

# **GENERAL OBJECTIVES FOR PRE-CLERCKSHIP YEAR 1** (AS OF MARCH 16, 2010)

## **1. FOUNDATIONS**

### **WEEK 1: Introduction to Genetics and Embryology**

- A. Describe how genetic information is packaged into chromosomes and justify the role of the nucleus in storing that genetic information, making it available for the synthesis of specific proteins, and in ensuring that genetic information is passed on to subsequent generations of cells and of individuals with minimal incorporation of errors during mitosis and meiosis.
- B. Compare and contrast the formation of gametes in females versus males and summarize the major patterns of inheritance and how they can be documented using pedigrees.
- C. Describe the process of fertilization and outline the major embryological developmental events occurring during the first 3 weeks of development that lead to the emergence of the three primary germ layers.
- D. Using examples, describe how alterations in the number and/or composition of chromosomes can result in alterations in development and in subsequent body form and function and how those alterations can be identified using prenatal testing.
- E. Define teratogen and link timing of exposure to a teratogen to its detrimental effects on development.
- F. Correctly use anatomical terminology when referring to a structure within the body or on a radiographic image. Summarize the main structural features of epithelial tissues, bones, muscles and joints and describe the gross anatomy of the vertebral column and dorsal innervation and musculature.
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

### **Week 2: Support and Movement**

- A. Describe the ionic gradients and membrane permeabilities that contribute to the maintenance of the resting membrane potential and the mechanisms that lead to the generation of action potentials in excitable cells. Explain the processes of action potential propagation and synaptic transmission.
- B. Within the context of muscular dystrophy, explain how gene mutations can lead to the synthesis of proteins with altered or absent function. Summarize the various types of gene mutations and explain their roles with regard to inherited disease. Calculate the genetic risk of a particular genetic disease when provided with an appropriate family history and/or population-based data.
- C. Distinguish structurally between skeletal, smooth and cardiac muscle cells and describe the process of muscle contraction, both at the level of the individual cell and of the motor unit.
- D. Describe the gross anatomy of the lower limb, including the neurovascular structures. Describe the musculature and major blood routes of the torso and link the histological features of various connective tissues with their body functions.
- E. Summarize the key features of the various modalities for imaging bone and soft tissues.
- F. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- G. Apply his/her learning of clinical skills.

### **Week 3: Spine & Introduction to Pharmacology**

- A. Describe the normal development of the spine and describe how various developmental errors can lead to chronic loss of normal function (e.g. various postural disorders, spina bifida).
- B. Summarize the causes, clinical presentations, evaluation approaches, treatments and prevention strategies pertaining to cervical (neck) pain and to back pain.
- C. Describe alternate mechanisms of inheritance (mitochondrial, gonadal mosaicism, imprinting, multifactorial) as they apply to the inheritance of disease.
- D. Discuss basic pharmacokinetics and pharmacokinetic parameters as they relate to drug dosing and drug clearance.
- E. Link radiologic imaging of the spine with the spinal anatomy studied during week 1.
- F. Describe the gross anatomy of the hip and pelvis, compare the histology of cartilage with that of bone, and distinguish between the various types of joints in the body.
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

### **Week 4: Introduction to Blood**

- A. List and describe the properties of the components of blood.
- B. Describe the regulation of hematopoiesis with particular emphasis on the production of erythrocytes and platelets.
- C. List, briefly describe and summarize the utility of tests that aid in the diagnosis of diseases of the blood and bone marrow.
- D. Describe the epidemiology, pathophysiology, clinical presentation, complications, diagnosis and management of pancytopenia (anemia, leukopenia, neutropenia, thrombocytopenia).
- E. Identify the key anatomical features (including neurovascular structures) of the upper limb. Describe the gross anatomy of the knee and thigh and the radiologic imaging of the hip and pelvis with the gross anatomy of those structures as studied during the previous week.
- F. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- G. Apply his/her learning of clinical skills.

