



Quality Assurance Unit



**Tanta University
Faculty of Medicine**

Department of Chest

**Course Specifications
(2nd part , 4th semester)**

Chest Diploma Degree

2021-2022

Chest Diploma Degree Course Specifications, 2nd part, 4th semester

University: T anta

Faculty: Medicine

Department: Chest

A- Administrative Information

1. Course title: Diploma. Chest Diseases
2. Department offering the program: Chest Department
3. Department responsible for the course: Chest Department
4. Course code: 7007
5. Level: 2nd part, 4th semester: 9 credit-hours. (15 weeks)
6. No. of Credit / taught hours:

| The course | Obligatory (Theoretical) | Practical | Scientific activity | Elective |
|-----------------|-----------------------------|-------------|------------------------|-------------|
| Credit hours | 4 hours | 3hours | 1 hour | 1 hours |
| Taught hours | 60 Hours | 90 hours | 60 hours | 15 hours |

7. Authorization date of course specification: 21/8/2019

B- Professional Information

1 – Overall Course aims

Purpose of the curriculum:

The purpose of this curriculum is to provide the basis for training in the specialty of Chest Diseases to the level of award of a Certificate of Completion of Training. At this level, the doctor should have the knowledge, skills, attitudes and competencies to practice as an independent specialist practitioner, at Consultant level.

Professionalism is a difficult quality to define. One definition proposed by the Royal College of Physicians is “a set of values, behaviors’ and relationships that underpin the trust that the public has in the profession.” Professionalism includes the ability to deal with diagnostic and therapeutic uncertainty. Whilst this curriculum attempts to spell out the knowledge, skills attitudes and behaviors’ that underpin training in Chest Diseases, the attributes which make up the “professional” specialist are much more than the simple sum of all these added together. The progression from candidate to professional requires, in addition to the simple acquisition of the building blocks described in this curriculum, the development of a high degree of personal and professional maturity and this requires time, experience and the internalization by the candidate of a whole variety of attributes that he/she is exposed to in the work place. In part, this also involves learning by example, such that it is incumbent on all trainers

to ensure that their candidates are exposed to appropriate work place and learning environments.

OBJECTIVES OF CHEST DISEASES SPECIALTY CURRICULUM:

The candidate will be given the opportunity to become competent in:

1. Establishing a differential diagnosis for patients presenting with clinical features of respiratory disease by appropriate use of history, clinical examination and appropriate investigations.
2. Applying knowledge derived from the appropriate basic sciences which are relevant to Chest Diseases.
3. Applying appropriate and sufficient knowledge and skills in the diagnosis and management of patients with respiratory disease to ensure safe independent practice at NHS independent Consultant Specialist level.
4. Developing a management plan for the "whole patient." This should include not only the appropriate treatment but also take into account health promotion, disease prevention, long-term management plans and palliative care medicine where appropriate.

2 – Intended learning outcomes (ILOs):

a. knowledge and understanding:

By then, end of the Course the candidate will have gained knowledge and systematic understanding of:

- a.1. Identify the basic science in relation to respiratory medicine.
- a.2. Discuss the various causes and pathogenesis of diseases in respiratory medicine.
- a.3. Discuss the methods of promoting health and preventing diseases in respiratory medicine, including nutrition, exercise, life styles, physiological health, genetic predisposition to disease, sanitation, environmental and work place hazards, preventive pharmacology and immunization.
- a.4. Express the clinical manifestations and differential diagnosis of respiratory diseases with an emphasis on the incidence of the different manifestations and their relative importance in establishing the diagnosis, and the early manifestations of serious diseases .
- a.5. Explain the scientific basis and interpretation of diagnostic studies with knowledge of the study / studies of choice in any specific situation and of the accuracy of the study in establishing diagnosis.
- a.6. Express the principles, the indications, the relative advantages and disadvantages of various therapeutic modalities including mental health care and behavioral modification, nutritional therapy, pharmacotherapy, surgery, radiotherapy,

immunotherapy and physical rehabilitation as applied to common clinical situations in respiratory medicine.

a.7. Express the principles of genetics, the role of genetics in health and disease and the basic principles of gene therapy and genetic counseling in respiratory medicine.

a.8. Summarize the theories and principles that govern ethical decision making in clinical practice and the major ethical dilemmas in respiratory medicine, particularly those that arise at the beginning and the end of life and from the rapid expansion of medical knowledge and technology.

a.9. Identify the relevant airways and pulmonary vascular structures and their relation to each other in order to help the candidate while performing invasive bronchoscopy or non invasive imaging by all imaging techniques (e.g. CT, MSCT pulmonary angiography and MRI)

a.10. Discuss the physiological basis of control of breathing (central & peripheral).

a.11. Specify information from different types of sample from the lung, view of the pathologist.

a.12. Summarize the classification, mode of action, indications, contraindications, interactions and adverse effects of drugs used in the field of pulmonary medicine especially asthma, COPD and Tuberculosis.

a.13. Outline the WHO International Health Regulations (2005)

a.14. Outline WHO Epidemic and Pandemic Alert and Responses (EPR)

a.15. Define and classify hormonal disorders related to chest diseases.

b. Intellectual skills:

By the end of the Course the trainee will be able to:

(b.1.) Data acquisition:

b.1.1. Obtain and document a complete and a focused medical history for a patient with respiratory disease.

b.1.2. Perform and document a complete and a focused physical and mental status examination for a patient.

b.1.3. Perform an emergency - directed examination for patients with common respiratory emergencies.

b.1.4. Utilize sources of information in addition to the patient interview to augment the medical history. Such sources include family or friends, medical records and other health care professionals.

