

FACULTY OF MEDICAL SCIENCES UNIVERSITY OF DELHI

Clinical contents of post graduate training including three years training program of M.D. Medicine.

During this training the candidate is expected to develop the following knowledge and skills :

1. Clinical skills : These are essential to practice competently in adult internal medicine and include the following
 - General verbal communication skills – These include establishment of professional relationships with patients and their relatives in order to obtain organized , relevant and complete medical histories and perform thorough physical examination.
 - General physical examination skills – This includes the ability to perform an accurate physical and mental state examination including complex medical problems and an ability to interpret physical signs.
 - General written communication skills – This includes ability to write clear, concise, and accurate medical history and clinical examination followed by a clear management plan . Also includes ability to write discharge summaries and transfer summaries.
 - Patient management skills – This includes ability to interpret and integrate history and physical findings with laboratory results to arrive at diagnosis and management by use of appropriate resources , thereby avoiding unnecessary investigations and hospitalization
2. Clinical judgement – This is the process by which the trainee learns to make diagnostic and therapeutic decisions. It includes
 - Integration of medical knowledge and clinical skills.
 - Consideration of diagnostic and therapeutic alternatives.
 - Consideration of the risk – benefit ratio for the patient and awareness of cost of investigations and treatment.
3. Allied skills - This includes the following
 - Research – In this the trainee acquires the basic knowledge of research methodology including hypothesis generation, study design and research

methodology, understanding of basic principles of epidemiology and principles of statistical analysis.

- Learning methods – This includes the following
 - ❖ Presentation skills.
 - ❖ Literature searches
 - ❖ Computer assisted learning
 - ❖ Peer review
 - ❖ Formal teaching of the nurses and other health professionals.
 - Service to medical community – This includes writing reports, publishing case reports and reviews.
 - Technical skills – This includes various clinical procedures like arterial and venous punctures, paracentesis of various body fluids, lumbar punctures, urinary catheterization, cardiopulmonary resuscitation and various specialized procedures which are mentioned later on.
 - Management of terminal illness and bereavement care of dying, decisions regarding resuscitation, handling the relatives and request for organ donation.
4. Moral and ethical behaviour – This implies consistent demonstration of high standards of moral and ethical behaviour towards patients, families and co-workers. Examination of female patients must be done in presence of chaperone.
5. Humanistic qualities include the ability to
- Listen, be honest, courteous and responsive to the patient's wishes.
 - Earn the patient's trust
 - Provide empathy and compassion
 - Be respectful of the patient's need for information and autonomy.
- 6 Professional attitude and behaviour – During the training, trainee assimilates attitudes, behaviour and interpersonal skills essential for medical practice. This includes
- Consideration of interests of the patient and community as of paramount and ability to establish a positive relationship with the patient
 - Honesty, compassion and respect for every patient and sensitivity in performing internal examination.
 - Maintain comprehensive and timely medical records.
 - Evaluate new medical scientific information and logical use of guidelines, texts, reference literature and related sources.
 - Availability in consultative role to other physicians when needed.
7. Total medical care – The trainee inculcates above skills to manage patients effectively during the course of training. This includes the ability to
- Apply appropriate comprehensive care of high quality.
 - Be responsive to the patient's needs and wishes.

- Use therapeutic modalities, laboratory tests and diagnostic procedures efficiently and in patient's best interests.
- Provide appropriate and effective utilization and coordination of care by consultants and other specialist health care professionals.
- Optimal use of limited resources to maintain or enhance quality of care

Clinical content of the training includes expertise in the following theoretical and practical skills in different subspecialties of internal medicine :

A. CARDIOLOGY –

Theoretical knowledge of

- Normal cardiac anatomy and physiology.
- Congenital heart disease especially in adult life and pregnancy.
- Valvular heart disease including aetiology, pathophysiology, diagnosis and management , valve surgery and prosthetic valves.
- Aetiology, diagnosis and management of pulmonary embolism, hypertension, corpulmonale, cardiomyopathy, myocarditis, endocarditis, pericardial diseases, aortic aneurysm and dissection, cardiac transplantation, cardiac changes and problems in pregnancy , heart failure.
- Cardiac arrhythmias including ECG, clinical diagnosis and management of patients with brady and tachyarrhythmias and syncope with use of pacing and understanding of the pharmacology and clinical applications of antiarrhythmic and cardioactive drugs.
- Coronary disease including pathophysiology; risk factors and management; use of tests for diagnosis, prognostic assessment and management; management of stable and unstable angina and myocardial infarction including diagnosis, therapy, revascularization, complications, secondary prevention, rehabilitation, risk stratification etc ; understanding of indications for and principles of coronary surgery and post surgical management.
- Cardiac investigations including detailed knowledge and practical experience in standard EKGs, 24 hour EKG monitoring and stress testing; knowledge of echocardiography, indications for and interpretation of cardiac nuclear medicine scans, cardiac CT & MRI, cardiac catheterization and angiography including understanding of the procedures with complications and pre and post procedure management.

Practical skills

- Mechanics and interpretation of EKG.

