MDSC 3311
Applied Para-Clinical Sciences I
September 06 – October 22, 2010
(7 weeks)

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Introduction

The various courses of Year III (Para-Clinical sciences) are interposed at a transition point in the training of medical students. The courses bridge the gap between the pre-clinical sciences and clinical training. The courses focus on the patho-physiologic basis of disease, investigation and interpretation in the process of making a diagnosis, therapeutic management of diseases and finally, prevention and primary care along with psychosocial issues in the disease management.

The courses that constitute the year 3 programme include: 1) MDSC 3311–Applied Para-Clinical Sciences I, 2) MDSC 3312–Applied Para-Clinical Sciences II, 3) MDSC 3313–Applied Para-Clinical Sciences III and 4) MDSC 3314–Integrated Para-Clinical Sciences.

The courses encompass the key subject areas of Anatomical Pathology, Haematology, Microbiology, Chemical Pathology (also known as Clinical Chemistry), Immunology, Pharmacology and Public Health and Primary Care. Learning objectives for each module of the Applied Para-Clinical Sciences will be covered by lectures and from the study of clinical cases using the Problem-Based Learning methods and tutorials. The unique course, MDSC3314–Integrated Para-Clinical Sciences, combines the skills training programme with clinical clerkships in various sub-disciplines of Pathology and Microbiology (i.e. periods of tuition in clinical laboratories and in clinical settings), Clinical Pharmacology seminar sessions and Community Health.

Evaluation is based on performance in Continuous Assessment, which includes the clinical pharmacology sessions, PBL tutorials, progressive disclosure question (PDQ), end of clerkship examinations, log book activity and the final university examination. **Passing in all the courses is mandatory for proceeding to clinical year (Year 4).**
Course Assessment

Continuous Assessment: 25 marks

1. Progressive Disclosure Question (PDQ) 20/25
2. PBL Score 5/25

Progressive Disclosure Question (PDQ)

Progressive disclosure question (PDQ), featuring an evolving case scenario, tests a candidate's problem solving and reasoning ability, rather than mere factual recall. You will be presented with a case study in which clinical information is disclosed progressively. For each piece of information that becomes available, you will be required to provide short answers before proceeding to the next scenario. The process is intended to test your ability to sequentially and logically solve a clinical problem by requesting investigations required to aid in the understanding of the problem as well as their interpretation that will lead you to arrive to a diagnosis. With this information you will then be able to design a therapeutic plan to manage the patient. To answer the questions you will need to apply the knowledge acquired in the different disciplines that comprise the Para-clinical science curriculum. This assessment will take place at the end of this course and carry the weight of 20%.

Final Course Examination: 75 marks

Combined Essay (25) and Multiple Choice Questions (50)

NB. University examinations regulations apply for the Progressive Disclosure Questions (PDQ) and final end of course examinations.
Course Committee & Resource Personnel

Course Development Committee

Faculty Members, Department of Para-Clinical Sciences

Resource Personnel

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Course Contents and Lecture Topics

SYSTEMIC ANATOMICAL PATHOLOGY

Prerequisite: Completion of Preclinical Courses
General Anatomical Pathology (MDSC 1002)

Objectives: To enable medical students to understand and apply the knowledge thus acquired upon study of patho-physiological and morphological changes of common diseases involving cardiovascular and respiratory systems.
To apply knowledge in clinical cases.

Synopsis: Nine (9) one-hour lectures and seven (7) three-hour PBL sessions.

Course Content:


Lecture Topics:
1. Thrombo-embolism, Infarction and Shock
2. Atherosclerosis & Aneurysms
3. Ischemic Heart Disease and Congestive Cardiac Failure
4. Valvular and Congenital Heart Disease
5. Myocarditis and Cardiomyopathy
6. Pneumonias and Tuberculosis
7. Vascular disorders of the Lung
8. Chronic obstructive airway disease
9. Pulmonary Neoplasms

CHEMICAL PATHOLOGY

Prerequisite: Completion of Preclinical Courses
General Anatomical Pathology (MDSC 1002)

Objectives: The students are expected to understand the factors that affect laboratory results and the justification for selective laboratory investigations. The students should also learn about all protein, enzyme and lipid parameters involved in cardiovascular diseases and how disturbances in acid-balance are reflected in clinical settings.

Synopsis: Four (4) one-hour lectures and seven (7) three-hour PBL sessions.

