

Statutes
M. D. Medical Oncology



Khyber Medical University
Peshawar
2011

GENERAL STATUTES AND REGULATIONS

General regulations (Eligibility):

- 1.1 Candidates must be medical graduates with MBBS or equivalent basic medical qualification recognized and registered by PMDC
- 1.2 The entry test for this course shall be conducted by Khyber Medical University and will be part 1 exam of MD Medical Oncology which will be basic and applied medicine and Oncology.
- 1.3 Candidates who have passed FCPS/MRCP part-1 in Medicine and allied will be exempted from entry test (part 1) of the Medical Oncology program.
- 1.4 This five year program will include 2 years of general medicine followed by intermediate module exam at the end of 2nd year. Candidate has to pass intermediate module before appearing in the final MD examination.
- 1.5 Candidates who have passed FCPS/MRCP will be exempted from the entry test and mandatory rotation in general medicine and will be taken directly into year three of Medical Oncology MD program.
- 1.6 Selection criteria for the candidates will be as prescribed by PGMI.
- 1.7 Names of at least two referees to be provided with references.
- 1.8 Registration and deposit of the required fee (as determined by PGMI or KMU) is mandatory before course can be started
- 1.9 Prior experience in any field of oncology in an oncology department shall be preferable. Certificate of experience must be produced from Head of the concerned department and the candidate must be registered with the Medical Registration of Authority if experience is from abroad and should be certified by PMDC
- 1.10 Certificate of good standing from Head of the Department last attended

Curriculum for M. D. in Medical Oncology

Introduction to the course

In majority of developed countries a proper program for teaching and training as well as research in the field of medical oncology have been developed with standard requirement of 5-6 years of specialty training in medical oncology. This training mostly consist of a minimum of 2-3 years of general medicine and 2-3 years of full time medical oncology (and related specialties) training. Research is an important aspect in cancer medicine and trainee must be trained both in clinical aspects as well as research aspects of oncology so that after completion of their training they can work both as a clinician and an academician. In order to start the MD course, therefore the candidate must have completed at least 24 months training in general medicine. During these 5 years of medical oncology sub-specialty training, the trainee shall be expected to do basic research as well and write a dissertation/thesis regarding his research work. Dissertation should be on original work. This will be in addition to his/her clinical training in general medicine (24 months) and 36 months full time training in medical oncology.

REQUIREMENTS AND COURSE OF STUDIES/CURRICULUM

Faculty members

The medical oncology program faculty shall include a minimum of one full-time qualified teaching faculty member (supervisor). Supervisor must be at least Assistant professor and have 5 years teaching experience in medical oncology after post graduation. Research experience shall be essential for the faculty member/supervisor. Each of the faculty members must devote substantial time (at least 10 hours per week) to teaching, research and evaluation of the performance, progress, and competence of the trainees. The unit concerned should have a minimum of twenty beds and should take both acute as well as chronic patients. Experience shall be provided in PGMI based teaching hospitals as well as other Hospitals or centers with academic and clinical activities in the field of oncology.

Duties of a trainee, training record, personal development and professional conduct

In addition to their research and clinical training, emphasis shall be laid on professionalism and ethics as well as good clinical practice. The trainee shall be judged on his personal conduct and development, morals and ethics during his training and if not up to the mark, either training shall be terminated or the award of degree can be refused. This is in order to prepare specialists not only with good clinical skills but also moral values and high professional standards. Training is on full time basis and the

trainee shall perform on call duties while in oncology ward or on rotation, as allocated to him by his supervisor. The trainee shall maintain a record of training in the form of a log book. The supervisor shall check this record regularly for evidence of training and to confirm the progress made by the trainee and also countersign it. Being a full time course, trainees shall not be allowed private practice. Engagement in any type of private business activities or private practice shall be grounds for termination of training.

AIMS AND OBJECTIVES OF THE COURSE:

The overall purpose (goals) of the curriculum is to produce physicians who, at the end of the training:

1. Are experts in the field of medical oncology and can practice the specialty independently
2. Are able to identify risk factors for various cancers
3. Are able to discuss various screening methods for patients at high risk of certain malignancies
4. Are able to analyze and interpret various diagnostic modalities used for patients with common cancers
5. Are able to design appropriate treatment strategies for cancer patients according to the stage of the disease
6. Are able to work as part of multidisciplinary team
7. Have advanced skills in communication (including breaking bad news) with the patient, their families as well as the health care team
8. Are well aware of all aspects of biomedical ethics and professionalism
9. Have skills of shared decision making
10. Possess the required abilities necessary for a teaching and learning
11. Are able to conduct independent research in the field of medical oncology
12. Are able to continue their professional development throughout their career

COURSE OF STUDIES FOR THE DEGREE OF M. D. IN MEDICAL

(A) CLINICAL RESEARCH WORK:

This will be an essential component of MD (Medical Oncology). Trainees shall be taught about the design and conduct of clinical trials and basics of research methodology. They shall be imparted knowledge about research ethics and good medical/research practice. They should also be well versed with the importance of conflict of interest, confidentiality and informed consent. During their training period, trainees should be able to write a scientific paper in established medical journals. Trainees should be able to search for cancer specific information on the internet and digital libraries and should be computer literate. Participation of trainees in group meetings, symposia, lectures and conferences shall be mandatory. They shall be encouraged to present their studies in

conferences. Trainees have to write a thesis/dissertation regarding their research (basic or clinical) during the course of studies which should be of sufficient merit so as to be able to be published in an impact factor medical journal. Thesis/dissertation has to be approved by one internal and one external examination **before** the trainee can sit in the written examination. Synopsis should be submitted within **first year** of the training. Dissertation will remain property of the department and any further publication has to be authorized by the department. Candidate alternately may publish two original articles in an impact factor journal.

(B) BASIC SCIENCES

(a) Molecular biology of cancer and other basics of oncology including oncologic pharmacology and radio-diagnostics:

The trainee shall be taught the basic cell structure and biology of cancer (including genetics). They should be aware of cell cycle and other principles of oncologic pharmacology including drug dosing, mixing, adverse effects etc. They shall be also taught the epidemiology and etiology of cancer, cancer prevention and screening.

(b) Principles of diagnostic skills, staging, response criteria, treatment outcomes etc:

Special emphasis shall be laid on the principles of laboratory based diagnosis (including malignant hematology, immunohistochemistry and immunocytochemistry), PCR, FISH, tumor markers, chromosomal analysis etc. They should also be aware of performance status scales, RECIST response criteria and should be able to define treatment outcomes such as overall survival, disease free survival, progression free survival.

(C) CLINICAL ONCOLOGY

(a) Principles of multidisciplinary cancer therapy and its indications:

Trainees will spend a substantial amount of time in clinical training in medical oncology ward. They shall be trained in the basic aspects of cancer therapeutic agents (pharmacology) as well as principles of cancer chemotherapy including targeted therapies (its indications and contraindications) and its related effects. They should be well accustomed to various types of cancer therapies including:

- Principles of surgical oncology
- Principles of radiation oncology
- Principles of oncologic pharmacotherapy
- Principles of targeted and biologic therapy

(b) Management of site-specific cancers

In addition to general medical knowledge, trainees should have gained thorough knowledge, skills and attitude regarding various aspects of oncology including etiology and risk factors, epidemiology, genetic basis, screening, history taking, clinical examination skills, sign/symptoms, interpreting diagnostic data (both laboratory based and radiology based), staging, counseling, current literature as well as state of the art treatment plans for the following cancers (modules):

(1) Scientific basis of oncology (M)

(2) Breast cancer (M)

(3) Primary malignant tumors of the lung and pleura (M):

Small-cell lung cancer

Non-small-cell lung cancer

Pulmonary carcinoid

Mesothelioma

Thymoma

(4) Cancers of the Genito-urinary tract (M):

Cancer of the kidney

Cancer of the urinary bladder

Prostate cancer

Cancer of the testes

Cancer of the penis

(5) Gynecologic malignancies (M):

Cancer of the uterine cervix

Carcinoma and sarcoma of the endometrium (uterus)

Carcinoma of the ovary

Germ cell tumors of the ovary

(6) Sarcomas (M):

Bone sarcomas (adult and pediatric)

Soft tissue sarcoma (adult and pediatric)

Gastrointestinal stromal tumors

(7) Skin cancers (O):

Melanoma

Basal cell and squamous cell cancers

(8) Central nervous system malignancies (O):

Gliomas

Medulloblastomas

Metastasis to CNS and neoplastic meningitis

(9) Head and neck cancers (O):

- Cancers of the oral cavity
- Nasopharyngeal cancers
- Thyroid cancer
- Parathyroid cancer
- Salivary gland tumors

(10) Gastrointestinal cancers (M):

- Esophageal cancer
- Gastric cancer
- Neuro-endocrine tumors, adrenal tumors and tumors of the small bowel
- Colo-rectal cancer
- Anal cancer
- Hepatic cancers
- Cancers of the biliary tract
- Pancreatic cancer

(11) Hematologic malignancies (M):

- Leukemias (acute and chronic leukemias)
- Lymphomas (Hodgkin's disease, Non-Hodgkin's lymphoma, cutaneous T-cell lymphoma)
- Plasma cell dyscrasias, myeloproliferative and myelodysplastic syndromes

(12) Carcinoma of unknown primary site (M)

(13) AIDS related malignancies (O)

(14) Endocrine cancers (O)

(15) Communication skills (M)

(16) Research and Ethics in Research (M)

(17) Educational and assessment strategies (M)

(M= Mandatory; O= Optional)

Specific learning outcomes for each malignancy/module shall be provided separately.