- Interpretation of X-Ray Chest.
- TMT monitoring and interpretation
- Ambulatory EKG monitoring and interpretation.
- Cardiopulmonary resuscitation including BLS and ACLS.
- Treating dysrhythmias and conduction disturbances. External pacing and TPI
- Central line insertion and CVP measurement.
- Insertion of arterial line
- Thrombolysis.

B. NEUROLOGY-

Theoretical knowledge of

- Normal anatomy, physiology and anatomic principles that allow localization of neurologic disease.
- Ability to diagnose and manage common neurological disorders including strokes, TIAs, SAH, SDH, epilepsy, nonepileptic seizures and other psychogenic illnesses, migraine, dementia, multiple sclerosis, Parkinson's disease, myelopathy, myopathies, neuropathies, MND, disorders of neuromuscular junction, meningitis, encephalitis, neoplasms, brain abscess, vasculitis, pyramidal and extrapyramidal disorders, disorders of sensation, hearing and vision etc.
- Knowledge of and ability to diagnose congenital disorders like brain and spinal cord malformations, arnold chiari malformation, meningomyelocele, cortical malformations etc., chromosomal abnormalities, micro and macrocephaly, aberrant development like development delay, mental retardation, neurodegenerative diseases, developmental disorders of higher cerebral function like mental retardation, developmental language disorders, learning disabilities (e.g. , dyslexia), attention deficit disorders, pervasive developmental disorders (e.g., autism) etc.
- Recognition and early treatment with appropriate onward referral of neurological emergencies such as coma, raised intracranial pressure, status epilepticus, infection, visual failure, spinal cord compression, neuromuscular respiratory failure including GB syndrome, neoplastic disease, Wernick-Korsakoff encephalopathy and giant cell arteritis.
- Knowledge of nutritional and metabolic diseases of nervous system and manifestations of disease.
- Understanding of the assessment of the brain death and an appreciation of ethical issues associated with managing brain death, terminal motor neuron disease and the entry of patients with coma, aphasia or confusion into research studies.
- Knowledge of indications, capabilities and limitations of investigations such as lumbar puncture & CSF examination, CT and MRI of brain and spinal cord, duplex ultrasonography, spinal CT angiography, MR

angiography, EEG, electromyography and nerve conduction studies, evoked potential studies, myelography and invasive digital subtraction cerebral angiography.

- Some knowledge of the indications for neurosurgery.

Practical skills

- Lumbar puncture
- Muscle biopsy
- Taking a history and performing a complex neurologic and mental status examination, Glasgow coma scale. Using clinical knowledge to localize a lesion and to assess the acuity and prognosis of clinical problem and formulate a rational plan of further investigation and management.

C. INTENSIVE CARE MEDICINE

Theoretical knowledge of

- Assessment and Medical management of trauma patients; respiratory failure and acute respiratory disorders like ARDS, COAD, pulmonary embolism, empyema , pneumothorax etc; acute cardiovascular disorders like CHF, IHD, dysrhythmias, cardiac arrest, aortic aneurysms; toxicologic emergencies, sepsis, shock, renal failure, acid base disorders; neurologic emergencies like coma, CVAs, seizure disorders, spinal cord compression, infectious and inflammatory disorders; environmental disorders like heat and cold injuries, burns, electrocution, hypersensitivity reactions etc.
- The assessment and resuscitation and ongoing acute management of critically ill and injured patients with life threatening single and multiple organ system failure.
- Indications and interpretations of diagnostic tests like EKGs, radiology imaging of acute head and cervical spine injuries, chest pathology, acute abdominal conditions, pelvis and extremity injuries.
- Recognition and understanding of the correct use of drugs and therapies within the ICU pharmacopoeia: analgesics, sedatives, muscle relaxants, inotropic agents, antidysrhythmia drugs, including digoxin, diuretics, antibiotic drugs and fluids for resuscitation.
- Physiological monitoring and clinical measurement.
- Knowledge of principles of care, medicolegal issues like informed consent, laws and liability.

Practical skills

- Airway management

- ◆ Hemlich maneuver
- ◆ Optimising airway patency / bag mask ventilation
- ◆ Oral, nasotracheal esophageal- obturator, and intubations in children and adults.
- ◆ Needle thoracentesis and tube thoracostomy
- ◆ Mechanical ventilation including a range of ventilatory modes and strategies.
- Hemodynamic techniques
- ◆ Arterial catheter insertion / blood gas sampling
- ◆ Central venous access (jugular, femoral, subclavian, brachial.)
- ◆ venous cut down
- ◆ renal replacement therapy
- Diagnostic and therapeutic procedures
- ◆ Control of epistaxis.
- ◆ Peritoneal tap and lavage
- ◆ Lumbar puncture
- ◆ Pericardiocentesis
- ◆ Nasogastric intubation
- ◆ Thoracentesis