Course Content:
1. Cardiac Biomarkers: Troponin I, T; CK- MB; Myoglobin; BNP, Homocysteine, CRP.
2. Lipids and Lipoproteins: Metabolism of Lipoproteins; Clinical Importance of Lipoproteins; Hyper and Hypolipoproteinaemia; Coronary Heart disease risk factors
3. Blood Gases: Respiratory Acidosis; Respiratory Alkalosis; Metabolic Acidosis; Metabolic Alkalosis; Henderson – Hasselbach Equation; Mechanism of Compensation

Lecture Topics:
1. Interpretation of Clinical Laboratory results
2. Cardiac Biomarkers in diagnosis of Heart Disease
3. Dyslipidemia and Cardiovascular Disease
4. Blood Gases

HAEMATOLOGY

Description: To give medical students access to history taking and laboratory investigations in patients with haematologic disorders.

Prerequisite: Introduction to Haematology MDSC1002

Objectives: To teach students the pathophysiology of common haematological conditions. To teach students haematological manifestations of systemic disease. At the end of the course students should know how common symptoms and signs of common haematological conditions arise. At the end of the course students should know how to use appropriate laboratory investigations to evaluate different conditions.

Synopsis: Seven (7) one hour lectures and seven (7) three hour PBL sessions.

Course Content:
1. Anaemias: Approach to a patient with anaemia; Approach to a patient with microcytic anaemia; Approach to a patient with macrocytic anemia; Approach to a patient with haemolytic anaemia

Lecture Topics:
1. History taking in haematological disorders
2. The Full/Complete Blood Count (CBC/FBC)
3. Microcytic Anaemia Part 1
4. Microcytic Anaemia Part 11
5. Macrocytic Anaemia
6. An approach to haemolytic anaemias
7. Sickle cell disease and G-6PD deficiency

CLINICAL IMMUNOLOGY

Prerequisite: Basic Immunology (MDSC 1002)

Objectives: To introduce medical students to the concept of medical disease because of abnormalities of immune system function (cardiovascular, respiratory, and haematological systems).

To apply knowledge to clinical cases.

To introduce students to basic principles of immunologic testing and the optimal use of the clinical diagnostic immunology laboratory in the diagnosis and monitoring of more common immunological disorders.

Synopsis: Seven (7) one-hour lectures and seven (7) three-hour PBL sessions.

Course Content:
1. Structure and Function of the Normal Immune system
   • Describe the structure and function of major immune cells and organs
   • Describe the cellular and humoral components of the innate immune system and outline how they function in host protection
   • Describe the events in acute inflammation as an important part of the innate immune response
   • Discuss how the immune response progresses from a non-specific to a specific response- outline the role of antigen presenting cells, the immune synapse and cytokines in this process
   • Describe the cellular and humoral components of the adaptive immune system and show how they provide host protection

2. Host Defence against Infections
   • Normal defence mechanisms against various pathogens: extracellular and intracellular bacteria, encapsulated bacteria, viruses, protozoa, fungi and helminths

3. Immunodeficiency
   • Outline a simple classification of defects of the immune system
   • List the common causes of secondary immune deficiencies
   • Discuss the pathogenesis and main clinical features of the following primary antibody deficiencies- IgA deficiency, IgG2 subclass deficiency, Bruton’s agammaglobulinaemia, common variable immune deficiency, HyperIgM syndrome
   • Outline the pathogenesis and main clinical features of the following T-cell and mixed immune deficiencies – Di George’s syndrome, Severe Combined Immune Deficiency
• Outline the pathogenesis and clinical features of the following phagocytic and complement deficiencies – Chronic Granulomatous Disease, Complement Deficiencies including Hereditary Angioneurotic Oedema

4. Hypersensitivity: Classification and Clinical Disorder
• Define the terms hypersensitivity, allergy and atopy
• Classify hypersensitivity mechanisms using the Gell and Coombs classification scheme
• Describe the immunopathogenesis and clinical presentation of allergic rhinitis and asthma.
• Outline the principles of prevention and treatment of these conditions
• Define anaphylaxis and list common triggers for this condition.
• Outline the principles of evaluation and management of an anaphylactic reaction
• Compare and contrast the role of hypersensitivity reactions in intravascular and extravascular haemolysis
• Describe with clinical examples serum sickness and Arthus reaction
• Describe the immunopathogenesis, clinical representation and manifestations of the Mantoux reaction, immune-mediated contact dermatitis and granuloma formation. Use relevant clinical examples in your description
• Discuss the use of the clinical diagnostic immunology laboratory in the diagnosis and monitoring of suspected hypersensitivity disorders