b.1.5. Identify anatomic landmarks on postmortem specimens

b.1.6. Interpret results of physiologic tests such as pulmonary function tests, arterial blood gases and electrolyte analysis.

b.1.7. To define the place of bronchoalveolar lavage (BAL) and lung biopsy in the diagnostic work-up of diffuse lung disease.

b.1.8. Take a relevant history of a patient's medication regimen

(b.2.) Data analysis and problem solving:

b.2.1. Interpret patient symptoms and physical findings in terms of their anatomic, pathologic and functional diagnostic significances.

b.2.2. Identify problems, prioritize them, and generate a list of initial diagnostic hypotheses (differential diagnosis) for each problem.

b.2.3. Select the most appropriate and cost effective diagnostic and therapeutic producers for each problem.

b.2.4. Interpret the results of diagnostic procedures.

b.2.5. Use the results of all tests ordered to modify the problem list and the differential diagnosis accordingly.

b.2.6. Combine the clinical and investigational database, with the evidence based knowledge in clinical problem solving.

b.2.7. Clinical assessment of different cardiac, renal and hepatic diseases and their impact on the chest.

(b.3.) Skills related to treatment strategies:

b.3.1. Recognize patients with immediately life-threatening conditions and institute appropriate initial therapy.

b.3.2. Recognize patients with serious conditions requiring critical care and institute course of management according guide lines available.

b.3.3. Design and apply rational therapeutic strategies for both acute and chronic conditions that take into account the various variables that influence these strategies.

b.3.4. Deal with complications of respiratory diseases.

b.3.5. Identify and manage patients with chronic conditions requiring long term follow-up, rehabilitation, or relief of pain.

b.3.6. Achieve consensus with the patient or the patient's relatives on the treatment plan selected.

b.3.7. Monitor the effectiveness of therapy by identifying clinical and investigative parameters to be used in assessing the patient's response to treatment and re-evaluate management plan accordingly.

c. Professional and practical skills:

By the end of the Course the trainee will be able to:

(c.1.) Communication skills:

(c.1.1.) Patient- doctor relationship

c.1.1.1. Apply respect to all patients irrespective of their socioeconomic levels, culture or religious beliefs and use language appropriate to the patient's culture.

c.1.1.2. Conduct patient interviews that are characterized by patience and attentive listening.

c.1.1.3. Explain to the patient or the patient's relatives the nature of illness, the diagnostic plan, the treatment options and the possible complications in such a way that is easily understood, answers patient's questions, encourages discussion and promotes the patient's participation in decision making.

c.1.1.4. Write clear concise patient records: admission sheet, progress notes, physician orders, and referrals for consultation, discharge summary and follow-up notes.

c.1.1.5. Use appropriate skills and strategies of communication during difficult situations such as giving bad news and dealing with angry patients.

c.1.1.6. Discuss medical errors or professional mistakes honestly and openly in a way that promotes patient trust and self-learning.

(c.1.2.) Relation to collaboration with healthcare professionals:

c.1.2.1. Communicate effectively with other health care professionals to maximize patient benefits and minimize the risk of errors.

c.1.2.2. Respect the role and contributions of other health care professionals regardless of degree or occupation.

c.1.2.3. Undertake appropriate formal and informal consultations with colleagues and perform appropriate referrals to other health care professionals.

c.1.2.4. Write a concise and informative report on patient(s) conditions.

c.1.2.5. Work effectively as a member or a leader of an interdisciplinary team, and acquire the ability to develop and apply management plans for patients in collaboration with the members of the team.

c.1.2.6. General measures to reduce spread of infection in hospital wards

d. General and transferable skills:

by the end of the course the trainee will be able to

(d.1.) Life-long learning:

d.1.1. Show commitment to life-long self-learning.

d.1.2. Use the sources of biomedical information to remain current with advances in knowledge and practice.

d.1.3. Frame a question, search the literature and utilize the obtained information to solve a particular clinical problem or plan management of an individual patient according to the principles of Evidence-Based Medicine.

d.1.4. Know the principles of critical Appraisal of scientific research.

(d.2.) Ethical behavior:

d.2.1. Identify alternatives in difficult ethical choices, analyze considerations supporting different alternatives and formulate course of action that takes account of this ethical complexity.

d.2.2. Behave towards patients in a manner consistent with the ideals of profession by consistently doing the following:

d.2.3. Treat the patient as a person, not a disease, and understand that the patient is a person with beliefs, values, goals and concerns which must be respected.

d.2.4. Respect the patient's dignity, privacy, information confidentiality and autonomy.

d.2.5. Deliver care in a way that will allow the patient to feel he / she has received medical care in a caring, compassionate and human manner.

d.2.6. Maintain honesty and integrity in all interactions with patients, patient's families, colleagues and others with whom physicians must interact in their professional lives.

d.2.7. Maintain a professional image in manner, dress, speech and interpersonal relationships that is consistent with the medical profession's accepted contemporary standards in the community.

d.2.8. Be responsible towards work and in emergency situations.

d.2.9. Advocate the patient's interests over ones' own interests.

d.2.10. Provide care to patients who are unable to pay.

d.2.11. Recognize and effectively deal with unethical behavior of other members of the healthcare team.

d.2.12. The trainee should consider the cost implications of cost benefit of various treatment modalities.