D. RESPIRATORY MEDICINE

Theoretical knowledge of

- Understanding of basic respiratory and sleep physiology.
- Assessment of respiratory symptoms and signs.
- Interpretation of CXRs, arterial blood gases, basic lung function and understanding of indications for bronchoscopy, thoracoscopy and needle biopsy.
- Handling of respiratory emergencies like severe pneumonia, pneumothorax, acute severe asthma, acute respiratory failure, pulmonary thromboembolism, acute upper respiratory obstruction
- Knowledge of aetiology, pathophysiology, differential diagnosis and management of obstructive lung diseases like asthma & COPD and restrictive lung diseases like ILD.
- Management of sleep disorders like obstructive and central sleep apnoea, neuromuscular diseases and ventilatory failure.
- Assessment and management of respiratory infections like parenchymal infections including bronchitis, bronchiectasis and pneumonia (including complications and empyema and parapneumonic effusions); cystic fibrosis; opportunistic infections in the immunocompromised, spectrum of infections and noninfectious manifestations in HIV related pulmonary disease; tuberculosis, nontuberculosis mycobacterial infections and fungal diseases.

- Investigation and management of pulmonary vascular disease like pulmonary thromboembolism, pulmonary hypertension
- Staging assessment and management of primary and secondary lung cancers, mesotheliomas and mediastinal tumors.
- Pathophysiology and management of ARDS.
- Knowledge of selection of potential recipients for lung transplantation and management of post transplant problems and survival.
- Knowledge of occupational lung diseases and pulmonary involvement in systemic diseases like sarcoidosis.

Practical skills

- Aspiration of pleural effusion and biopsy.
- Insertion of intercostals drain / catheter and subsequent management of drain.
- Establishment and maintenance of oropharyngeal airway.
- Endotracheal intubation
- Spirometry.

E. NEPHROLOGY

Theoretical knowledge of

- Fluid , electrolyte and acid base homeostasis :
- ◆ Recognition of under and over hydration; causes, consequences and treatment.
- ◆ Electrolyte disorders associated with altered sodium, potassium, acid-base and water homeostasis. Appropriate treatment of these disorders.
- ◆ Biochemical tests of renal function; urinalysis and urine microscopy; serological testing; appropriate use of renal imaging techniques.
- ◆ The differential diagnosis and management of proteinuria, hematuria, oliguria, polyuria.
- ◆ Indications and requirements for and complications of renal biopsy.
- ◆ Immunopathogenesis and treatment options of major glomerulopathies.
- ◆ Aetiology, complications and management of nephrotic and nephritic syndromes.
- ◆ Aetiology, clinical manifestations and treatment of diabetic and analgesic nephropathy, reflux nephropathy, tubulointerstitial diseases of kidneys.
- ◆ Upper and lower urinary tract infections, nephrolithiasis and obstructive uropathy: diagnosis and management including indications for emergency nephrostomy.
- ◆ Inherited renal diseases like PKD, alport's disease.
- ◆ Renal stone disease : Incidence, aetiology, clinical manifestations, prevention, drug therapy, urologic principles.

- ◆ Incidence, natural history, diagnosis and management of hypertensive renal disease and renovascular disease.
- Acute and chronic renal failure : Defination, differentiation between prerenal, renal and post renal causes of renal failure, knowledge of common causes, clinical manifestations, assessment of severity, nondialytic therapy including principles of calcium-phosphate balance; effect of common drugs on renal function and principles of dose modification of drugs in renal failure.
- Indications, various modes and complications of Hemo Dialysis and Peritoneal Dialysis
- Renal transplantation : Screening of potential recipients and donors, immunosuppressive regimens, recognition and management of post transplant problems, basic principles of diagnosis and management of cellular and vascular rejection.

Practical skills

- Urine microscopy
- Renal biopsy.
- Hemodialysis and peritoneal dialysis and management of all complications.
- Tenckhoff catheter insertion and its further management
- Insertion of double lumen AV catheter for hemodialysis

F. ENDOCRINOLOGY AND METABOLISM

Theoretical knowledge of

- Basic mechanisms of hormone action in health and disease :
 - ◆ Structure and synthesis of peptide and steroid hormones.
 - ◆ Transport and delivery of hormones to target organs.
 - ◆ Negative feedback control of hormone secretion.
 - ◆ Interaction of hormones with receptors and second messengers.
- Assessment of endocrine function
- Interpreting the results of common endocrine laboratory tests
- Assessment and management of functioning and nonfunctioning anterior pituitary tumors, hyperprolactinemia, acromegaly and posterior pituitary disorders.
- Hypopituitarism
- Diabetes insipidus and SIADH
- Aetiology, diagnosis and management of hyper and hypothyroidism with complications including thyroid storm and myxoedema coma; diagnosis and principles of management of Iodine deficiency disorders,

autoimmune thyroid disorders, thyroid nodule, goitre and thyroid carcinoma.