Lecture Topics:
1. Review of the Immune System I
2. Immune Deficiency I
3. Immune Deficiency II
4. Type 1 Hypersensitivity: Allergy and Allergic Diseases
5. Types 2 & 3 Hypersensitivity
6. Type 4 Hypersensitivity
7. Tumour Immunology

SYSTEMIC MEDICAL MICROBIOLOGY

Description: This course will cover the aetio-pathogenesis, epidemiology, clinical features and laboratory diagnosis of infections associated with respiratory, cardiovascular, skin and soft tissue systems.

Prerequisite: Completion of Preclinical Courses
General Microbiology/Pathology (MDSC 1002)

Objectives: To enable medical students to understand and apply the knowledge thus acquired upon study of aetiology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention of diseases caused by microorganisms infecting the respiratory, cardiovascular, skin and soft tissue systems.
To apply such knowledge in clinical cases.
Synopsis: Eleven (11) one-hour lectures and seven (7) three-hour PBL sessions.

Course Content:
1. **Staphylococci and Micrococci**: Streptococci and Enterococci; Leprosy
2. **Cardiovascular System**: Rheumatic fever; Infective endocarditis; Rickettsia and Mycoplasma
3. **Respiratory System**: Haemophilus, Bordetella, Brucella; Tuberculosis; Orthomyxovirus and Paramyxovirus
4. **Haematology & Others**: Blood protozoa; Bacterial zoonosis; Anti-infective agents

Lecture Topics:
1. Streptococci and Enterococci
2. Haemophilus, Bordetella, Brucella
3. Tuberculosis & Leprosy
4. Staphylococci and Micrococci
5. Orthomyxovirus and Paramyxovirus
6. Blood protozoa
7. Bacterial zoonosis
8. Anti infective agents
9. Rheumatic fever
10. Infective endocarditis
11. Rickettsia and Mycoplasma

SYSTEMIC PHARMACOLOGY

Prerequisite: Completion of Preclinical Courses
General Pharmacology (MDSC 1002)

Objectives: To provide students with the required pharmacological knowledge and skills that would give them the expertise to choose the most appropriate and safe therapeutic regime.
To develop the students’ faculties to understand, integrate, interpret and apply the skills of this knowledge for real life clinical scenarios.
To prepare students for lifelong learning to deal with the ever increasing quantity of pharmaceutical agents that they would encounter throughout their professional careers.

Synopsis: Eight (8) one-hour lectures and seven (7) three-hour PBL sessions.

Course Content:
1. **Cardiovascular/Renal Systems & Blood**: Drug treatment in cardiovascular disorders:
   Cardiac glycosides in heart failure, antihypertensive drugs, drugs in arrhythmias. Drug treatment of anaemia. Drugs affecting the renal system: Diuretics.
2. **Respiratory System**: Drug treatment of respiratory disorders: Asthma, COPD.


**Lecture Topics:**
1. Diuretics
2. Cardiac glycosides
3. Antihypertensive drugs
4. Antiarrhythmic drugs
5. Antimicrobials
6. Drugs in anaemia
7. Antituberculosis
8. Antiretroviral drugs

**PUBLIC HEALTH AND PRIMARY CARE**

**Description:** The course is organized in several modules and will be delivered through a series of lectures. The course would cover Public Health issues associated with pathological and microbiological cases that would be presented in the PBL lectures. The purpose of this course is to introduce you to the discipline of public health practice as it applies to the common pathological and microbiological conditions you may encounter.

**Objectives:** The aim of this course is to give the medical student a broad foundation in the practice of Public Health and Primary Care Medicine. In doing so, you will be able to offer to your community, ways to prevent and control common diseases.