In order to keep medical oncology curriculum up to date, alive and dynamic, periodic modifications and enhancements shall be carried out as and when required, in consultation with the Dean and PGMI/KMU Academic Council.

WORKSHOPS

All candidates must attend mandatory workshops organized / recognized by KMU with in first three years of training.

These workshops include

1. Research methodology and dissertation writing including SPSS.
2. Basic computer skills.
3. Communication skills and professional asim
4. Bio-ethics

(c) Medical emergencies, supportive care, palliative treatment and end of life issues:

Trainees should be fully conversant with anticipating, diagnosing and promptly treating medical emergencies in oncology and common conditions associated with cancer or its treatment such as:

- Cancer pain and its management
- Nausea and vomiting and its management
- Management of febrile neutropenia and septic shock
- Treatment of anemia
- Thrombocytopenia and its management
- Growth factors and its rational use in anemia, neutropenia and thrombocytopenia
- Disseminated intravascular coagulation
- Constipation, bowel obstruction and perforation and their management
- Urinary obstruction
- Increased intracranial pressure, spinal cord compression and other CNS related complications
- Treatment of bone metastases and skeletal related events
- Management of fatigue and dyspnea
- Hemoptysis
- Prevention and treatment of extravasation
- Metabolic emergencies and para-neoplastic syndromes, tumor lysis syndrome, hypercalcemia, hypo/hyperglycemia, SVC syndrome, SIADH
- Palliative care and end-of-life
- Depression, anxiety, delirium and other psychological issues

(D) Trainees shall also be imparted training in the following disciplines:

(a) Mandatory Rotations

- Radiotherapy and nuclear medicine (04 weeks)
- Pathology including hematology (04 weeks)

- Surgery (04 weeks)
- Psychiatry (04 weeks)
- Pediatrics (04 weeks)

(b) Communication skills, Medical Ethics, Psycho-oncology and Rehabilitation

Special emphasis shall be laid on communication skills including breaking bad news, genetic counseling, informed consent, legal issues pertaining to oncology, short and long term complications of cancer therapy, follow-up visits, communicating with the patient, communicating with the relatives/attendants, communicating with colleagues, juniors and peers. Examinations shall include the trainee's experience in these aspects.

(c) Practical Procedures in Oncology:

Trainees should be able to perform the following practical procedures at the end of the course:

- Preparation and administration of chemotherapeutic drugs
- Bone marrow aspiration and trephine biopsy
- Lumbar puncture
- Triple intra-thecal therapy
- Pleural fluid drainage
- Ascites tapping
- CV line

EDUCATIONAL STRATEGIES & LEARNING ENVIRONMENT

Learning opportunities for cognitive domain shall be provided in the form of lectures, tutorials, case based discussion, journal club, attendance at multidisciplinary meetings, ward rounds and OPDs, library and self-directed learning & reflection. Learning opportunities for psychomotor domain shall be provided through demonstration and individual practice under supervision, role plays and real patients. Learning opportunities for affective domain shall be provided through case based discussions, role plays, self-study, self-reflection (reflective journals), role models and MSF. Reflection-on-action and reflection- in-action shall be encouraged in trainees. TMO evaluation is regularly carried out by the faculty.

Demonstration room, conference room, lecture halls/auditoria, OPD, oncology ward beds (20), basic equipment, library with internet facility and digital library and print versions of latest national and international journals and reference books, video-

conferencing and tele-medicine facilities, cafeteria etc are available. Diagnostic facilities and audio-visual facilities are also available in the Hospital. Trainees will be given sufficient time for self study and research assignment. Minimum mandatory teaching program is also in place.

Department of Medical Education (DME), Department of Research and Development (R&D) and Institutional Research and Ethics Board (IREB) are already functional at PGMI.

PRGRAM EVALUATION AND ASSESSMENT OF OUTCOME

Academic inspection team and the Academic Council of PGMI are actively involved in monitoring and evaluation and feedback for improvement of academic activities in all teaching units. Minimum mandatory teaching program is in place.

Internal evaluations in the form of Mini-CEX, short cases, MSF, log books and observation will be regularly carried out with feedback provided to the trainees.

Summative evaluation shall be in the form of MCQs, EMQs, SEQ, OSCE/short cases, OSVE/long case, review of log book and defense of research dissertation.

EXAMINATION:

English shall be the medium of instruction and examination. Examination shall be held by Khyber Medical University, Peshawar after completion of five years training. Examination shall be held only once a year.

Thesis/dissertation has to be approved before candidate can sit in the examination. Thesis/dissertation shall be evaluated by an internal and external examiner.

Examination shall be conducted in one part with written examination as well as practical clinical assessment.

Trainees shall be assessed in all the relevant fields of oncology and medicine during the examination which will include SEQs/SAQs, MCQs, EMQs, OSCE/short cases, table viva/OSVE/long case and assessment of research project assignment.