- Diagnosis and management of syndromes of adrenocortical excess and insufficiency.
- Assessment and principles of management of hypogonadism, disorders of fertility, male impotence, use of gonadal hormone replacement, hirsutism, androgen excess syndromes, PC OD etc.
- Diagnosis, investigations and management of hypo and hypernatremia, hypo and hyperkalemia, hypo and hypercalcemia including hyperparathyroidism and hyperparathyroidism of malignancy and hyper and hypovitaminosis D.
- Aetiology, diagnosis and management of osteoporosis and fractures including post menopausal osteoporosis and hormone replacement therapy .
- Obesity & Metabolic syndrome
- Polycystic ovarian disease & hirsutism.
- Paget's disease of bone.
- Diagnosis and management of ectopic humoral syndromes.
- Aetiology, classification, risk stratification, prevention and management of dyslipidaemia including ATP guidelines.
- Aetiology, classification, diagnosis, investigations and management of diabetes(Life style & pharmacotherapy) and its micro and macrovascular complications including :
 - ◆ Initial management of newly presented diabetes.
 - ◆ The pathophysiological basis of IDDM and NIDDM.
 - ◆ Pathophysiology and management of hyperglycemic crisis (Diabetic Ketoacidosis & Hyperosmolar coma) and hypoglycemia.
 - ◆ Management of diabetes during surgery and acute illnesses.
 - ◆ Management of erectile dysfunction
 - ◆ Management of neuropathies including autonomous neuropathy.
 - ◆ Management of nephropathy, retinopathy, hypertension, dyslipidaemia, CAD in diabetic patients
 - ◆ Principles of management of diabetes in pregnancy including gestational diabetes.
 - ◆ Management of diabetic foot including prevention and treatment of diabetic foot ulceration, cellulitis and gangrene.
 - ◆ Multidisciplinary approach to modern diabetes care and the importance of patient participation and patient education.

Practical skills :

- Taking detailed history & clinical evaluation of endocrine disorder
- Managing insulin and oral hypoglycemic therapy.
- Fingerprick blood glucose monitoring.
- Ophthalmoscopy for vitreo-retinal disease.

- Interpretation of BMD tests
- Assessing autonomic neuropathy

G. ALLERGY AND IMMUNOLOGY

Theoretical knowledge of :

- Structure and function of cellular and humoral components of immune system.
- Immune response and hypersensitivity reactions.
- The types of tissue injury mediated by cells with immune function, antibodies, immunological and inflammatory mediators such as cytokines and complement components etc.
- The mechanisms involved in the generation and control of immune responses to foreign proteins, allergens, microorganisms and autoantigens.
- Knowledge of immunogenetics especially the HLA system and its role in transplantation and disease association.
- Diagnosis and management of primary and secondary immunodeficiency.
- Aetiology, staging, clinical manifestations, complications and management of HIV patients.
- The diagnosis and management of allergic disorders including asthma, rhinitis, urticaria / angioedema, anaphylaxis, food allergy and other reactions.
- Knowledge of the mechanisms of action, pharmacokinetics and indications for the use of antihistamines, bronchodilators, inhaled steroids and other anti-allergy pharmaceuticals.
- Organ specific and multisystem autoimmune diseases including rheumatological disorders.
- Systemic vasculitides.
- Amyloidosis, sarcoidosis and immune complex disorders.
- Monoclonal antibodies: diagnostic & therapeutic role

Practical skills :

- Skin testing : puncture, intradermal, interfering conditions or medications.
- Invitro testing
- Understanding the principles and monitoring of plasmapheresis and desensitization.

- Pulmonary function tests including spirometry.
- Exercise challenge testing.
- Management of laryngeal oedema & anaphylactic shock
- Recognition & Management of hypersensitivity reactions

H. GASTROENTROLOGY AND HEPATOLOGY

Theoretical knowledge of :

- Assessment, investigation and management of heartburn, chest pain, dysphagia, persistent vomiting and dyspepsia.
- Diagnosis and management of oesophageal dysmotility, infections and reflux.
- Acute and chronic abdomen pain.
- Diagnosis and management of peptic ulcer including detection and treatment of H. pylori.
- Investigation, diagnosis and management of acute and chronic upper as well as lower GI bleed.
- Malabsorption syndromes including diagnosis and management of coeliac disease and tropical sprue.
- Presentation, investigation, diagnosis and management of GI malignancy including oesophageal, gastric, pancreatic and colorectal cancer.
- Diagnosis and management of inflammatory bowel diseases including their complications
- Irritable bowel syndrome and functional bowel disease.
- Aetiology, presentation, complications and management of acute and chronic pancreatitis.
- Diarrhoea, GI infection and AIDS.
- Causes, investigations and management of acute and chronic liver disease including immunologic liver disease.
- Diagnosis, prophylaxis and management of hepatitis including viral hepatitis.
- Haemochromatosis.
- Diagnosis and management of HCC and other hepatic tumors.
- Knowledge of appropriate use of endoscopy, colonoscopy, hepatobiliary imaging and radiological imaging (Ultra sound, CT, Barium studies) other diagnostic tests in gastrointestinal disease.
- Tests of malabsorption

Practical skills :

- Abdominal Paracentesis.
- Insertion of nasogastric tube and Sengstaken Blakemore tube.
- Liver biopsy.
- Abdominal fat pad biopsy for amyloidosis.