### **Week 5: Red Blood Cells**

- A. Describe the process and regulation of oxygen transport to the tissues under normal conditions and in the presence of carbon monoxide.
- B. Summarize the epidemiology, pathophysiology, clinical presentation, diagnosis and treatment of selected hemolytic anemias as well as anemias resulting from a lack of vitamin B<sub>12</sub>, iron and/or folate.
- C. Distinguish between hemoglobinopathies due to enzyme defects versus abnormal hemoglobin production versus abnormal hemoglobin structure. Summarize the epidemiology, pathophysiology, clinical presentation, diagnosis and treatment of sickle cell anemia and the thalassemias.
- D. Summarize the epidemiology, pathophysiology, clinical presentation, diagnosis and treatment of selected myoproliferative disorders.
- E. Briefly summarize autopsy in terms of: under what conditions it should be performed, the type of information it can provide, the procedure to follow to both request and to perform an autopsy.
- F. Summarize the histology of normal bone marrow and briefly describe how that would change with various red cell disorders.
- G. Describe the process of hemostasis. List and briefly describe the diagnostic tests that can be used to evaluate abnormalities in hemostasis.
- H. Describe the gross anatomy of the leg and foot.

- I. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- J. Apply his/her learning of clinical skills.

### **Week 6: Coagulation and Transfusion**

- A. Define homeostasis and recognize disease as a disruption of the normal regulation of body homeostasis.
- B. Distinguish between clinically important hereditary bleeding disorders and coagulation disorders secondary to various diseases.
- C. Describe the ABO and Rh systems of blood typing. Summarize the possible complications associated with blood transfusion and list and briefly describe the specific use of various blood products for transfusion.
- D. Distinguish between disseminated intravascular clotting (DIC) and idiopathic thrombocytopenic purpura (ITP) in terms of epidemiology, pathophysiology, clinical presentation, diagnosis and treatment.
- E. Describe in general terms the components of innate and adaptive immunity and their functions.
- F. Describe the bony anatomy of the upper limb. Link the radiologic imaging of the lower limb with the gross anatomy of those structures as studied during the previous two weeks.
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

### **Week 7: Leukemia**

- A. Recognize how the immune system differentiates between self and non-self.
- B. Describe the clinical outcomes of immune system dysfunction.
- C. Describe the inflammatory response, both acute and chronic.
- D. Describe the pathophysiology, clinical presentations, complications, diagnosis and management of allergies.
- E. Describe the muscles of the arm and forearm
- F. Describe the important radiologic findings in trauma

### **Week 8: Immunology**

- A. Recognize how the immune system differentiates between self and non-self.
- B. Describe the clinical outcomes of immune system dysfunction.
- C. Describe the inflammatory response, both acute and chronic.
- D. Describe the pathophysiology, clinical presentations, complications, diagnosis and management of allergies.
- E. Describe the muscles of the arm and forearm
- F. Describe the important radiologic findings in trauma
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

## **Week 9: Monoarthritis and Microbiology**

- A. Describe the epidemiology, pathophysiology, clinical presentation, complications, diagnosis and management (including pharmacological) of monoarthritis and spondyloarthropathies.
- B. Describe the epidemiology, classification & treatments of medically important bacterial pathogens.
- C. Describe the typical radiologic features of a MSK infection
- D. Describe the epidemiology, pathophysiology, clinical presentation, complications, diagnosis and management (including pharmacological) of acute pneumonia.
- E. Briefly summarize the functional classification of commonly used antimicrobial agents.
- F. Summarize the functional anatomy of the musculature of the hand.
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

## **Week 11: HIV**

- A. Discuss HIV in terms of its genetic organization, life-cycle, effect on immune function, modes of transmission and prevention strategies.
- B. Describe the clinical progression of HIV infection, its complications, and its management
- C. Discuss the presentations, complications, diagnoses and management of various infectious syndromes
- D. Describe the life-cycles, clinical presentations, complications, diagnosis and management of various parasitic and fungal infections
- E. Discuss the steps to investigating an outbreak and the implementation of infection control measures.
- F. Describe the important radiologic findings of fractures and bone tumors.
- G. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- H. Apply his/her learning of clinical skills.