**Lecture Topics:**
1. Primary Health Care Concepts
   a. Historical basis
   b. Declaration of Alma Ata (1978)
   c. Essential elements
2. Levels of prevention
   a. Primary, secondary, tertiary
   b. Interventions
3. Environmental Health
   a. Waste management
   b. Water treatment
   c. Food quality control
   d. Zoonoses
4. The Epidemiological Transition in the Caribbean – An Overview
   a. Chronic non-communicable diseases vs. acute communicable diseases
5. Epidemiology of the major infectious and chronic diseases
   a. Cardiovascular disease
   b. Disability and its challenges including HIV
c. Tobacco-related diseases

6. Introduction to International Health/Travel Medicine
   a. Immunization requirement
   b. Case study presentation (SARS, H1N1, etc)

*NB: For additional information on course objectives, please contact resource personnel.*
Specific Objectives

1. Discuss the relationship between hypercholesterolemia and atherosclerosis. Review the pathogenesis of the atheromatous plaque.
2. Describe the gross and microscopic morphological changes produced by atherosclerosis in medium sized muscular arteries and larger elastic arteries such as the aorta.
3. Name several complications of atherosclerosis.
4. Recall common diseases significantly increase the risk of atherosclerosis.
5. Review lipid and lipoprotein metabolism.
6. Discuss the pattern of plasma lipid and lipoprotein in atherosclerosis.
7. Discuss the mechanism of action of drugs used to lower serum cholesterol.
8. Discuss the role of digoxin in the treatment of congestive heart failure.
9. Explain the term, “digitalized”.
10. Review the anatomy of coronary circulation.
11. Define Angina pectoris. Mention the types and outline their characteristics.
12. List the risk factors of Ischaemic heart disease. Describe each of them indicating the clinical significance.
13. Describe the pathogenesis, morphology and complication of acute myocardial infarction.
14. List the investigations done in a patient suspected of having an acute myocardial infarction. Describe their importance.
15. Define the term cardiac biomarker.
16. List various biomarkers that can be used to diagnose acute myocardial infarction.
17. Describe the time course for the various biomarkers after the onset of myocardial infarction.
18. Explain the role of troponin in the diagnosis of myocardial infarction.
19. Describe the basic principles of coronary angiography and its indications.
20. Outline the indications, advantages and drawbacks of coronary bypass surgery and angioplasty.
21. Describe the changes in the lungs seen in left heart failure.
22. Discuss the cholesterol transport capacities of HDL and LDL in relation to heart disease.
23. List the drugs used to treat different types of angina and describe their mechanism of action.
24. Describe the mechanism of action of calcium channel blockers as antihypertensive agents.
25. Describe the principles of therapy for acute myocardial infarction, including the use of morphine and the pharmacology of thrombolytic agents.
26. Discuss the role of primary prevention in coronary artery disease.
27. Describe the grieving process and how people cope with loss.
28. Discuss the differential diagnosis of chest pain in hypertensive patients.
29. Know the pathological effects of hypertension on the heart.
30. Discuss the pathogenesis of dissecting aneurism.
31. Know the morphological and clinical features of dissecting aneurism of the aorta.
32. Outline the investigations used to diagnose dissecting aneurism of the aorta.
33. Know the complications of dissecting aneurysm of the aorta and its prognosis.
34. Classify antihypertensive agents based on their site of action.
35. Explain the use of thiazide diuretics in the treatment of hypertension.
36. Discuss the use of inotropic agents in the treatment of shock.
37. List ten factors with could affect the blood pressure reading.
38. Describe the morphological changes seen in the heart in acute rheumatic carditis.
39. In acute rheumatic fever, explain morphological changes you might see in the skin and in the joints.
40. What is meant by the following terms: Aschoff body, Anitschkow cells, verrucous endocarditis?
41. Describe the morphological features seen in the mitral and aortic valves in chronic rheumatic heart disease.
42. List four serious complications of mitral stenosis.
43. Describe the immunopathogenesis of rheumatic fever.
44. Explain the principles of therapy for rheumatic fever.
45. Explain the rational for use of digoxin in treating atrial fibrillation.
46. List the drugs used in the treatment of acute heart failure; discuss their mechanisms of action and their side effects.
47. Describe the social factors which are associated with rheumatic fever.
48. Describe important test of adequate marrow response required in a patient who is hemolyzing.
49. Define the causes of thrombocytopenia under the headings: impaired production, increased consumption/destruction.
50. Explain the etiology of malaria. Reconstruct the life cycle of malaria parasites.
51. List differences between vivax and falciparum malaria.
52. Discuss the laboratory diagnosis of malaria.
53. Describe the morphology of liver and spleen in malaria.
54. Outline the complications of falciparum malaria.
55. Outline the management of traveller’s diarrhoea.
56. Discuss the drugs used in the chemoprophylaxis and management of various types of malaria.
57. Discuss the factors affecting patient compliance.
58. Outline the components of the immune response to the malarial parasites. State the limitations of this response that lead to chronic infection.
59. Review the normal structure of haemoglobin.
60. Consider how underproduction of one chain may affect the haemoglobin molecule.
61. Outline the different types of thalassaemia.
62. Investigate the reasons for the presentations at 6 months rather than at birth.
63. List the causes of microcytic anaemia (differential diagnosis).
64. For each differential outline the investigations needed to confirm the diagnosis.
65. What features are present on the blood film of a patient with β thalassaemia major?