I. HEMATOLOGY AND ONCOLOGY :

Theoretical skills :

- An understanding of haemopoiesis and how the cellular elements of the blood are made.
- Mechanisms, investigations and therapy of red cell disorders like anaemias, polycythemias, thalassemias, haemoglobinopathies.
- Pathophysiology, investigation and therapy of white cell disorders like leukemias, lymphomas, myeloproliferative disorders, myeloma and other plasma cell disorders.
- Pathophysiology, investigation and therapy of platelet disorders like thrombocytosis and thrombocytopenia.
- Diagnosis and management of acquired disorders of haemostasis like DIC as well as inherited disorders like haemophilia and VW disease and an understanding of prevalence, investigation and management of thrombophilia.
- Indications for transfusion of red cells, platelets, fresh frozen plasma, cryoprecipitate, albumin and immunoglobulin concentrates. The principles of cross matching and assessment of transfusion reactions.
- Principles of autologous and allogenic haemopoetic stem cell transplantation including tissue typing, high dose therapy and graft-versus-host disease.
- Assessment and management of haematological emergencies like neutropenic fever, massive haemorrhage, abnormal bleeding, thromboembolism, hypercalcemia, vomiting and pain relief.
- Principles of laboratory haematology like blood counting and morphology, immunophenotyping, cytogenetic analysis, simple tests of haemostasis and blood cross matching.
- Assessment of acutely ill patients with malignancy & Management of oncological emergencies due to disease or therapy including hypercalcaemia, SVC obstruction, spinal cord compression, cardiac tamponade, neutropenic infection.
- Principles of cancer staging.

- Principles of anticancer therapy including endocrine, cytotoxic, radiation and palliative; principles of monitoring of patients receiving anticancer therapy.
- Knowledge of cancers that can be cured by primary chemotherapy including testicular cancers and lymphomas; knowledge of cancers in which adjuvant or neoadjuvant chemotherapy may enhance the outcomes of local treatment including breast, head and neck, lung, colon and ovarian cancers; knowledge of common cancers that can be palliated by nonsurgical cancer therapies including breast cancer, lung cancer, colorectal cancer and prostate cancer.
- Knowledge of paraneoplastic syndromes associated with cancer.
- Mechanisms of action and toxicities of various classes of cytotoxic drugs.
- Principles of palliative therapy.
- Understanding of genetic pathophysiology of common malignancies including breast, colon, and stomach cancer and leukemias.

Practical skills :

- Blood transfusion and administration of blood and blood products.
- Insertion and care of central lines.
- Prescription and safe administration of intravenous chemotherapy.
- Acute management of extravasation.
- Performance of thoracentesis, ascitic tap and lumbar puncture, Bone marrow aspiration & Biopsy.
- Discussion with patients and their relatives about the diagnosis and prognosis of malignancies.

J. RHEUMATOLOGY :

Theoretical knowledge of :

- Classification, clinical features, diagnosis, lab findings, pathophysiology and management of inflammatory as well as non inflammatory disorders including :
 - ◆ Rheumatoid arthritis.
 - ◆ Infectious arthritis.
 - ◆ Osteoarthritis.
 - ◆ Ankylosing spondylitis, reactive arthritis, psoriatic arthritis, arthritis associated with inflammatory bowel disease.
 - ◆ SLE, Sjogren's syndrome, poly and dermatomyositis, scleroderma, MCTD.
 - ◆ Vasculitis including PAN, Takayasu's, temporal arteritis and polymyalgia rheumatica.

- ◆ Gout, pseudogout and chondrocalcinosis.
- ◆ Osteoporosis, osteomalacia and paget's disease.
- Use of anti-inflammatory, disease modifying and immunosuppressive drugs including their adverse affects and safety monitoring procedures.
- Management of chronic progressive disorders including the appropriate use of medical therapy, relative role of orthopedic surgery, workings of multidisciplinary team like physiotherapy, occupational therapy and means of evaluating and addressing disability and handicap including the provision of aids.

Practical skills :

- Examination of joints & ability to distinguish between inflammatory & non inflammatory joint diseases.
- Evaluation & interpretation of radiological images of joints.
- Management of acute rheumatological emergencies like red hot joint, temporal arteritis, acute low back pain, vasculitis and development of cervical myelopathy in rheumatoid arthritis.
- Knee joint aspiration.
- Correctly prescribe physical therapy.
- Perform common measurements to follow disease progression.
- Educate the patient and family about disease, its progression and prognosis and community resources etc.

K. GERIATRIC MEDICINE

Theoretical knowledge of :

- The underlying physiologic normal aging changes in various body systems including diminished homeostatic abilities, altered metabolism and reduced functional reserve.
- Alteration of normal physical examination with ageing.
- The unique modes of presentation of elderly patients for care, including altered and nonspecific presentations of diseases.
- Interpretation of laboratory values in elderly.
- The hazards of drug treatment in elderly people including pharmacokinetic and pharmacodynamic changes in drug handling with age and disease, risks of multiple drug prescription, iatrogenic drug induced disease.
- Management of specific syndromes encountered in old age like falls, cognitive impairment, delirium, pain, urinary and fecal incontinence, constipation, gait disorders.