## **Week 12: Soft tissue Injury**

- A. Describe the epidemiology, pathophysiology, clinical presentation, complications, diagnosis and management (including pharmacological) of common diagnoses leading to the presentation of a limping child.
- B. Describe the epidemiology, pathophysiology, clinical presentation, complications, diagnosis and management (including pharmacological) of common MSK soft tissue disorders
- C. Describe the clinical presentation, approach to diagnosis and management of congenital MSK disorders.
- D. Describe the clinical presentation, approach to diagnosis and management of common and important MSK tumors
- E. Demonstrate an understanding of wound healing process
- F. Demonstrate an understanding of human biomechanics with clinical emphasis on the hip and knee
- G. Recognize the different types of cartilage
- H. Identify normal and abnormal radiological findings as related to children with injury and common MSK conditions.
- I. Recognize the Social, Individual and Medical System dimensions of the clinical problems discussed during the theme.
- J. Apply his/her learning of clinical skills.

## 2. UNIT 1

### Week 6: Normal Airway and Lung

- The Nose and Sinuses
  1. Describe the anatomy and physiological functions of the nose and paranasal sinuses.
  2. Describe the normal anatomy of the chest and paranasal sinuses on plain films and CT scan.
- The Lungs and Airways
  1. Describe the anatomic and muscular structures involved in the respiratory system.
  2. Describe how the structures of the lung and chest wall produce the pressures needed to cause the respiratory system to expand and deflate
  3. Discuss the key factors that determine lung compliance, airflow, and work of breathing
  4. Describe how oxygen is transported in the blood
- Pulmonary Function Testing
  1. Describe how spirometry is performed and the shape of a normal time-volume curve and flow-volume loop.
  2. Identify values and flow-volume loops obtained by spirometry that would be indicative of an obstructive, restrictive or mixed disorder.
- Acute Respiratory Distress Syndrome (ARDS)
  1. Define Acute Respiratory Distress Syndrome (ARDS)
  2. Outline the important causes of ARDS,
  3. Describe how abnormalities in lung function lead to the manifestations of ARDS

### Week 7: The Lungs in Health and Failure

- Gases and Gas Exchange
  - a. Describe how the lung achieves ventilation-perfusion matching, and how ventilation-perfusion inequality leads to hypoxemia
  - b. Discuss how the body controls oxygen and carbon dioxide tensions in arterial blood
  - c. Define the following terms: acute respiratory acidosis, acute respiratory alkalosis, chronic respiratory acidosis and chronic respiratory alkalosis.
  - d. Describe the importance of compensation in respiratory acidosis and alkalosis, and explain the interrelation between  $\text{HCO}_3$  and  $\text{PCO}_2$ .
- Respiratory Failure
  - e. Define hypoxic and hypercapneic respiratory failure, and discuss how acute and chronic respiratory failure differ.
  - f. List the major causes of hypoxemia and hypercapnia
  - g. Briefly describe how oxygen and non-invasive and invasive ventilation can be used to treat respiratory failure in the hospital and at home and list the main complications of each of these treatment modalities.
- Apnea
  - h. Define central, mixed, and obstructive sleep apnea, and identify common causes and risk factors for these conditions
- Exercise
  - i. Discuss how ventilation and cardiac output increase during exercise in normal individuals
  - j. Describe what are the factors are that limit exercise in health and disease.