66. Describe the film features in β thalassemic different from a patient with iron deficiency.
67. How much iron is administered in the transfusion of one unit of blood?
68. What are the side effects of iron overload and how are they managed?
69. What are the side effects of chelation therapy?
70. Describe hypothalamus-pituitary-gonadal axis.
71. Define the following terms: autologous grafting; isogeneic grafting; allogeneic grafting; heterologous or xenogeneic grafting, human leukocyte antigens; haptotype.
72. Discuss the rationale for HLA typing of donor and recipient prior to organ &/or bone marrow transplantation.
73. Identify the mode of inheritance of sickle cell disease.
74. List the common genotypes of sickle cell disease in Trinidad and Tobago.
75. Identify the lesion in sickle cell disease at the DNA level and at the level of the globin chain.
76. What is the pathogenesis of the clinical syndromes in sickle cell disease?
77. What factors appear to ameliorate the severity?
78. In a patient who is haemolyzing, what is the value of the reticulocyte count?
79. Explain the reason for giving folic acid supplemental.
80. Raised K+ is common in sickle cell disease, why?
81. List the vaccines routinely administered in sickle cell disease and give reasons where appropriate.
82. List the indications for treatment with folic acid.
83. Know the major inherited bleeding disorders and the factors associated with each.
84. Identify the mode of inheritance for each disorder.
85. What types of bleeding are characteristic for von Willebrand’s disease as compared to Hemophilia?
86. What laboratory abnormalities identify the presence of the Hemophilias and von Willebrands disease?
87. What blood products are available for treating these disorders?
88. Discuss the possible sources of bilirubin.
89. Describe bilirubin metabolism.
90. Discuss the mechanism of action of drugs used to treat both local and systemic fungal infections.
91. Discuss the pathogenesis of HIV infection. List the different clinical syndromes associated with HIV infection. Outline the use of the clinical immunology laboratory in the diagnosis and monitoring of this condition.
92. Review the normal Hb for age and sex.
93. In a patient with high Hb due to haemochromatosis, what are (a) the HLA associations (b) the importance diagnostic (c) the routine treatment measures?
94. Outline the biochemical tests that constitute blood gases.
95. Explain how acid-base status affects other plasma electrolytes.
96. Briefly review the differences between an antitussive and an expectorant. Give examples.
97. Know the changes in red cells mass and plasma that occur during pregnancy.
98. What are the iron requirements during pregnancy?
99. List the risk factors for thrombosis under the headings congenital and acquired. Review Virchow’s triad as it applies to this patient. Define embolism. List several common sources of emboli.
100. Where do most pulmonary emboli arise? What factors determine whether a pulmonary embolus will cause infarction?
101. Most systemic emboli arise from within heart. List several cardiac conditions that predispose to systemic emboli.
102. Discuss the etiology of the following type of emboli: amniotic fluid, nitrogen bubble and fat.
103. Define infarct. What is the difference between a red and a white infarct?
104. What factors determine whether vascular occlusion will produce infarction?
105. Describe important biochemical constituents of urine in pregnancy.
106. What are “qualitative tests”? 
107. Discuss the procedure for collecting 24-hour urine sample.
108. Describe the pattern of blood gases in acute shortness of breath.
109. Describe the mode of action of heparin.
110. Describe how a patient on heparin should be monitored.
111. What complications might you expect from heparin therapy?
112. Describe the advantages of low molecular weight heparins.
113. Explain the Henderson-Hasselbach equation.
114. Outline the pattern of plasma HCO₃, H⁺ and PCO₂ in the above conditions.
115. Describe acid-base balance during hypoventilation and hyperventilation.
116. Discuss respiratory acidosis and alkalosis.
117. Discuss the role of lung and kidney in respiratory acidosis or alkalosis.
118. List the various acid-base disorders.
119. Explain the compensation with respect to the various acid-base disorders.
120. Outline the major immune defences in the upper and lower respiratory tract.
121. Explain the roles of the alveolar macrophage and bronchial associated lymphoid tissue.
122. Outline a simple classification of defects in immune function.
123. List the major causes of primary antibody deficiency in children and adults. Indicate the main clinical features associated with these conditions. Outline the principles of diagnosis and management.
124. Define the term ‘bronchiectasis’ and list the conditions that predispose to the disease.
125. Understand the pathogenesis of bronchiectasis and know the morphological features of the disease.
126. Review the pathology of major pulmonary infections including bronchopneumonia, lung abscess, lobar pneumonia and primary atypical pneumonia.
127. List the classes of drugs used to treat lower respiratory tract infections. Describe their mechanism of action and side effects.
128. Describe the aetio-pathogenesis, morphology, clinical features, diagnosis and outcome of myocarditis and cardiomyopathies.
129. Classify and describe the aetio-pathogenesis, morphology, clinical features, diagnosis and outcome of Vasculitides.
130. Classify and discuss common congenital heart diseases.
131. Describe the aetio-pathogenesis, morphology, clinical features, diagnosis and outcome of restrictive and obstructive lung diseases.
132. Describe the classification, aetio-pathogenesis, morphology, clinical features, diagnosis, staging and prognosis of lung cancer.
133. Describe the structure and function of major immune cells and organs.
134. Describe the cellular and humoral components of the innate immune system and outline how they function in host protection.
135. Describe the events in acute inflammation as an important part of the innate immune response.