(d.3.) skills related to social and community context of healthcare:

d.3.1. Define the Egyptian healthcare system and the community based resources and services and properly-utilize them to provide high quality and cost-effective patient and community care.

d.3.2. Participate actively in health promotion, disease prevention.

d.3.3. Deal appropriately with a specific community health problem

1. Obligatory hours

4 credit hours = 60 taught hours distributed as follows:

- | | |
|---|---------|
| 1. Thoracic tumours | 5 hours |
| 2. Respiratory infections excluding tuberculosis and non-tuberculous mycobacterial diseases | 5 hours |
| 3. Tuberculosis (TB) including extrapulmonary TB and non-tuberculous (opportunistic) mycobacterial diseases | 5 hours |
| 4. Pulmonary vascular diseases | 5 hours |
| 5. Occupational and environmental diseases | 4 hours |
| 6. Diffuse parenchymal (interstitial) lung diseases and orphan lung diseases | 5 hours |
| 7. Pleural diseases | 4 hours |
| 8. Diseases of the chest wall, respiratory muscles , diaphragm | 3 hours |
| 9. Mediastinal diseases | 3 hours |
| 10. Pleuro-pulmonary manifestations of systemic/extrapulmonary disorders | 4 hours |
| 11. Genetic and developmental disorders | 3 hours |
| 12. Allergic and eosinophilic lung diseases excluding asthma | 3 hours |
| 13. Respiratory manifestations of immunodeficiency disorders | 3 hour |
| 14. Lung transplantation | 3 hours |
| 15. Pleural procedures | 3 hours |
| 16. Pediatric pulmonary Medicine | 2 hours |

2. Practical training:

3 credit hours =Total 90 hours .

Clinical problems that must be observed, managed under supervision & managed independently by Pulmonary Medicine candidate

Pneumonia

Pulmonary & extra pulmonary tuberculosis

Pleural effusion & empyema

Pneumothorax

Interstitial lung diseases especially IPF and sarcoidosis

Pulmonary embolism

Pulmonary hypertension and cor pulmonale

Lung Neoplasm

Mediastinal Lesion

Pulmonary manifestations of systemic diseases

Pregnancy and different chest diseases

Patients who are in need for pulmonary rehabilitation

3. Scientific activity

1credit hour =Total 60 hours.

a- Seminars and bedside teaching:

1 taught hour /week

b- Workshops, Congresses, Thesis discussion and Chest conferences:

N.B: Those which have credit hours will be accepted as it is.

c- Practical procedures:

Each procedure has 1 scientific hour.

The candidate should fulfill at least 10 different procedures.

| Procedure/ Investigation | Level of participation | Level of Competence |
|-----------------------------|--------------------------------|------------------------|
| Spirometry | Interpret Report | III |
| ABG | Attend Interpret Perform | III |
| Thoracocentesis | Attend Perform | III |
| FOB: BAL | Attend Assist Perform | III |
| FOB: NB | Attend Assist Perform | II |
| Noninvasive ventilation | Attend | |

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| Procedure/ Investigation | Level of participation | Level of Competence |
|--|---|------------------------|
| | Assist Perform | III |
| Invasive ventilation | Attend Assist | II |
| Endotracheal intubation | Attend assist Perform | II |
| Polysomnography & Sleep studies | Attend Perform | II |
| Pulmonary rehabilitation & physiotherapy | Attend assist Perform | III |
| Nutritional support in ICU | Attend assist Perform | III |
| CXR & CT | Interpret Report | III |
| Thoracoscopy | Attend Observe | II |
| Intercostal intubation & pleural biopsy | Attend & observe | II |
| ECG & Echocardiography | Perform & interpret Attend & interpret | III II |
| Rigid bronchoscopy | Attend & observe | II |
| Cardio-pulmonary resuscitation | Attend & assist | III |

| Procedure/ Investigation | Level of participation | Level of Competence |
|------------------------------|-------------------------------|------------------------|
| | Perform | |
| Advanced pulmonary functions | Attend & observe Interpret | II |

Definition of the levels of competence

Level I: Experience of selecting the appropriate diagnosis modality & interpreting the results or choosing an appropriate treatment for which the patient should be referred. This level of competence does not include performing a technique.

Level II: Practical experience, but not as an independent operator (has assisted in or performed a particular technique under the guidance of a superior staff).

Level III: Is able to independently perform the technique or procedure unaided.

4-Teaching and learning methods

The following methods of teaching and learning will be used:

1) Apprenticeship learning (experiential learning):

- Observation b-1,b-2,b-3
- Assisting b-2, b-3, d-3
- Participation c-1, d-3
- Supervised Performance d-1,d-2, d-3
- Independent Performance b-1,b-2,b-3 ,c-1,d-1,d-2,d-3.

2) Formal Teaching

- Lectures a-1, a-2,a-3.
- Seminars a-4, a-5, a-6, a-7.
- Clinical ward rounds b-1,b-2,b-3 ,c-1,d-1,d-2,d-3
- Crash courses
- Workshops. d-1, d-2, d-3.

3) Self study

- Library a 1- 10
- Textbook a 1- 10
- Journals d-1, d-2, d-3.

- Internet b-1,b-2,b-3,d-1,d-2,d-3
- 4) Meetings and Conferences c-2, d-1,d-2,d-3
- 5) Supervised Research b-1,b-2, c-2, d-1

5-Student Assessment

The general rules and regulations of assessment approved by Tanta University.

End semester assessment:

- Log book:
All candidates must successfully fulfill at least 75% attendance of theoretical, practical training and scientific activity.

End semester exam :

At the 15th week, All candidates must successfully pass exam in form of MCQ exam for theoretical and practical training.

6- List of references

6.1 Course notes

6.2 Text book

Fishmann's Chest Diseases

Murray Pulmonary Medicine

Crofton and Douglas Pulmonary Medicine

6.3 Recommended books

6.4 Periodicals and web site

American Review Respiratory and Intensive Care Medicine

European Respiratory Journal

Chest

Thorax

7-Other resources/ facilities required for teaching and learning to achieve the above ILOs

None

8-we certify that all of the information required to deliver this course is contained in the above specifications and will be implemented

We verify that the above Course and the analysis of students and external evaluator opinions are accurate.