## Week 8: Airway Disease

- Asthma
  1. Describe the symptoms, triggers (environmental and immunologic), epidemiology, pathophysiology, and diagnosis of asthma in children and adults
  2. Outline the mechanisms of action, side effects and indications for the following drugs in asthma: glucocorticoids (oral and inhaled), anticholinergics, beta-2 adrenergic bronchodilators, antileukotrienes.
- Rhinosinusitis and Sinusitis
  1. Compare and contrast upper respiratory tract infection, acute sinusitis and chronic rhinosinusitis.
  2. List the risk factors for the development of rhinosinusitis, and the 4 most common pathogens in acute rhinosinusitis.
  3. Describe the symptoms, physical examination findings, and treatment of allergic rhinitis, vasomotor rhinitis and rhinitis medicamentosa.
- Tonsillar Disease
  1. Compare and contrast tonsillitis, peritonsillar cellulitis, peritonsillar abscess, mononucleosis and adenotonsillar hypertrophy.
- Cystic Fibrosis
  1. Discuss the pathophysiology of cystic fibrosis,
  2. Recognize the effects of CF on key affected organ systems
  3. Discuss major aspects of the treatment of CF
- Chronic Obstructive Lung Disease
  1. Define and describe the main types of chronic airflow obstruction (chronic bronchitis, emphysema) and how each type affects pulmonary mechanics, diffusing capacity and gas exchange.
  2. Describe the risk factors for COPD
  3. Recognize the symptoms of COPD
  4. Describe the treatment of chronic obstructive lung disease, including understanding the causes and manifestations of acute exacerbations of chronic bronchitis.
- The Respiratory Tree and the Environment
  1. Describe the major effects of key indoor and outdoor air pollutants on lung pathophysiology

## Week 9: Pneumonitis

- Infectious Pneumonias
  1. Identify the pathologic and radiologic features of pneumonia (bronchopneumonia, lobar and interstitial).
  2. List the signs and symptoms of pneumonia and describe the diagnostic measures used to diagnose pneumonia and determine the infecting organism.
  3. Explain how the body's host defences protect us from developing pneumonia, and why immunosuppressed patients are at increased risk for pneumonia
  4. Compare and contrast typical from atypical pneumonia
  5. Describe the organisms commonly causing both types of pneumonia in children, healthy adults and the elderly.
  6. Compare and differentiate the common organisms responsible for community-acquired pneumonia and nosocomial pneumonia as well as their treatment. List the risk factors for nosocomial pneumonia.
  7. Enumerate which types of organism usually respond to the following classes of antibiotics: penicillins, extended spectrum penicillins, cephalosporins (1st, 2nd, and 3rd generation), carbapenems, macrolides and aminoglycosides.
- Tuberculosis
  1. Compare features of primary and reactivation pulmonary tuberculosis
  2. Describe the use and interpretation of the tuberculin skin test
  3. Discuss the general principles of treatment of active and latent TB infection.
- Interstitial Lung Disease

1. Discuss the main differences in epidemiology, presentation, radiographic appearance, and response to therapy of major forms of idiopathic interstitial lung disease
  2. Identify typical causes of secondary interstitial lung disease.
- Embryology, and Respiratory Disease in the Newborn
    1. Describe the key development stages of lung embryogenesis.
    2. Discuss the causes, presentation, and radiographic appearance of respiratory distress syndrome and bronchopulmonary dysplasia.
  - Respiratory Distress in the Child
    1. Compare and differentiate epiglottitis, croup, pertussis, and bronchiolitis
    2. Develop an approach to determining the cause of respiratory distress associated with stridor or wheezing in children and be able to identify life-threatening pediatric airway emergencies based on history and physical examination.