Pass percentage for the whole examination will be 60% aggregate, with individual components not less than 55%. If a candidate scores less than 55% in individual component, he/she will be considered failed even if the aggregate score is above 60%.

Intermediate module examination

A candidate will be eligible for Intermediate module examination after 24 months of training in General Medicine, arranged by the university on quarterly basis and will include one written MCQs paper (100 marks) , TOACS /Structured Short Cases (70 marks) and Structured Long case (30 marks).

Candidates who joined the MD programme after passing major diploma, MRCP/FCPS will be exempted from intermediate module.

Final Examination

PAPER A: 100 marks, Time duration 3 hours MCQs and EMQs

Part I General medicine and mandatory rotation modules (40 marks)

Part II: Genetics, cellular and molecular biology related to oncology, ethics, epidemiology & statistics, etiology, screening (60 marks)

PAPER B: 100 marks, Time duaration 03 hours SEQs

Part I: Oncological pharmacology and therapeutics (30 marks)

Part II: Medical oncology (disease specific paper) and malignant hematology (70 marks)

PRACTICALS:

A Oral examination/structured viva (OSVE)/OSCE:	50 marks
B Short cases (four)	100 marks
C Long case (one)	50 marks

TOTAL MARKS IN THE EXAMINATION: 400 marks

Viva shall include full discussion on research project/thesis, any aspect of medicine, medical oncology and malignant hematology as well as x-rays, scans, laboratory reports etc.

Passing marks in each module shall be 60%, with individual component score of not less than 55% as detailed above.

Head of Department of Medical Oncology, Postgraduate Medical Institute, Hayatabad Medical Complex, Peshawar shall be the convener of the examination.

There shall be two sets of examiners; two internal examiners from PGMI (or its affiliated institutions) and two external examiners selected by Controller of examinations, KMU, in consultation with Head of Oncology Dept, PGMI. Head of the Department/Supervisor of the candidate may not be allowed to examine his/her trainee.

Questions in the paper (SEQs, EMQs and MCQs) shall be shared equally (50%) by Internal and External examiners.

Board of Examiners shall arrange the result of written, clinical/practical and oral examinations in consolidated form and send it with in ten days after completion of examination to the Controller of Examination KMU for formal declaration.

All trainees shall be judged on their morals and ethics during their training and if found not up to the mark, either their training shall be terminated or the award of degree can be refused by PGMI/KMU.

Upon successful completion of examination the candidate shall be awarded the Degree of **M D (Medical Oncology)** by Khyber Medical University, Peshawar. This shall entitle him for clinical and academic posts in medical oncology.

ADMISSION FEE AND EXAMINATION FEE:

Affiliation Fee, Admission Fee and Examination Fee including thesis evaluation shall be charged as fixed by KMU.

RECOMMENDED TEXT BOOKS

- **Textbook of Medical Oncology** by Cavalli, Hansen, Kaye (Taylor and Francis Publishers)
- **Cancer Treatment** by Haskell (Saunders Publishers)
- **Cancer and its management** by Robert Souhami and Jeffrey Tobias (Blackwell Publishing) (introductory text book)
- **Cancer Management: A multidisciplinary approach** by Richard Pazdur, Lawrence Coia, William J Hoskins, Lawrence D Wagman (The Oncology Group, CMP Medica Publishers)
- **Clinical Hematology** by Ludlam (ELBS Publishing)
- **Cancer: Principles and Practice of Oncology** by De Vita (Reference Book) (Lippincott Publishers)

RECOMMENDED JOURNALS

- Journal of Clinical Oncology
- Annals of Oncology
- Cancer
- Blood

- The Oncologist
- New England Journal of Medicine
- Clinical Care Options (Web-site)

REFERENCES:

Hansen HH, Bajorin DF, Muss HB, Purkalne G, Schrijvers D, Stahel R. ESMO/ASCO Task Force on Global Core Curriculum in Medical Oncology. Recommendations for a global core curriculum in Medical Oncology. J Clin Oncol 2004; 22 (22): 4616-4625.

Higher Medical Training. Curriculum for Medical Oncology: Joint Committee on higher medical training (JCHMT), London (January 2003) www.jchmt.org.uk

PART-I TEST FOR M. D. IN MEDICAL ONCOLOGY & ENDOCRINOLOGY (Combined)

MCQs in general medicine:	50
MCQs in basic sciences:	50
Total MCQs:	100

Pass Marks: 50%

LIST OF TOPICS FOR BASIC MEDICAL SCIENCES & GENERAL MEDICINE:

Anatomy

- Clinical relevant anatomy including neuro-anatomy

Cell, molecular and membrane biology

- Structure and function of the components of the cell and its membrane
- How cells communicate internally and with each other by means of chemical substances and membrane receptors.