136. Discuss how the immune response progresses from a non-specific to a specific response—outline the role of antigen presenting cells, the immune synapse and cytokines in this process.

137. Describe the cellular and humoral components of the adaptive immune system and show how they provide host protection.

138. Discuss normal defence mechanisms against various pathogens: extracellular and intracellular bacteria, encapsulated bacteria, viruses, protozoa, fungi and helminths.

139. List the common causes of secondary immune deficiencies.

140. Discuss the pathogenesis and main clinical features of the following primary antibody deficiencies—IgA deficiency, IgG2 subclass deficiency, Bruton’s agammaglobulinaemia, common variable immune deficiency, HyperIgM syndrome.

141. Outline the pathogenesis and main clinical features of the following T-cell and mixed immune deficiencies—Di George’s syndrome, Severe Combined Immune Deficiency

142. Outline the pathogenesis and clinical features of the following phagocytic and complement deficiencies—Chronic Granulomatous Disease, Complement Deficiencies including Hereditary Angioneurotic Oedema.

143. Define the terms hypersensitivity, allergy and atopy.

144. Classify hypersensitivity mechanisms using the Gell and Coombs classification scheme.

145. Describe the immunopathogenesis and clinical presentation of allergic rhinitis and asthma.

146. Outline the principles of prevention and treatment of these conditions.

147. Define anaphylaxis and list common triggers for this condition.

148. Outline the principles of evaluation and management of an anaphylactic reaction.

149. Compare and contrast the role of hypersensitivity reactions in intravascular and extravascular haemolysis.

150. Describe with clinical examples serum sickness and Arthus reaction.

151. Describe the immunopathogenesis, clinical representation and manifestations of the Mantoux reaction, immune-mediated contact dermatitis and granuloma formation. Use relevant clinical examples in your description.

152. Discuss the use of the clinical diagnostic immunology laboratory in the diagnosis and monitoring of suspected hypersensitivity disorders.

153. Outline the process of haemopoiesis and show how growth factors influence the production of different cell lines.

154. Review the normal ranges of blood cell parameters.

155. Explain the reasons for different normal ranges based on age and sex.

156. Classify anaemias based on the red cell structure.

157. Review the CBC.

158. Review the structure of haemoglobin.

159. List the causes of haemolytic anaemia under the headings congenital causes and acquired causes.

160. Review causes of hemolytic anaemia under the headings: Congenital: acquired; Abnormalities of the red cell (membrane, enzymes, haemoglobin)
161. Discuss laboratory tests you would perform in a patient with haemolytic anaemia and when you would perform them.