Course coordinator and head of department

name.....signature.....Date.....

Head of quality assurance unit:

name.....signature.....Date.....

The ILOs of the 4th semester course specifications included in the appendix are integral part of this course program.

Appendix

A. Practical training ILOs

1 Breathlessness

Objective

- ◆ Be competent to carry out specialist assessment of severity and form a structured differential diagnosis leading to appropriate further investigation and management
- ◆ Candidate must have experience (minimum of 2 years) in dealing with patients presenting with chronic symptoms in outpatient department
Or acute symptoms in acute/emergency admissions unit
- ◆ Be able to manage the breathless patient effectively

Knowledge

- ◆ Causes of breathlessness
- ◆ Differentiate cardiac, respiratory, neuromuscular and metabolic causes
- ◆ Know and understand pathogenesis of causes
- ◆ Know and understand management/treatment
- ◆ Pharmacology of drugs used
- ◆ Relevant guidelines

Skills:

- ◆ Performance and interpretation of spirometry (competence)
- ◆ Interpretation of other appropriate Lung Function Tests (competence)
- ◆ Interpretation of Chest Radiology:
 - Chest X-Ray
 - V/Q scans
 - Chest CT scans (competence))
- ◆ Performance and interpretation of arterial blood gases (competence)
- ◆ Use of inhaled and nebulised drug therapy (competence)

2 Cough

Objective

- Be competent to carry out specialist assessment and form a structured differential diagnosis of causes leading to appropriate further investigation and management
- Candidate must have experience in assessing patients referred to the outpatient department with cough (minimum of 2 years)

- Be able to manage the patient with cough effectively

Knowledge

- Causes of cough with:
Normal CXR
Abnormal CXR
- How to formulate an appropriate differential diagnosis
- Appropriate investigation of cough, including specialist studies
- ENT causes
- Management/treatment of cough linked to underlying diagnosis
- Pharmacology of drugs used
- Relevant guidelines

Skills:

- Performance and interpretation of spirometry.
- Interpretation of other appropriate Lung Function Tests
- Interpretation of Chest Radiology
- Special investigations, including bronchoscopy
- Use of inhaled and nebulised drug therapy.

3 Haemoptysis

Objectives

- Be competent to undertake specialist assessment and form a structured differential diagnosis in patients with haemoptysis leading to appropriate further investigation and management
- Candidate must have experience of patients presenting with:
 - haemoptysis in outpatient setting
 - acute severe haemoptysis in acute/emergency admissions unit setting (minimum of 2 years)
- Be able to manage the patient with haemoptysis effectively

Knowledge

- Causes of haemoptysis
- How to assess severity and formulate diagnostic strategy
- How to formulate management plan, appropriate to degree of urgency
- Need for interventional radiology/surgery
- Relevant guidelines

Skills:

- Interpretation of Chest Radiology
- Bronchoscopy
- Resuscitation, including basic airway skills

4 Pleuritic Chest Pain

Objectives:

- ❖ Be competent to undertake specialist assessment and form structured differential diagnosis in patients with pleuritic chest pain
- ❖ Candidate must have experience in dealing with patients presenting with
 - chronic symptoms in outpatient department
 - acute symptoms in acute/emergency admissions unit
- ❖ Be able to manage the patient with pleuritic chest pain effectively

Knowledge:

- ❖ Causes of pleuritic chest pain
- ❖ Understand pathogenesis of causes
- ❖ Differential diagnosis of causes
- ❖ How to formulate a plan of investigation, including appropriate use of ultrasound, closed and CT-guided pleural biopsy and Medical Thoracoscopy
- ❖ Treatments and Management
- ❖ Pharmacology of drugs
- ❖ Relevant guidelines

Skills:

- ❖ Interpretation of Chest Radiology including Chest XRay, V/Q scans, CT scans, CTPA scans
- ❖ Pleural biopsy
- ❖ Ultrasound
- ❖ Medical Thoracoscopy (knowledge of; some candidates may gain experience)

5 Abnormal Chest X-Ray

Objectives:

- Be competent to assess and form differential diagnosis in patients with:
 - localized abnormalities on chest x-ray, for instance mass lesions
 - diffusely abnormal chest x-ray, for instance interstitial pulmonary fibrosis
- Candidate must have experience in dealing with patients presenting with the following throughout training:
 - abnormal chest x-ray in outpatient department
 - abnormal chest xray in acute/emergency admissions unit
- Be able to formulate an appropriate plan for investigation and management

Knowledge:

- Causes of abnormal Chest X-Ray
- Differential diagnosis of causes
Know and understand pathogenesis of causes
- Know how to formulate plan for further investigation and management

Skills: Interpretation of Chest Radiology

B. Practical Procedures ILOs

1– Tuberculin Skin Tests

Objective

- Be able to perform (competence/experience) and interpret (competence) tuberculin skin tests

Knowledge

- Types of tuberculin tests
- Indications for tuberculin tests
- How to read tuberculin tests
- Relevant guidelines
- Understand relative roles of tuberculin skin tests and gamma - interferon tests

Skills

- Perform (competence/experience) and read/interpret (competence) tuberculin tests
- Document sufficient patients in training record

2 – Intensive Care (ICU) and High Dependency Units (HDU)

Objective

- Be competent to recognize patients who will benefit from intensive care or high dependency units
- Have knowledge and experience of the care provided in intensive care and high dependency units
- Candidate may care for inpatients in ICU and HDU during their clinical placements. Candidate must also spend at least 60 working days in an intensive care unit approved by the Regional Chest Diseases STC/PD. Ideally this should occur in one block. If this is not possible, 4 units of 15 consecutive working days is acceptable
- Candidates may have to be seconded to a specialized unit to gain experience as this is not available in all placements