Physiology, biochemistry and metabolism

- Structure and function of the different organs and their interaction (such as hormonal and neural influences)
- Broad principle of metabolism such as the production of energy and pathways of carbohydrate, protein, and lipid metabolism
- Principle of nutrition, water, electrolyte and acid base balance.
- Physiology and biochemistry of each organ system

Genetics

- Structure and function of chromosomes and genes
- Principles of inheritance of chromosomal and genetic disorders

Immunology

- **Basic principles of immune-mechanisms**
 - Humoral and cell-mediated immunity
 - Immunodeficiency syndromes
 - Phagocytic dysfunction diseases
 - Complement deficiencies
 - Hypersensitivities including allergies and autoimmune diseases
- **Immunological tests:**
 - Immune system in health and disease
- **Clinical conditions**
 - Various immunodeficiency syndromes and their mechanisms
 - Clinical characteristics and immediate management of acute allergic emergencies
 - Immunology as applied with other medical diseases (ex: Rheumatic diseases - connective tissue diseases)
- **Management:**
 - Principles of immunosuppressive therapy including major indications and side-effects

• **Infectious diseases and tropical medicine**

- **Microbiology**
 - Taxonomy of bacteria in terms of Gram-staining and aerobic /anaerobic metabolism
 - Virus classification for members of the herpes group
 - Virus replication with reference to the retroviruses
 - Major pathogenic protozoa and helminths
- **Immunology of infectious diseases**
 - Immune deficiency states linked with types of opportunistic infections
 - Principle of immunisation and vaccines currently used

- **Pathophysiology**
 - Septic shock
 - ARDS
 - Role of cytokines in infection

- **Epidemiology**
 - Principles relevant to infectious diseases

- **Treatment**
 - Broad indications for commonly employed antimicrobial agents
 - Major adverse effects for commonly employed antimicrobial agents

- **Specific infections**
 - Characteristics, recognition, prevention, eradication, and pathological effects of all commonly encountered bacteria, viruses, rickettsia, fungi, protozoa, parasites and toxins.
 - Principle of infection control
 - Differential diagnostic and appropriate investigations
 - Presumptive therapies indications

Statistics, Epidemiology and Evidence-based medicine

- **Descriptive statistics**
 - Mean, median, mode, standard deviation, standard error, confidence interval, variance

- **Graphical techniques**
 - Histogram
 - Box-plot
 - Scattergram

- **Inferential techniques**
 - Null hypothesis, alternative hypothesis
 - Parametric and non-parametric tests
 - Normal distribution

- Statistical power
- One and two tailed tests
- Statistical significance, P value
- Study design
- **Evidence based medicine**
 - General understanding of evidence-based management and applications to management of patients
- **Clinical trials**
 - Interpretation of simple clinical trial data
 - Randomisation
 - Placebo-controlled trial
 - Open trial
 - Single-blind trial
 - Double-blind trial
 - Intention-to-treat
 - Bias

Clinical haematology

- **Physiology, control and function of formed blood elements**
- **Bone marrow structure and function**
- **Applications of biochemistry, genetics, immunology and virology to blood disorders**
- **Effects of age and pregnancy on blood diseases**
- **Splenomegaly, lymphadenopathy and their causes**
- **Principles and hazards of blood and blood product replacement therapy**
- **Principles, but not detail, of anti-tumour chemotherapy**
- **Principles of marrow transplantation**
- **Adverse effects of drugs on the blood**
- **Iron metabolism and mechanisms of various anemias**
- **Polycythaemia and myeloproliferative disorders**
 - Causes, investigation and management of polycythaemia
 - Causes, investigation and management of myeloproliferative disorders
- **White cells disorders**
 - Physiology of leucocytes

- Leucocytosis and leucopenia
- Acute and chronic leukaemias, including diagnosis, management and prognosis
- Lymphoproliferative diseases including Hodgkin's disease, non-Hodgkin's lymphomas and plasma cell dyscrasias.
- **Disorders of haemostasis**
 - Platelet function and coagulation
 - Thrombocytopenia and impaired platelet function
 - Thrombocytosis
 - Common congenital and acquired disorders of coagulation (especially anticoagulant therapy and disseminated intravascular coagulation)

Clinical pharmacology, therapeutics and clinical toxicology

- **Pharmacology**
 - Mechanisms by which drugs produce their pharmacological effects
 - Basic principles of agonism and antagonism
 - Clinical implication of drugs that act at different receptor sites
 - Links between the pharmacological effects of drugs at the molecular level, the cellular level, and the tissue / organ level, and how these are affected by disease processes and other drugs
 - Principles by which both therapeutic and adverse effects occur
- **Clinical pharmacokinetics**
 - Processes of drug absorption and distribution
 - Bio-transformation and excretion
 - Concepts of drug half-life and clearance
 - First order and zero order kinetics
- **Monitoring drug therapy**
 - Direct measurement of therapeutic response
 - Measurement of plasma drug concentrations
 - Scientific basis for the measurement of drug concentration and its link to the principles of pharmacokinetics
- **Adverse drug reactions**
 - Epidemiology of adverse drug reactions: recognition and avoidance
 - Important adverse effects of commonly used drugs
 - Importance of adverse drug reaction reporting schemes