162. What is macrocytosis? Review the causes for a high MCV.

163. Describe the laboratory diagnosis of mycobacterial infection and common opportunistic infections.

164. Discuss the role of the BCG vaccine in the prevention of tuberculosis.

165. Describe the administration and interpretation of a Mantoux test.

166. Discuss the first and second line drugs used in the treatment of tuberculosis? Mention their side effects.

167. Discuss the tests used to diagnose and monitor HIV infection.

168. Discuss the pathogenesis and morphological features of pneumocystis pneumonia.

169. Classify drugs used in the treatment of HIV and explain their mechanism of action.

170. Describe the pharmacokinetic properties and toxic effects of the antiretroviral drugs.

Pharmacology objectives are available in the printed booklet from the Pharmacology Unit. Students are advised that the lecture schedule and the programme for large group activities will be displayed on the Notice Board at the commencement of the Course.
**Problem 1: Precordial Pain and Breathlessness**

DJ is a 54-year-old East Indian male who works as a manager at a local manufacturing company. He presented to Priority Care Facility at Eric Williams Medical Sciences Complex with sudden onset of substernal chest pressure associated with dyspnoea and diaphoresis. Substernal chest pain (intensity 7 out of 10) began at around 5.00 am. The pain radiated to his left arm and throat, but did not go through to his back or into his abdomen.

Upon inquiry he initially denied that he had experienced chest pain, but later he could recall that on few occasions he had transient chest pains radiating to his left arm while walking briskly in his office.

He was not aware of his diabetic status. His father, a taxi-driver, died suddenly at the age of 56. He is an active smoker of two packs per day for more than 20 years and has been diagnosed with hypertension (HTN). He does not exercise regularly. His family physician had prescribed for him the following medications: ACE inhibitor for hypertension. GTN sublingual when required.

**Physical examination and Investigations**

Patient was anxious and in distress. His height was 5ft 8in and weight 180lbs. No jugular distension. Pulse=100/min, regular and normal rhythm. Heart sounds - soft S4 and Lungs had no rales. BP =140/90 mm Hg. Other organ systems examination was unremarkable.

ECG showed evidence of an anterior wall acute STEMI; with 2-mm ST elevation in leads V1-V4. Lab investigations included a complete blood count, electrolytes, BUN and cardiac enzymes. His lipid profile revealed Total Cholesterol = 220 mg/dL, LDL= 130, HDL= 42, but he is not taking statins. Coagulation panel and creatinine were normal. Chest X-ray (portable) also was normal.

He was discharged following five days of medical line management in the hospital and also was counselled to seek interventional approach.
**Problem 2: Microcytic Anaemia**

A 25-year-old librarian was referred to the haematology clinic for evaluation of anaemia. She gave a history of lifelong tiredness in spite of repeated treatment with oral iron tablets. She had no history of heartburn or menorrhagia. The only medications she had ever taken were iron tablets. There was no family history of anaemia. She had been transfused on three occasions in the previous year.

On examination she was pale and her skin had a slate gray appearance. Her pulse was 110 beats per minute. Her blood pressure was 110/80 mm Hg. She had a flow murmur. There was no pedal oedema. Her spleen was palpable at the level of the umbilicus.

Her blood count was as follows
\[
\text{Hb: 5.6g/dl} \quad \text{WBC: 15 \times 10^9/L} \quad \text{MCV: 68 fl} \quad \text{Platelets: 168 \times 10^9/L}
\]

Her blood film showed microcytosis, target cells and numerous nucleated red cells. A serum ferritin was 1500ug/L.

A provisional diagnosis of *Thalassaemia intermedia* was made and the patient was cross-matched for a 4-unit transfusion of packed red cells. She was counselled about the diagnosis and advised about the need for splenectomy to reduce transfusion requirements.
Problem 3: Fever and Consolidation of Lung

A 27-year-old man presented to the emergency room complaining of fever and cough. Two days previously, he noted the onset of weakness and malaise, which forced him to go to bed earlier than usual. The next morning he had a shaking chill that lasted 15 minutes. One hour later his temperature was 39.4°C. Several hours later he noted the onset of right lower chest pain, which was aggravated by taking a deep breath and by coughing. That evening his cough became productive of brown-coloured sputum. All the symptoms had progressed by the time he arrived at the emergency room.

Physical examination revealed an acutely ill young man with BP 120/80, pulse rate 120/minute, respiratory rate of 32/minute and temperature of 39.4°C. His lips and nail beds were cyanotic. There was increased vocal fremitus, dullness and rales over the right lateral chest.