Knowledge

- Conditions requiring ICU and HDU, particularly Acute Respiratory Distress Syndrome (ARDS) and septic syndromes
- Knowledge of measures used to monitor and support all vital organ systems in an intensive care unit
- Requirements for an adequately staffed and equipped unit
- Interaction of anaesthetists physicians, surgeons, nurses, microbiologists, physiotherapists, dieticians
- Role of the multidisciplinary team in ICU and HDU
- Knowledge of the interface between ICU/HDU and the general/specialty wards, including outreach services
- Relevant guidelines

Skills

- ALS skills (competence)
- Basic airway skills (competence)
- Ability to advise on and manage respiratory patients on ICU and HDU (competence)
- Ability to advise on the respiratory care of general patients on ICU and HDU (competence)
- Ventilatory support modalities (competence in C-PAP and NIV; experience of mechanical ventilation and mechanical ventilation strategies)
- Chest drain insertion (competence)
- Bronchoscopy (competence)

3. Closed Pleural Biopsy and Thoracic Ultrasound

Objective

- Be safe, efficient and competent at pleural biopsy (optional)
- Have knowledge of the technique of physician practiced thoracic ultrasound

Knowledge:

- Indications for closed pleural biopsy
- Various techniques of closed pleural biopsy, both blind and image guided
- The role of physician - practised thoracic ultrasound
- Patient consent and explanation of risks and benefits
- Relevant guidelines

Skills:

- Be competent in safely performing closed blind pleural biopsy. A minimum of 10 should be recorded in the training record

- Initially candidate should be under the supervision of a senior colleague skilled in the performance of this technique and then perform independently when competent
- Some candidates may wish to acquire training in thoracic ultrasound.

C. Obligatory ILOs

1: Thoracic tumours (TT)

Knowledge

- Definition, classification and aetiology of TT: lung cancer (LC), mesothelioma (M), metastatic TT (MTT), benign intrathoracic

tumours, mediastinal (MT), chest wall tumours, sarcoma and lymphoma (L)

- Epidemiology of TT
 - Risk factors for LC, M and L
 - Clinical symptoms, syndromes and physical signs of TT including paraneoplastic syndromes
 - Relevant investigations: noninvasive (chest X-ray, ultrasound, fluoroscopy, CT, MR, nuclear techniques, PET-CT) and invasive (sampling methods for cytology and histology).
 - Tumour markers
 - Histological and TNM classification of TT
 - Performance status
 - Therapeutic modalities in LC, M, MT and in other TT: chemotherapy (including targeted molecular therapy), radiotherapy, interventional bronchoscopic techniques, palliative therapy, best supportive care
 - Indications for surgical interventions (pathological assessment, functional assessment and pre-operating staging)
 - Complications of surgery, chemotherapy and radiotherapy
 - Prognosis (survival, functional consequences, disability)
 - Rehabilitation
- ##### Skills:
- Application of the above knowledge
 - Evaluation of functional status
 - Sputum induction

- Flexible bronchoscopy, rigid bronchoscopy
- Endobronchial ultrasound
- Transbronchial lung biopsy
- Transbronchial needle aspiration
- Percutaneous needle biopsy
- Fine needle lymph node aspiration for cytology
- Pleural ultrasound imaging
- Thoracocentesis
- Interventional bronchoscopic techniques
- Medical thoracoscopy (level 2#)
- Pleural drainage
- Chemotherapy, management of adverse events
- Palliative care

Behaviour and attitudes

- Multidisciplinary approach

2: Respiratory infections excluding tuberculous and non-tuberculosis mycobacterial diseases

Knowledge

- Definition, classification and aetiology 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
- Epidemiology of NTBRI (microbiology, age related factors, geographical issues, occupational considerations, comorbidities, immunological status)
- Clinical manifestations of viral (including epidemic viral), bacterial, fungal and parasitic infection
- Relevant investigations: noninvasive (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
- Pneumocystis jiroveci pneumonia

- Related complications such as lung abscess, empyema and sepsis
- Relevant therapeutic measures including antibiotics and other antimicrobials and susceptibility testing
- Criteria for hospitalisation and referral to ICU in CAP
- Prognosis, predictive factors for high risk of death
- Prevention of NTBRI including vaccination and infection control

Skills

- Application of the above knowledge
- Evaluation of functional status and severity of disease
- Taking samples for microbiological diagnosis (sputum, blood, pleural fluid, bronchoscopic samples, percutaneous needle aspiration)
- Thoracocentesis (diagnostic and therapeutic)
- Local pleural treatment measures for empyema (pleural drainage, pleural irrigation and fibrinolytic treatment)
- Vaccination

Behaviour and attitudes

- Multidisciplinary approach

3: Tuberculosis (TB) including extrapulmonary TB (EPTB) and non-tuberculous (opportunistic) mycobacterial diseases (NTBMD)

Knowledge

(a) Tuberculosis:

- Definition, classification and aetiology
- Epidemiology and pathophysiology
- Transmission of mycobacteria
- Risk factors for developing TB
- Pathogenesis of TB (events in nonimmunised host, immunologic response to M. tuberculosis, exogenous versus endogenous infection, latent TB infection)
- Immunological features of latent TB (tuberculin sensitivity, interferon gamma release)
- TB in immunocompromised host
- General manifestations of TB

- Clinical and radiological features of pulmonary TB
- Bacteriological evaluation including molecular techniques
- 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)
- Microbiological, clinical, laboratory and radiological control in the course of therapy.