- **Drug interactions**
 - Adverse drug interactions and mechanisms by which interaction may occur
 - Common drug interactions and their clinical consequences
- **Pharmacogenetics**
 - Principles of pharmacogenetics and its importance in determining variations in response to drugs in man, both in term of efficacy and toxicity
 - Clinical consequences of the common pharmacogenetic variations relevant to clinical practice
- **Therapeutics for specific patient groups**
 - Principles of therapeutics as they apply in the following circumstances:
 - The elderly
 - Pregnancy and breast feeding
 - Patients with renal disease
 - Patients with hepatic disease
 - Effects of these altered physiology on the pharmacokinetics and pharmacodynamics of drugs
 - Principle underlying drug choice, in pregnancy and breast feeding
 - Teratogenic effects of drugs that may be used in pregnancy - Drugs that may produce toxicity in the case of renal and hepatic disease
- **Clinical toxicology**
 - Principle of management of patients poisoned by drugs or other toxic substances
 - Assessment, recognition of common symptom patterns
 - Principles of removal of toxic substances
 - Antidotes where these approaches may be appropriate
- **Criteria for selecting drugs in a therapeutic class**
 - Criteria used to select a drug from among drugs in a popular therapeutic class including:
 - Differences in pharmacokinetics and pharmacodynamics
 - The approved indications of the drug
 - Possible adverse effects or drug inteactions
 - Cost effectiveness
 - Nomenclature
 - Used to describing studies that may be used to underpin drug selection
- **Drug formulations and routes of administration**
 - Various formulations of medicines available
 - Routes by which medicines may be administered

- Advantages and disadvantages of various routes and preparation
- Most appropriate formulation selection and drug administration in common clinical scenarios

Rheumatology

- **Basic principles of the common musculoskeletal conditions**
- **Clinical science**
 - Basic physiology, biochemistry, anatomy and pathology relating to musculoskeletal diseases
 - Pathology of the common rheumatic conditions
- **Clinical conditions**
 - Relative prevalence and major associations of the common rheumatological conditions
 - Symptoms and signs of the rheumatic diseases
 - Arthritis associated with other medical conditions
- **Investigations**
 - Investigations relevant to the diagnosis and assessment of rheumatic diseases including
 - Acute phase proteins
 - Immunological tests relating to the connective tissue diseases
 - Contemporary imaging techniques
- **Management**
 - Management of acute rheumatological emergencies including Septic arthritis, Osteomyelitis, temporal arteritis and acute spinal cord compression
 - Management of rheumatic diseases

Cardiology

- **Anatomy and physiology**
 - Basic anatomy and physiology of the heart in health and disease
- **Pathophysiology and pathology**
 - Mechanism underlying the main pathological processes
- **Cell biology**
 - Topics of proven clinical relevance such as:
 - Excitation-contraction process

- Molecular and cellular aspects of hypertrophy of the myocardium of vascular smooth muscle
- **Clinical pharmacology**
 - Indications of drug therapy in cardiac disease
 - Actions, interactions, and side effects of the drugs used, with emphasis on new drugs and newly observed side effects.
- **Clinical cardiology**
 - Clinical features and management of the cardiac disorders encountered in hospital practice by the general physician
 - Risk factors
 - Common ECG abnormalities
 - Basic echocardiographic abnormalities such as hypertrophic obstructive cardiomyopathy or pericardial effusion
 - Indication for coronary angiography

Respiratory medicine

- **Anatomy and physiology**
 - Clinical relevant anatomy of the upper and lower respiratory tract and thorax including radiological anatomy
 - Principles of respiratory physiology including: How respiration is controlled
- **Pathophysiology and pathology**
 - Effects of disease on pulmonary physiology and anatomy including:
 - The pulmonary and bronchial circulations as gas exchange
 - Adaptations to chronic hypoxaemia
 - Pleural fluid production and reabsorption
 - Application of the basic immunological processes to pulmonary pathology including:
 - Asthma
 - Alveolitis
 - Tuberculosis
 - Humoral and cellular immunodeficiency states and sequelae
 - Microbiology of acute and chronic respiratory infections
- **Clinical pharmacology**
 - Indications for, and mechanisms of action of, drugs used in respiratory disease together with their interactions and side effects.
 - Important respiratory complications of other drugs (NSAIDs and beta blockers)

- **Clinical conditions**

- Clinical features, investigation and management of respiratory disease likely to be encountered by a general physician

Ex:

- Pleural effusion
- Chest pain
- Haemoptysis
- Breathlessness

- General principles of oncological management including indication of surgery

Indications for specialised investigations including bronchoscopy, CT scanning, lung biopsy, lung volumes and exercise testing

- Investigation of sleep related disorders and of the radiological aspects of respiratory diseases

- Indications for, and problems of, lung transplantation

- Control of Mycobacterium tuberculosis infection

Neurology

- **Neuroanatomy**

- Detailed Neuroanatomy to appreciate the localisation of a particular neurological problem

- **Neurophysiology**

- Aspects of Neurophysiology relevant to the understanding of neurological disease

- **Neurogenetics**

- Recent advances in the understanding of the genetic basis for various neurological disorders

- **Cell biology**

- Advances in the cellular mechanisms of certain neurological disease processes which have provided better understanding of disease mechanisms and which might, in the future, lead to more rational therapy

- **Neuropharmacology**

- New drug developments in neurology
- Established drug therapies

- **Neuropathology**
 - Pathological aspects of some common diseases such as multiple sclerosis, Parkinson's disease and Alzheimer's disease
- **Clinical neurology**
 - Common disorders
 - Clinical features which have been shown to be of diagnostic value
 - Areas of recent advance, particularly those which have either led to better definition of disease entities, or have led to their improved management

• **Psychiatry**

- **Mental state**
 - Conduct and scope of a mental state examination
 - Features of abnormal mental states and particularly those present commonly to physicians and to Accident and Emergency Departments
- **Aetiological factors in psychiatric illness**
 - Primary aetiological factors in psychiatric areas including:
 - Genetic factors
 - Environmental factors
 - Life events
- **Investigations**
 - Potential value of, and indications for, common investigations used in psychiatric illness including:
 - Psychometric testing
 - EEG
 - Brain imaging
- **Syndromes of psychiatric disorder and their treatment**
 - Organic brain syndromes (delirium, dementia, focal brain syndromes, head injury)
 - Schizophrenia and related syndromes - Paranoid disorders and related syndromes
 - Affective disorders (anxiety states, phobic disorders, bipolar affective disorders)
 - Grief and bereavement
 - Self-harm, attempted suicide, suicide
 - Substance misuse (including alcohol dependence)
 - Eating disorders
 - Obsessive compulsive disorder

- Abnormal illness behaviour
- Syndromes associated with medically explained physical symptoms (including somatization and somatoform syndrome)
- **Psychiatric aspects of physical disease**
 - Psychiatric presentation of physical disease including:
 - Endocrine and metabolic disorders
 - Toxic states
 - AIDS
 - Neurological disease
 - Epilepsy
 - Pain
- **Mental retardation**
 - Features of the commoner syndromes

Gastroenterology

- **Clinical science**
 - Structure and function of the gastrointestinal and hepatobiliary tract (anatomy, physiology and biochemistry)
- **Clinical nutrition**
 - Nutritional requirements in health
 - Assessment of nutritional status
 - Nutritional deficiency states
 - Primary nutritional disorders
- **Disorders of the mouth, tongue and salivary glands**
 - Mouth ulcers, periodontal and salivary disorders
 - Oral manifestations of systemic and dermatological disorders
- **Disorders of the oesophagus and stomach**
 - Alchasia
 - Carcinomas
 - Peptic ulceration
 - Gastritis
 - Gastrointestinal haemorrhage
- **Functional disorders**
 - Functional chest pain and functional dyspepsia

- Irritable bowel syndrome and functional abdominal pain
- Functional constipation and diarrhoea
- **Disorders of the small intestine**
 - Malabsorption syndromes and gluten enteropathy
 - Hormone-secreting tumours of the gut
- **Disorders of the liver, biliary tree and pancreas**
 - Bilirubin metabolism and the enterohepatic circulation of bile acids
 - Causes of jaundice and cholestasis
 - Common pancreatic disorders including carcinoma
 - Fulminant liver failure
 - Acute and chronic hepatitis
 - Drugs, toxins, alcohol and the liver
- **The acute abdomen**
 - Perforated viscus and peritonitis
 - Intestinal obstruction
 - Ischaemic disease of the small and large bowel
- **Inflammatory bowel diseases**
 - Crohn's disease
 - Ulcerative colitis
 - Infective gastroenteritis
 - Parasitic and protozoal gut infections
- **Colorectal disorders**
 - Polyps
 - Carcinomas
 - Diverticular disease
 - Anorectal disorders

Endocrinology

- **Mechanisms of hormone action and importance of**
- **Receptors and substances involved in control of intracellular metabolism**
- **Clinically relevant anatomical aspects of the speciality**