- Management of specific diseases with strong age associated risk such as strokes, hypertension, hypotension, dementia, arthritis, osteoporosis, pressure ulcers, Parkinson's disease.
- The presentation and management of psychiatric illness in old age and its relationship to physical illness.
- Understanding of important ethical and legal issues in caring for elderly people.
- The range of services available to promote rehabilitation or maintenance of an independent lifestyle for elderly people, increasing their ability to function as long as possible in their existing family, home and social environment.
- The risks and adverse outcomes in geriatric care of polypharmacy, iatrogenic illness, immobilization and its consequences, over dependency, inappropriate institutionalization, non recognition of treatable illness, over treatment, inappropriate use of high technology and the unsupported family.
- Understanding the role of aids and appliances in rehabilitation of elderly disabled people.
- The use of rating scales in particular clinical situation , e.g., a mental test score, a geriatric depression scale, and scoring of activities of daily living using a recognized scale.

Practical skills :

- Administration of functional and cognitive assessment scales.
- Obtaining a comprehensive history and mental status examination.
- Communicating to the patient and the care givers the proposed investigation and treatment in such a way as to promote understanding, compliance and appropriate attitudes
- Counseling about psychologic, social and physical stresses and changes of age, dying and death.

L. ADOLESCENT HEALTH

Theoretical knowledge of :

- Normal anatomy and physiology associated with puberty and adolescent years.
- Stages of adolescence and psychologic growth and development in each stage.
- Adolescent health care including history taking, physical examination, screening tests and interpretation, immunizations, healthy diet, cessation of smoking and recreational drug use, safe sexual practices etc.
- Variations in physical growth and development like short and tall stature, precocious and delayed puberty, delayed menarche etc.

- Specific problems of adolescents like acne, obesity, sexual concerns, pregnancy, psychiatric issues, learning and eating disorders, infections, violence, substance abuse
- Medicolegal issues of adolescents.

Practical skills :

- Growth & pubertal assessment
- Taking a history and sexual history and performing a physical examination
- Providing patient education for preventive measures appropriate for adolescent health care needs
- Determining their parental relationship and dealing with adolescents in the context of their family and community.

M. DERMATOLOGY

Theoretical knowledge of :

- a) Diseases predominantly cutaneous with possible systemic associations :
- Inflammatory skin disease :
 - ◆ Eczema- atopic, discoid, stasis, seborrhoeic dermatitis, psoriasis, acne rosacea, urticaria, photosensitivity.
 - ◆ Infection, infestation.
 - ◆ Viral – warts, herpes zoster / simplex, molluscum contagiosum, HIV, exanthems.
 - ◆ Bacterial – acute like streptococcus, staphylococcus, impetigo, cellulitis; chronic like TB, leprosy and syphilis.
 - ◆ Fungal – Dermatophyte, candidiasis, pityriasis versicolor.
 - ◆ Infestation – scabies, pediculoses.
 - ◆ Immunologically mediated – pemphigus, pemphigoid, dermatitis herpetiformis, alopecia areata, vitiligo, acute and chronic cutaneous vasculitis, cutaneous lupus erythematosus.
 - ◆ Drug reactions – urticaria, maculopapular eruptions, erythema multiforme, steven johnson’s syndrome
 - ◆ Generalized pruritis.
 - Skin tumours :
 - ◆ Benign – seborrhoeic keratoses, melanocytic naevi, dermatofibroma, hemangioma and other vascular abnormalities.
 - ◆ Malignant / pre-malignant – solar keratoses, Bowen’s disease, BCC, SCC, melanoma, Kaposi’s sarcoma.
- b) Diseases predominantly systemic with possible cutaneous associations :

- Systemic malignancy- acanthosis nigricans, dermatomyositis, erythema nodosum, epidermolysis bullosa acquisita, pruritis.
- Metabolic diseases – diabetes, hyper or hypothyroidism, porphria, liver / renal failure, androgenisation.
- Immunologically mediated / collagen vascular disease – lupus erythematosus, dermatomyositis, RA, PAN, vasculitis.
- IBD – pyoderma gangrenosum, oral mucosal disease, erythematous nodosum.
- Dermatological emergencies – disseminated herpes simplex, acute angio-oedema, anaphylaxis, acute allergic contact dermatitis, erythroderma, TEN, pustular psoriasis.

Practical skills :

- Skin biopsy.
- Excision of skin lesions.
- Intralesional injection of corticosteroids.
- Incision and drainage.
- Nutrition counseling and routine skin care.