### **Week 11: Cancer of the Head, Neck, and Lungs**

- Hemoptysis
  1. Identify the common causes of hemoptysis, and develop an approach to the investigation of hemoptysis
- Lung Cancer
  1. Develop an approach to differentiate malignant from non-malignant lung nodules, including understanding key factors distinguishing them on chest imaging.
  2. Discuss the incidence, risk factors, prevalence, presentation, radiology, management and prognosis of various types of lung cancer.
  3. Discuss the clinical staging of lung cancer (TNM classification).
  4. Define the terms “operability” and “resectability” with respect to lung cancers. Describe key therapeutic modalities used to treat lung cancer.
  5. Describe common and important complications of lung cancer
- Diseases of the Pleura
  1. List the symptoms and signs of pleural effusions and discuss the common causes of, and differences between, transudative and exudative pleural effusions.
  2. Discuss the differences between a parapneumonic effusion and empyema.
  3. Explain the difference between primary and secondary malignancies of the pleura and describe their symptomatology
  4. List the common sites of origin of malignant pleural effusions
  5. Describe the treatment plan for malignant pleural effusions.
- The Larynx in Health and Disease
  1. Describe the functions of the larynx.
  2. Define the symptoms of laryngeal disease including hoarseness, odynophagia, dysphagia and stridor, and provide a differential diagnosis for the patient presenting with hoarseness.
- Cancers of the Head and Neck
  1. Differentiate between benign and malignant lesions of the head and neck in terms of the patient’s presenting symptoms and signs.
  2. Discuss the presentation and management options for malignancies of the oropharynx and larynx.
  3. Describe what is a tracheostomy tube and enumerate the indications for its placement

### **3. PSD/PDC/INTERVIEWING SKILLS GENERAL OBJECTIVES**

#### **A. PSD/PDC GENERAL OBJECTIVES:**

By the end of the course the student will be able to perform a physical examination using appropriate techniques.

#### **SKILLS:**

By the end of the course the student will be able to:

1. Complete a structured physical examination following an orderly sequence of inspection, palpation, percussion and auscultation.
2. Conduct a targeted physical examination based on the obtained history
3. Adapt the content and the order of the examination according to the age and health of the patient.
4. Describe physical findings using appropriate medical terminology
5. Present a written report of the physical examination according to the structure outlined in Bates.
6. Be able to communicate with the patient using appropriate language

#### **KNOWLEDGE:**

By the end of the course the student will be able to:

1. Explain the different components of the physical examination and why they are used.
2. Choose the appropriate physical examination based on the clinical scenario.
3. Recognize what is normal vs abnormal in the clinical exam.
4. Integrate anatomy, physiology and pathophysiology to help in the interpretation of the physical examination.
5. Synthesize the information obtained in an organized approach.

#### **ATTITUDES:**

By the end of the course the student will be able to:

1. Conduct a physical examination while respecting the dignity of the patient.
2. Demonstrate empathy and respect towards the patient at all times.
3. Apply the principles of hygiene as they apply to health care professionals.
4. Demonstrate the principles of professionalism including behaviour and dress code.

#### **B. INTERVIEWING SKILLS GENERAL OBJECTIVES**

At the end of this course students will be able to interview a patient using effective physician – patient communication and clinical interviewing skills.

#### **SKILLS:**

By the end of the course the student will:

1. Be able to conduct a patient centered medical interview
2. Be able to perform a screening as well as a focused medical history
3. Write a complete medical history
4. Be able to orally present a medical history using appropriate terms
5. Demonstrate sensitivity and support towards the patient.
6. Be able to explore the patient's experiences of illness – their feelings, ideas, effects of the illness on function and expectations of care.
7. Demonstrate key components of Professionalism in the patient/physician encounter re: respect; confidentiality; punctuality
8. Be able to communicate with the patient using appropriate language

**KNOWLEDGE:**

At the end of the course the student will be able to:

1. Describe the non-biological determinants of health and how these may influence a patient's health.
2. Understand the biopsychosocial model and its application to the medical interview.
3. Understand the importance and value of a team approach in the care of a patient.
4. Demonstrate Knowledge of the different components of the medical history

**ATTITUDES:**

At the end of the course the student will:

1. Appreciate the importance of empathy and respect in the patient/physician relationship
2. Recognize the patients as a partner in their health with feelings, fears, ideas and expectations.
3. Appreciate the role of Allied Health Professionals in the care of the patient
4. Understand the importance of self directed learning
5. Appreciate the importance of commitment to work as a health professional
6. Demonstrate Professionalism in his/her behaviour, dress and speech