Supervision of chemotherapy, directly observed therapy (DOT)

- Adjunctive therapy (resection (if appropriate), corticosteroids, drugs to prevent and treat adverse events)
- Surveillance in organised TB control programmes including Advocacy, Communication and Social Mobilisation for TB Control (ACSM)
- Prevention of TB (isolation of smear positive patients including use of negative pressure facilities, BCG vaccination, preventive treatment of persons exposed to MTB and

MDR MTB)

- Prognosis of pulmonary TB
- National and WHO regulations in relation to TB as infectious disease

(b) Extra-pulmonary tuberculosis:

- Organs involved (lymphatic system, pleura, pericardium, genitourinary system, bones and joints, abdominal, central nervous system, skin and eyes)
- Relevant imaging methods
- Sampling methods for bacterial diagnosis
- Therapeutic possibilities in EPTB other than anti TB chemotherapy including surgical treatment
- Prognosis of specific organ manifestations of TB
- Disability due to TB
- Rehabilitation

(c) Non-tuberculous (opportunistic) mycobacterial disease

- Bacteria causing NTBMD (M.aviumcomplex, M. Kansasii, other rapidly growing mycobacteria)
- Epidemiology of NTBMD and its relation to HIV infection

- Organ manifestations and clinical characteristics of NTBMD
- Criteria for diagnosis
- Therapeutic regimens used in NTBMD
- Prognosis
- Prevention of NTBMD
- Indications for surgical treatment

Skills

- Application of the above knowledge
- Sampling for microbiological examination (sputum induction, gastric washings, thoracocentesis, bronchial-, transbronchial percutaneous-, pleural- and lymph node biopsy)
- Tuberculin skin testing
- Sputum microscopy

Behaviour and attitudes

- Inform and educate patient about infective nature of the disease so that they comply with guidelines in the course of longterm treatment
- Be aware of the psychological and sociological aspects of long term disease management
- Multidisciplinary approach, especially in the case of EPTB

4: Pulmonary vascular diseases (PVDs)

Knowledge

- Definition, classification and aetiology of PVDs
- Physiology and pathophysiology of the pulmonary circulation
- Physiology and pathophysiology of coagulation and thrombosis
- Genetic and acquired risk factors for PVDs
- Current epidemiology and relevant pathology of PVDs
- Respiratory and non-respiratory clinical manifestations
- Respiratory and non-respiratory complications.
- Relevant investigations (lab tests (D-dimer), scintigraphy, CT, MRI, pulmangiography, right heart catheterisation)
- Indications for, and special problems of lung transplantation in selected PVD patients, including psychosocial

- Indication for surgical interventions, e.g., in pulmonary embolism (thrombectomy)
- Pharmacology and interactions of drugs used in the treatment of PVDs

Skills

- Application of the above knowledge
- ECG, echocardiography and imaging interpretation (scintigraphy, CT-scan, angiography).
- Evaluation of functional status
- Right heart catheterisation
- Assessment of severity of respiratory and systemic involvement
- Prevention, diagnosis and treatment of both cardiovascular and systemic complications
- Identification and management of patients with end-stage disease
- Assessment of eligibility for lung transplantation/ thrombectomy

Behaviour and attitudes

- Multidisciplinary approach

5: Occupational and Environmental Diseases

Knowledge

- Definition, classification and aetiology of occupational/environmental lung diseases
- Epidemiology and biological, immunological and inflammatory responses to respiratory irritants (fumes, chemicals, fibres, minerals, and particulates)
- Physiology and pathophysiology of lung deposition and damage
- The biological, immunological, and inflammatory responses to respiratory irritants (fumes, chemicals, fibres, minerals, and particulates)
- Environmental exposure and individual susceptibility
- Hazards encountered in both the industrial and rural environment
- Acute and chronic respiratory effects
- Respiratory and non-respiratory manifestations.
- Specific health policy and legislation
- Environmental and individual protective measures
- Basic principles of prevention and treatment
- Psychosocial implications of occupational/ environmental lung diseases

Skills:

- Application of the above knowledge
- Ability to take a detailed occupational history.
- Assessment of workplace safety and/or level of exposure to respiratory hazards
- Assessment of familial and individual susceptibility
- Imaging procedures (chest x-ray including ILO/ BIT classification) HRCT-scan, nuclear techniques
- Evaluation of functional status and of disability
- Performance and interpretation of bronchial provocation testing
- Prevention and early diagnosis
- Diagnosis of specific occupational/ environmental lung diseases
- Running of specialised outpatient services
- Prevention, diagnosis and treatment of non-respiratory complications
- Competent communication with patients, workers, employers, and other occupational professionals

Behaviour and attitudes

- Multidisciplinary approach (cooperation with industrial hygienists, toxicologists, internists, and public health administrators)
- Knowledge of relevant industrial processes, control of air pollution, and epidemiological studies
- Commitment to regular personal updating of the evolving pattern of industrial processes and technologies

6: Diffuse parenchymal(interstitial) lung diseases (ILD) and orphan lung diseases (OLD)

Knowledge

- Definition, classification and aetiology of ILD and OLD
- Epidemiology and pathophysiology
- Basic biology and immunology of ILD and OLD, including humoral and cellular mechanisms
- Relevant investigations: non-invasive (chest X-ray, high resolution CT-scan, lung function tests), invasive (broncho-alveolar lavage (BAL), transbronchial lung biopsy (TBLB), and VATS biopsy)
- Pulmonary and extrapulmonary manifestations of specific ILD and OLD

- Pharmacology and interactions of drugs used in the treatment of ILD and OLD

Skills

- Application of the above knowledge
- Interpretation of chest X-ray and high resolution CT-scan
- Evaluation of functional status
- Bronchoscopy incl. BAL and TBLB
- Prevention and treatment of cardiovascular and and systemic involvement
- Assessment of eligibility for lung transplantation