Thyroid

- Mechanisms of thyroid disease

- Clinical presentation and treatment
- **Hypothalamus/Pituitary**
 - Physiology and testing of the control mechanisms of the endocrine system
- **Adrenal**
 - Clinically relevant mechanisms of steroid biosynthesis
- **Ovary**
 - Physiology of ovarian functions
 - Conditions presenting to a physician
- **Testis**
 - Relevant investigations of urological infertility
 - Endocrine aspects of testicular functions
- **Growth**
 - Factors controlling growth hormone secretion
 - Normal growth patterns
 - General medical and endocrine causes of short stature
 - Control of excessive growth
 - Growth hormone therapy and its complications
- **Parathyroid/bone**
 - Control of bone turnover and disorders which can result of its failure
- **Diabetes mellitus**
 - Detailed knowledge is required in all aspects.
- **Disorders of lipid metabolism**
 - Importance of this group of disorder

• **Nephrology**

- **Physiology**
 - Discrete functions of Glomerular ultrafiltration and tubular function
 - Proximal and distal parts of the nephron, with particular reference to control of water and electrolyte balance
 - Renal tubular acidosis

- Cystinuria
- Fluid, electrolyte, and acid-balance disturbances
- **Molecular biology and genetics**
 - Genetic defects of common disorders including:
 - Polycystic kidney
 - Alport's syndrome
 - Hypophosphataemic rickets
 - Inflammatory injury of the kidney mediated by various cytokines factors
- **Glomerular and tubular disorders**
 - Glomerular ultra structure based upon techniques of light microscopy, electron microscopy and immunofluorescence as applied to renal biopsy
 - Primary Glomerular disorders as in idiopathic glomerulonephritis, and nephropathies of systemic diseases
- **Infections of the kidney**
 - Management of urinary tract infections including their detention, predisposing factors, prevention, and treatment
 - Anatomical abnormalities leading to repeated urinary tract infection
- **Calculus formation within the urinary tract**
 - Metabolic disorders predisposing to stone formation, their investigation, prevention and treatment
 - Management of acute and chronic renal failure and of disturbed physiology involved
 - Pathophysiological changes and non-dialytic treatment in different stages of progressive renal failure
 - Principle of nutritional requirements and dietary intervention for patients with chronic renal failure
 - Other therapeutic means to slow down the progression of renal failure
- **Hypertension and renal problems in pregnancy**
 - Renal adaptation to pregnancy
 - Management and prophylaxis of renal disease and hypertension in pregnancy
- **Drug and the kidney**
 - Role of the kidney in the normal elimination of drugs
 - Mechanisms by which drugs cause nephrotoxic damage
 - Principle of dose adjustment according to residual renal function
- **Renal replacement therapy**
 - Different dialysis modalities and their complications

- Complications related to immunosuppressive therapy following renal transplantation

Dermatology

- **Basic science**
 - Structure and function of the epidermis and dermis
- **Clinical dermatology**
 - Recognition of cutaneous symptoms and signs of systemic diseases (diseases affecting internal organs and presenting skin signs or symptoms)
 - Differential diagnosis and plan of investigation of patients whom, present with the following cutaneous signs or symptoms which may indicate internal diseases
 - Clinical features of the following skin diseases:
 - Psoriasis
 - Eczema
 - Urticaria
 - Superficial fungal infections (dermatophytosis, pityriasis versicolor)
 - Common skin cancers such as melanoma
 - Vitiligo and alopecia areata
 - Pemphigus and pemphigoid
 - Cutaneous herpes virus infections (herpes simplex, varicella zoster)
 - Cutaneous staphylococcal and streptococcal infections
 - Leprosy · Investigation
 - Principles of dermatological investigation such as patch testing
- **Drugs and therapy**
 - Drugs which cause life-threatening skin conditions such as
 - Erythroderma
 - Stevens-Johnson syndrome,
 - Angio-oedema
 - Toxic epidermal necrolysis

Medical Oncology:

BASIC SCIENCES:

Molecular biology of cancer and other basics of oncology including oncologic pharmacology and radio-diagnostics:

- Cell and membrane structure
- Receptors and their interaction
- Basic principles of genetics and cancer epidemiology
- Anatomical aspects in oncology
- Pathology and diagnostics related to oncology
- Research methodology

CLINICAL ONCOLOGY:

Basic principles of:

- Medical oncology
- surgical oncology
- oncologic pharmacotherapy
- targeted and biologic therapy

Basic knowledge of site-specific cancers:

- Breast cancer
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- Primary malignant tumors of the lung and pleura
- Cancers of the Genito-urinary tract
- Gynecologic malignancies
- Sarcomas
- Skin cancers
- Central nervous system malignancies
- Head and neck cancers
- Gastrointestinal cancers

- Hematologic malignancies
- Leukemias (acute and chronic leukemias)
- Lymphomas Plasma cell dyscrasias, myeloproliferative and myelodysplastic syndromes

- Carcinoma of unknown primary site

- AIDS related malignancies

- Endocrine cancers

- Medical emergencies and supportive care