N. CLINICAL GENETICS

Theoretical knowledge of :

- Ability to collect and record pedigree information
- Understanding of genetic segregation analysis, including methods and interpretation of linkage analysis. Application to autosomal dominant and recessive, sex linked, multifactorial and mitochondrial inheritance.
- Statistical approaches to risk interpretation and explanation of inheritance patterns and calculated or empiric risk figures to families.
- Basic molecular and biochemical genetics, including understanding of the mechanism and applications of Southern and Northern blotting, polymerase chain reaction, reverse transcription, allele specific hybridisation, DNA sequencing, DNA polymorphism analysis. Major pathways involved in energy and nitrogen metabolism.
- Basic understanding of the definitions and underlying processes for heterozygosity, homozygosity, polymorphism vs mutation, genetic heterogeneity, allelic heterogeneity, phenocopies, variable expressivity, age specific penetrance, new mutation, germline versus somatic mosaicism, variable penetrance, genomic imprinting, triplet repeat diseases, anticipation, epigenetic factors, somatic mutation, multifactorial inheritance, genetic control of continuous variables like height, blood pressure, intelligence.

- Teratology and developmental genetics including ability to identify individual with a personal or family history of physical or psychomotor developmental abnormalities for which genetic assessment would be appropriate.
- Cytogenetics : trisomy, monosomy, aneuploidy, deletion, inversion, duplication, reciprocal and Robertsonian translocation, florescent insitu hybridisation
- Cancer genetics including genetic mechanisms involved in acquired or inherited cancer and when to refer for a family history of cancer.
- Common adult onset conditions for which pre-symptomatic or predictive testing is available.
- Community genetics including principles and practices of screening.
- Pharmacogenetics : Psuedocholinesterase deficiency, acetylator activity, malignant hyperthermia, porphyrias, G-6PD deficiency, special anaesthetic problems encountered in myotonic and muscular dystrophies.
- Informed consent for genetic testing. Importance of privacy, autonomy, avoidance of harm, nondirectiveness, confidentiality of results and records.

Practical skills :

- The use of genetic databases such as Online Mendelian Inheritance in Man to obtain current information about diagnosis and DNA analysis for known genetic conditions.

O. INFECTIOUS DISEASES

Theoretical knowledge of :

- Principles and management of infection : clinical assessment of the febrile patient; the use of simple microbiological investigations; initiation of appropriate empiric and directed antimicrobial therapy.
- Evaluation and management of PUO.
- Principles of immunization and antibiotic prophylaxis.
- The mechanism of disease and host responses in infection.
- Infection in special hosts : infections in intensive care, infections associated with immunocompromised states like diabetes, alcohol abuse, chronic liver disease, old age, steroid treatment, neutropenic individuals and transplant recipients.
- Recognition and management of acute infectious emergencies including septicemia, meningitis, falciparum malaria, enteric fever, kala azar etc.
- Knowledge of clinical illness produced by bacterial, protozoal, helminthic, viral and fungal pathogens.
- Principles of hospital acquired infections.

- Principles of infection control in the community including epidemiology, transmission and prevention of common infections which threaten a community.
- Evaluation of acutely ill, febrile travellers and patients from overseas.
- Recognition and management of common community acquired infection such as lower respiratory tract infection, urinary tract infection, skin and soft tissue infection, infective arthritis, enteritis, hepatitis, biliary tract infection, endocarditis.
- Recognition & management tuberculosis & leprosy.
- Management of common STDs with knowledge of aetiology and investigations for management of urethral and vaginal discharge, cystitis, proctitis, prostatitis, epididymitis, and reactive arthritis.
- Diagnosis, evaluation and management of acute illness in HIV infected individuals: recognition, counseling and testing; antiretroviral therapy; management of major complications and prophylaxis.

Practical skills :

- Blood cultures from peripheral and central sites.
- Tuberculin test.
- Wound culture.
- Aspiration of usually sterile sites
- Communication skills: taking an infectious disease (including sexual) history; counseling for HIV testing.
- Immunization.
- Aspiration of liver abscess and guided aspiration of pus from other sites.
- Post exposure prophylaxis.

P. CLINICAL PHARMACOLOGY

Theoretical knowledge of :

- Principles underlying rational drug use :
- ◆ Pharmacodynamics including receptor / drug interactions, dose response, efficacy, tolerance, potency, agonists and antagonists.
- ◆ Pharmacokinetics including definition of drug clearance, half life, volume of distribution, therapeutic ratio, absolute and comparative bioavailability, drug transport and metabolism, the cytochrome family of enzymes. The importance of these concepts to choice of routes, dose, dose frequency of medications.
- Mechanisms of drug interactions and therapeutic drug monitoring.
- Systematic clinical pharmacology:

- Cardiovascular : diuretics, beta- blocking agents, ACE inhibitors, calcium channel blockers, nitrates, anticoagulants and thrombolytics, aspirin, anti- dysrhythmics.
- ◆ Respiratory : beta- agonists, and steroids.
- ◆ Endocrinology ; insulin, OHAs, statins, fibrates, thyroxine, carbimazole, desmopressin, glucocorticoids / mineralocorticoids and sex steroids, dopamine agonists.
- ◆ Infections : antibiotics like penicillins, cephalosporins, aminoglycosides, acyclovir, amphotericin, ketoconazole, AZT, protease inhibitors etc.
- ◆ CNS: benzodiazepines, SSRIs, tricyclics, MAOI, lithium, phenothiazines, levodopa, ergotamine, sumatriptan.
- ◆ GI : antiemetics, laxatives, antacids, H2 blockers, proton pump inhibitors, sulphasalazine.
- ◆ Rheumatology : NSAIDs, immunosuppressants and disease modifying drugs, biphosphonates, calcitonin.
- ◆ Oncology : anticancer drugs, cytotoxic drugs.
- Clinical toxicology including overdose, management of addiction, adverse drug reactions and management of anaphylaxis.