Behaviour and attitudes

- Multidisciplinary approach

7: Pleural diseases (PD)

Knowledge

- Definition, classification and aetiology of pleural effusions (serothorax, chylothorax, haemothorax, empyema)
- Epidemiology and pathophysiology of infectious, inflammatory, and neoplastic pleural disorders
- Macroscopic appearance of pleural fluids
- Distinction between transudative and exudative pleural effusions
- Definition, classification and aetiology of pleural thickening including pleural plaques
- Definition, classification and aetiology of pneumothorax (primary 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 including antibiotics, fibrinolytics and pleurodesis
- Indications for surgical intervention

Skills

- Application of the above knowledge
- Ultrasound
- Evaluation of functional status
- Thoracentesis (diagnostic and therapeutic)

- Pleural biopsy
- Pleural drainage
- Medical thoracoscopy (pleuroscopy)
- Pleurodesis (talc and other chemical agents)
- Chemotherapy and other local or systemic anti-tumour therapy in selected patients (malignant pleural effusion including mesothelioma)
- Irrigation and fibrinolytic treatment for empyema

Behaviour and attitudes

- Multidisciplinary approach

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

Knowledge

- Definition, classification and aetiology of chest wall diseases including kyphoscoliosis, ankylosing spondylitis, flail chest, pectus excavatum, and pathological effects of thoracoplasty
- Definition, classification and aetiology of diseases of the respiratory muscles (hemiplegia, poliomyelitis, and generalized neuromuscular diseases)
- Definition, classification and aetiology of diseases of the diaphragm, including diaphragmatic paralysis, hiccups, herniae
- Epidemiology and pathophysiology of diseases of CW, RM, and D
- 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)
- Relevant therapeutic measures including ventilatory support
- Indications for surgical intervention

Skills

- Application of the above knowledge
- Ultrasound
- Evaluation of functional status
- Invasive and non-invasive ventilatory support

- Home care (oxygen therapy, home ventilation)

- Palliative care

Behaviour and attitudes

- Multidisciplinary approach

9: Mediastinal diseases (MD)

Knowledge

- Definition, classification and aetiology of mediastinal diseases including tumours and cysts of the mediastinum, mediastinitis, Mediastinal fibrosis, and pneumomediastinum

- Epidemiology and pathophysiology of MD

- Related complications such as superior vena cava syndrome

- Relevant investigations: non-invasive (chest x-ray, fluoroscopy, CT, MR, pulmonary function tests) and invasive (bronchoscopy including transbronchial needle aspiration and endobronchial ultrasound)

- Relevant therapeutic measures

- Indications for surgical intervention (mediastinoscopy, mediastinotomy, VATS)

Skills:

- Application of the above knowledge

- Evaluation of functional status

- Bronchoscopy

- Transbronchial needle aspiration

- Endobronchial ultrasound

Behaviour and attitudes

- Multidisciplinary approach

10: Pleuro-pulmonary manifestations of systemic extrapulmonary disorders

Knowledge

- Definition, classification and aetiology of pleuro-pulmonary manifestations of systemic disease: pneumonitis, pleurisy, fibrosis, pleural thickening, pneumothorax

- Epidemiology and pathophysiology of pleuro-pulmonary manifestations of systemic disorders (including drug-induced pleuro-pulmonary diseases)

- Biological blood parameters for diagnosis of systemic diseases

- Relevant investigations: non-invasive (laboratory values, chest x-ray, ultrasound, CT, MR, nuclear techniques, lung function tests) and invasive (bronchoscopy including broncho-alveolar lavage, TBLB, thoracentesis, pleural biopsy)
- Related complications
- Relevant therapeutic measures including pharmacology of drugs used

Skills

- Application of the above knowledge
- Diagnosis of underlying diseases
- Non-invasive imaging modalities: chest x-ray, fluoroscopy, ultrasound, nuclear techniques, CT, MR
- Evaluation of functional status
- Broncho-alveolar lavage and TBLB
- Thoracentesis
- Pleural biopsy, pleural drainage
- Medical thoracoscopy
- Management of immunosuppressive drugs

Behaviour and attitudes

- Multidisciplinary team approach

11: Genetic and developmental disorders (GDD)

Knowledge

- Definition and classification of GDD
- Clinical manifestations of Primary Ciliary Dyskinesia (PCD), Alpha-1-Antitrypsin Deficiency (A1ATD) and genetic surfactant deficiency disorders (GSDD)
- Genetic background of PCD, A1ATD and GSDD
- Developmental causes of upper and lower respiratory tract malformations
- Late (adolescent/adult) manifestations of respiratory tract malformations
- Morphological and functional diagnosis of GDD (imaging modalities, lung function testing)
- Therapeutic options for managing respiratory manifestations.
- Management of outpatients and of hospitalised patients.
- Treatment of respiratory exacerbations and complications

- Diagnosis and management of non respiratory sequelae and complications
- Long term sequelae and the residual morbidity of respiratory malformations after management and surgery in infancy and childhood

Skills

- Application of the above knowledge
- Evaluation of functional status
- Flexible bronchoscopy including BAL and TBLB
- Replacement therapy using alpha-1- antitrypsin and surfactant

Behaviour and attitudes

- Knowledge of the special psychological aspects of long term disease management
- Cooperation with paediatric respiratory physicians and thoracic surgeons

