. Unauthorized absence from DNB/FNB training for more than 7 days may lead to cancellation of registration and discontinuation of the DNB/FNB training and rejoining shall not be permitted.
6. Any Leave availed by the candidate other than the eligible leave (30 days per year) shall lead to extension of DNB /FNB training. The training institute has to forward such requests to NBE along with the leave records of the candidate since his/her joining and supporting documents (if any) through the Head of the Institute with their recommendation/comments. NBE shall consider such requests on merit provided the seat is not carried over and compromise with training of existing trainees in the Department.
7. Any extension of DNB/FNB training beyond the scheduled completion date of training is permissible only under extra-ordinary circumstances with prior approval of NBE. Such extension is neither automatic nor shall be granted as a matter of routine.
8. DNB/FNB trainees are required to complete their training by a prescribed cutoff date (as per information bulletin of Exit exam) for being eligible to DNB/FNB Exit examination.
9. The eligibility for DNB/FNB Final Examination shall be determined strictly in accordance with the criteria prescribed in the respective information bulletin.

10. Candidates join on or after 2018 can avail Maternity / Paternity leave, as per the Central or State Government policies, whichever is applicable to DNB/FNB training institute.
11. DNB/FNB trainees are eligible for stipend either during the leave period or extension of training period as per the policies of DNB/FNB training institute and prevailing rules.

EXAMINATION

FORMATIVE ASSESSMENT

Formative assessment includes various formal and informal assessment procedures by which evaluation of student's learning, comprehension, and academic progress is done by the teachers/ faculty to improve student attainment. Formative assessment test (FAT) is called as "Formative "as it informs the in process teaching and learning modifications. FAT is an integral part of the effective teaching .The goal of the FAT is to collect information which can be used to improve the student learning process.

Formative assessment is essentially positive in intent, directed towards promoting learning; it is therefore part of teaching. Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability. The assessment scheme consists of Three Parts which has to be essentially completed by the candidates.

The scheme includes:-

Part I:- Conduction of theory examination
Part-II :- Feedback session on the theory performance
Part-III :- Work place based clinical assessment

Scheme of Formative assessment

PART – I	**CONDUCT OF THEORY EXAMINATION**	Candidate has to appear for Theory Exam and it will be held for One day.
PART – II	**FEEDBACK SESSION ON THE THEORY PERFORMANCE**	Candidate has to appear for his/her Theory Exam Assessment Workshop.
PART – III	**WORK PLACE BASED CLINICAL ASSESSMENT**	After Theory Examination, Candidate has to appear for Clinical Assessment.

The performance of the resident during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student

1. Personal attributes:

- **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.
- **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

2. Clinical Work:

- **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
- **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
- **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
- **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

3. Academic Activity: Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

FINAL EXAMINATION

The summative assessment of competence will be done in the form of DNB Final Examination leading to the award of the degree of Diplomate of National Board in Respiratory Diseases. The DNB final is a two-stage examination comprising the theory and practical part. An eligible candidate who has qualified the theory exam is permitted to appear in the practical examination.

Theory Examination

1. The theory examination comprises of ***Four*** papers, maximum marks 100 each.
2. There are 10 short notes of 10 marks each, in each of the papers. The number of short notes and their respective marks weightage may vary in some subjects/some papers.
3. Maximum time permitted is 3 hours.
4. Candidate must score at least 50% in the aggregate of ***Four*** papers to qualify the theory examination.
5. Candidates who have qualified the theory examination are permitted to take up the practical examination.
6. The paper wise distribution of the Theory Examination shall be as follows:

Paper 1	Basic sciences related to the specialty Research Methodology
Paper 2	Principles and practices of Respiratory diseases General Medicine related to Respiratory medicine

Paper 3	Tuberculosis: Pulmonary and Extra Pulmonary Critical care medicine and sleep medicine
Paper 4	Diagnostic procedures and skills Recent advances and Investigations

a) Practical Examination:

1. Maximum Marks: 300.
2. Comprises of Clinical Examination and Viva.
3. Candidate must obtain a minimum of 50% marks in the Clinical Examination (including Viva) to qualify for the Practical Examination.
4. There are a maximum of three attempts that can be availed by a candidate for Practical Examination.
5. First attempt is the practical examination following immediately after the declaration of theory results.
6. Second and Third attempt in practical examination shall be permitted out of the next three sessions of practical examinations placed alongwith the next three successive theory examination sessions; after payment of full examination fees as may be prescribed by NBE.
7. Absentation from Practical Examination is counted as an attempt.
8. Appearance in first practical examination is compulsory;
9. Requests for Change in center of examination are not entertained, as the same is not permissible.
10. Candidates are required not to canvass with NBE for above.

Declaration of DNB Final Results

1. DNB final is a qualifying examination.
2. Results of DNB final examinations (theory & practical) are declared as PASS/FAIL.
3. DNB degree is awarded to a DNB trainee in the convocation of NBE.

RECOMMENDED TEXT BOOKS AND JOURNALS

a. Text Books

- Fishmen's Pulmonary Diseases and Disorders
- Croftan's Pulmonary Diseases
- Fraser & Pare's Diagnosis of the Diseases of the Chest
- Murray and Nadel – Textbook of respiratory medicine
- Pleural Diseases by Light. 5th Edition Lippincott, 2007.
- Tuberculosis by Dr. S.K Sharma
- Manual of Tuberculosis by Dr. Rajendra Prasad first edition 2015 jaypee brothers medical publishers.
- MDR and XDR Tuberculosis by Dr. Rajendra Prasad first edition 2015 jaypee brothers medical publishers.
- Atlas of Fibreoptic Bronchoscopy by Dr. Rajendra Prasad
- Atlas of Fibreoptic Bronchoscopy by Dr. Uday B Prakash
- George and Light – Essentials of Pulmonary and Critical Care Medicine
- Gibson –Textbook of Respiratory Medicine
- Egan's Fundamentals of Respiratory Care. 4th edition, Lippincott, 2005.
- Principles of Chest X-ray Diagnosis – Simon. 4th edition JayPee Bros, 1999.
- Respiratory Physiology JB west – 8th edition, LANGE McGraw Hill, 2008.
- Paul Marino – The ICU book – 3rd Edition Lippincott, 2005.
- Sleep Medicine – Kryger. 4th Edition Elsevier, 2005.
- Thoracic imaging –Webb & Higgins Lippincott, 2005.
- Diagnostic thoracic imaging – Miller, McGraw Hill 2006.
- Macleods – Clinical Examination-11th edition Churchill Livingstone, 2006.
- Davidson –Principles and Practice of Medicine. 21st Edition
- Churchill Livingston, 2010.Udwadia- Principles of critical care – 2nd Edition Oxford, 2007.
- Chang – Clinical Applications of Mechanical Ventilation. 3rd Edition Thomson, 2008.
- Clinical respiratory Medicine – Albert & Spiro-3rd Edition Elsevier Mosby, 2003.
- Synopsis of Diseases of the Chest –Fraser & Spiro-3rd Edition Elsevier, 2005.
- Tuberculosis – Case finding by Toman. 2nd Edition WHO Publication, 2004.
- Clinical Tuberculosis-Diagnosis and treatment by Dr. Rajendra Prasad first edition 2015 jaypee brothers medical publishers.

b. Journals

- Indian J Tuberculosis
- Chest
- Chest Clinics
- Lung India
- Indian Journal of Chest diseases and allied sciences
- Indian Journal of tuberculosis
- Thorax
- International Journal of TB and Lung Diseases
- American Journal of Respiratory and Critical care medicine
- European Respiratory journal
- European Respiratory review
- The Lancet Respiratory
- British Medical journal
- Journals of Indian medical association
- New England Journal of Medicine
- Journal of association of physicians of India
- Clinics in chest medicine
- American journal of roentgenology
- Cancer
- Cancer research
- Journal of thoracic and cardiovascular surgery
- Respiration
- Current opinion in pulmonary medicine
- Breathe

******