Practical skills :

- Being able to undertake a thorough medication review
- Being able to monitor drug therapy clinically and with laboratory assistance.

Q. NUCLEAR MEDICINE

Theoretical knowledge of :

- Cardiovascular system :
 - ◆ Understanding the principles of and indications for myocardial perfusion imaging using exercise and pharmacological stress.
 - ◆ Understanding the role of myocardial perfusion imaging in the post infarct patient, in patients who have undergone revascularization procedures and its use in detection of viable myocardium, stunned and hibernating myocardium.
- Respiratory system :
 - ◆ Understanding the principles of and indications for lung ventilation and perfusion imaging.
 - ◆ Understanding the role of contrast venography, compression ultrasound and pulmonary angiography in diagnosis of pulmonary embolism.
- Musculoskeletal system :
 - ◆ Understanding the principles of and clinical indications for bone scanning with particular reference to oncology and rheumatology.

- ◆ Understanding the role of bone scanning in the diagnosis of disease and integration of bone scan findings with plain radiography, CT scanning and MRI.
- ◆ Understanding the role of therapeutic radiopharmaceuticals in palliation of pain from bone metastasis.
- ◆ Understanding the role of dual photon absorptiometry and its role in the diagnosis and management of osteoporosis.
- Gastrointestinal system :
- ◆ Understanding the principles of and indications for oesophageal motility studies; gastric emptying scans ; colon transit studies; hepatobiliary studies and gastrointestinal bleeding studies; cavernous hemangioma studies; urea breath tests and labelled white cell scans.
- ◆ Capable of interpreting the results of these scans and integrating those results with the results of abdominal CT scanning and abdominal ultrasound.
- Nephrology :
- ◆ Understanding the principles of and indications for renal perfusion scanning, renal cortical scanning and GFR estimation.
- ◆ Understanding the use and limitation of pharmacological intervention (diuretics , ACE inhibitors) in dynamic renal scanning.
- ◆ Understanding the role of renal perfusion imaging in the detection of renovascular hypertension.
- Haematology :
- ◆ Understanding the principles of gallium scanning, white cell scanning, Schilling test, red blood cell volume and plasma volume estimations.
- ◆ Understanding the clinical indications for gallium scanning in the detection and monitoring of inflammation and malignancy.
- ◆ Understanding the clinical indications for white cell scanning in the detection of inflammation and infection.
- ◆ Understanding the role of therapeutic administration of Phosphorus-32 in the treatment of polycythemia rubra vera.
- Neurology :
- ◆ Understanding the principles of and indications for cerebral perfusion imaging.
- Endocrinology:
- ◆ Understanding the principles of and indications for thyroid and parathyroid scanning, I-131 MIBG scanning.
- ◆ Understanding the role of I-131 therapy in the treatment of thyrotoxicosis and thyroid cancer.

R. PALLIATIVE CARE

Theoretical knowledge of :

- Principles and philosophy of palliative care and their application in advanced disease.
- Management of emergencies in palliative care – acute confusional states, haemorrhage, acute severe pain, spinal cord compression, convulsions, SVC obstruction.
- Management of major physiologic pain syndromes like neuropathic, bone and visceral, their assessment, psychological factors, treatment and monitoring.
- Management of conditions and symptoms common in incurable and life threatening disease – Including hypercalcemia, mouth problems, anorexia, weakness, nausea and vomiting, dyspnoea, intestinal obstruction, constipation, diarrhoea, incontinence, anxiety, depression, restlessness, malignant effusion and ascites, lymphoedema.
- Pharmacology of drugs commonly used in pain control and nonpharmacological pain control measures.
- Psychosocial aspects of palliative medicine like communication with terminally ill patients, their relatives and health care professionals with respect to information transfer, therapeutic strategy; quality of life issues and their relevance in late stage disease.
- Legal and ethical issues like withholding and withdrawing life support, certification of death, procedures after death.

Practical skills :

- Counseling of patients and their families on the palliative or conservative management.
- Effective use of alternative routes of analgesia like rectal, topical, nasal and subcutaneous.
- Correct compliance with regulations pertaining to use of controlled substances in terminally ill patients.

S. PRAGNANCY RELATED MEDICAL DISORDER

Theoretical knowledge & Practical skills of :

Diagnosis, treatment & specific management strategies for gestational diabetes mellitus, diabetes mellitus, hypertension, pregnancy induced hypertension , rheumatic heart disease, epilepsy, eclampsia, preeclampsia, anaemia, graves diseases, hypothyroidism, hepatitis, bronchial asthma.