12: Allergic and eosinophilic lung diseases excluding asthma

Knowledge

- Definition, classification and aetiology of non-asthma allergic and eosinophilic lung diseases including hypersensitivity pneumonitis, Churg Strauss Syndrome, acute and chronic eosinophilic pneumonia, allergic bronchopulmonary aspergillosis and drug-induced disease
- Epidemiology and pathophysiology of non-asthma allergic and eosinophilic lung diseases
- Relevant investigations (including nasal provocation testing and methacholine/histamine bronchoprovocation testing, sputum induction, serology including ANCA and aspergillus/avian precipitins, transbronchial/VATS lung biopsy)
- Pharmacology of drugs used

Skills

- Application of the above knowledge
- Ear, nose and throat examination
- Assessment of the impact of rhinitis on health related quality of life
- Management of allergic disorders other than asthma and of eosinophilic lung diseases (including management of rhinitis)
- Broncho-alveolar lavage and lung biopsy
- Nasal provocation testing, bronchoprovocation testing, sputum induction
- Non-invasive investigations (including allergen skin tests, serum allergen tests)
- Pulmonary function tests

- Control of risk factors

13: Respiratory manifestations of immunodeficiency disorders

Knowledge

- Clinical features of respiratory infections in patients with
 - 1) congenital immunodeficiency (immunoglobulin deficiency syndromes and defects in cell-mediated immunity) and
 - 2) acquired immunodeficiency (HIV/AIDS, organ transplantation, lymphoma, cytotoxic chemotherapy, immunosuppressive drugs, malnutrition)
- Emphasis on important pathogens such as *Pneumocystis jirovecii* (carinii) and cytomegalovirus
- Clinical features of non-infectious respiratory manifestations (pulmonary oedema, pulmonary haemorrhage and infarction, malignancy, autoimmune vasculitis, radiation and drug-induced pneumonitis)
- Relevant investigations:
 - noninvasive (chest X-ray, CT, ultrasound, pulmonary function testing, microbiology of spontaneous and induced sputum,
 - invasive (bronchoscopy, broncho-alveolar lavage, transbronchial biopsy, thoracentesis and examination of pleural fluid)
- Relevant antibiotic therapy
- Intravenous immunoglobulin therapy
- Prognostic and predictive outcome factors
- Preventative measures e.g. reverse-barrier nursing and septrin prophylaxis

Skills

- Application of above knowledge
- Sputum induction technique
- Bronchoscopy with BAL/transbronchial biopsy
- Ultrasound
- Thoracentesis
- Relevant pulmonary function tests e.g. transfer factor in suspected pulmonary haemorrhage

Behaviour and attitudes

- Multidisciplinary approach with haematologists, oncologists, clinical immunologists, transplant physicians and microbiologists

14: Lung transplantation

Knowledge

- Diseases treatable by lung transplantation (IPF, CF, bronchiectasis, PPH, COPD, sarcoidosis)
- 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
- Principles of monitoring immunosuppressive drug therapy
- Principles of transbronchial lung biopsy for detection of rejection
- Diagnosis and treatment of acute and chronic complications, including rejection
- Obliterative bronchiolitis
- Diagnosis and treatment of opportunistic infections
- Prognosis

Skills

- Application of above knowledge
- Assessment of patient suitability for transplantation (physical and psychological)
- Nutritional supplementation
- Immunosuppressive treatment of rejection
- Bronchoscopy with bronchoalveolar lavage and appropriate imaging for detection of opportunistic infection
- Interventional bronchoscopic techniques such as stent placement

Behaviour and attitudes

- Multidisciplinary approach with thoracic surgeons, microbiologists and psychologists.

15: Pleural procedures

Knowledge

- Relevant anatomy of the chest wall and lungs
- Indications for pleural ultrasound, thoracentesis, closed pleural needle biopsy, pleuroscopy (medical thoracoscopy), intercostal tube drainage and pleurodesis

- Equipment required for pleural ultrasound, thoracentesis, closed pleural needle biopsy, pleuroscopy (medical thoracoscopy), intercostal tube drainage and pleurodesis
- Assessment of suitability for a pleural procedure, including knowledge of the contraindications for pleural procedures and awareness of the possible complications.
- Relevant pathology
- Appearance of anatomy and pathology with pleural ultrasound imaging
- Macroscopic appearance of pleural fluid and appropriate laboratory tests on it
- Pharmacology of drugs required for pleural procedures
- Knowledge of different uses of pleuroscopy (medical thoracoscopy)
- Indications for surgical intervention

Skills

- Application of the above knowledge
- Patient consent and explanation of the risks and benefits associated with pleural procedures
- Arrange and interpret relevant tests associated with selecting patients for a pleural procedure
- Performance of pleural ultrasound imaging and interpretation of pleural ultrasound images, correlation with other imaging modalities
- Performance of thoracentesis, closed pleural needle biopsy, pleuroscopy (medical thoracoscopy, and pleurodesis
- Performance of intercostal tube drainage, ability to secure correctly the intercostals tube and to confirm suitable position
- Appropriate management of a patient with a chest drain

Behaviour and attitudes

- Awareness of the limitations of pleural procedures
- Multidisciplinary approach

16. Pediatric respiratory Medicine

Knowledge

- Lung Growth and Development
- Imaging the pediatric lung
- Interpreting Lung Function in Children
- Asthma phenotypes in children
- Interstitial lung disease in children

- **An Update on Tuberculosis in Children**
- **Clinical and Radiological Approach of congenital lung diseases**
- **The Genetics of Respiratory Diseases.**

Skills:

- **To describe the appearance and structural growth of the lung during foetal life, infancy and childhood including airways, alveoli and vasculature.**
- **To recognize what does 'phenotype' mean in this context.**
- **To examine how disease processes and their treatment may affect lung development and how this may ultimately lead to an essentially normally functioning lung or one that is grossly abnormal.**