Gram stain of the sputum showed many polymorphonuclear leukocytes and gram-positive diplococci. Chest x-ray showed consolidation of right lower lobe. Twenty-four hours after the administration of appropriate antimicrobial therapy, the patient became afebrile. He eventually made a complete recovery.
Problem 4: Prison Infections

A 66-year-old prisoner was sent to the doctor for persistent cough and difficulty in breathing. A few weeks earlier he was alarmed when bright red blood came up in one of his coughing bouts. He had been in prison for the past year and lately was not keeping well, had lost some weight, suffered spells of diarrhoea for no apparent reason and was generally weak.

On physical examination, his BP was 130/80 mm Hg, pulse rate was 110/minute, respiratory rate was 26/minute and his temperature was 38°C. Movement of the chest wall was slightly reduced on the right side. His chest radiograph showed a lesion suggestive of a cavity in the right infra-clavicular area. He had a positive tuberculin skin test. Serological tests proved that he was positive for HIV antibodies.
Problem 5: Haemolytic Anaemia

AC is a 22-year old student complaining of episodic jaundice. He was transferred from the paediatric haematology clinic but as an adult, has been non-compliant with attendance. He admits that since he started living away from home he has not been taking care of himself and he lives on fast foods. Prior to a class field trip to Guyana, he took anti-malarial prophylaxis. Within two days he felt unwell.

On examination he was dehydrated, pale and icteric. He was afebrile. After taking bloods, hydration was started with normal saline.

His blood count was as follows:

Hb: 8.5g/dL  MCV: 100fl  WBC: 10 x 10⁹/L  Platelets: 400 x 10⁹/L
Problem 6: Febrile Child with Running Nose

An 8-year old Hispanic male, a previously known asthmatic, presented with a 4-day history of fever. He became acutely ill and vomited during lunch. Over the next 4 days he had fever ranging 38-40°C that was partly controlled by Children’s Panadol. He also developed cough, rhinorrhoea, and conjunctivitis. He appeared to be fatigued, and his parent reported that he was “very sleepy”. Over the past 2 days, his eyes had begun to itch and were painful. His parents noted that his eyes were puffy and he was sensitive to light. He had had no rashes. The patient’s lips were dried and cracked and he had a greatly reduced urinary output.

Other history pertinent to his illness is that he attended school twice per week, where he had multiple sick contacts (his illness occurred in late January). His 1-year old sibling had otitis media, some wheezing, vomiting, and productive cough.

On physical examination he had a temperature of 38.6°C, pulse rate of 126 beats/min, and respiratory rate of 28/min with an oxygen saturation of 100% on room air. Significant findings included bilateral conjunctivitis with exudate in the left eye, bleeding, cracked lips, and rhinorrhoea. He had shotty lymphadenopathy but no rash. His feet were slightly edematous. His respiratory examination revealed a few Rhonchi and Rales. Laboratory findings showed lymphocytosis in the blood. Chest X-ray revealed bilateral perihilar infiltrates. A nasopharyngeal swab was sent for rapid antigen testing for respiratory syncytial virus and influenza virus, and the result came back confirming the latter.
Recommended Textbooks

Anatomical Pathology
3. General and Systemic Pathology, J C E Underwood, latest ed., Churchill Livingstone. (Qz 4 g326 1992, 3 copies General Collection and Reserve)
4. Pathology, 3rd ed., Emanuel Rubin and John L Farber, J.P. Lippincott & Co. (Qz 4 p29854 1999, 1 copy Reserve Collection)

Chemical Pathology
1. Clinical Chemistry in Diagnosis and Treatment, Mayne, P.

Haematology

Immunology
1. Essentials of Clinical Immunology, Chapel, Haeney, Misbah & Snowden, 4th ed.
2. Immunology for medical students, Nairn & Helbert, 2nd, ed.
3. Cellular & Molecular Immunology, Abbas & Lichtman, 5th ed.

Microbiology
1. Medical Microbiology: An Introduction of Infectious Diseases, Sherris, H, latest ed.
2. Jarvetz, Melnick & Adelberg’s Medical Microbiology, Brooks, G. et al.

Pharmacology

Public Health and Primary Care
Multimedia Resources

Available at the Medical Sciences Library

**VIDEO TAPES**
- COPD – Differential Diagnosis (23 min.)
- Chemotherapy (25 min)
- Clinical Immunology: Laboratory Techniques (19 min.)
- Myocardial Infarction (20 min.)
- A review of Smoking Cessation (45 min.)
- A review of Pathology – Acid Base and Blood
- Pulmonary Emboli (21 min.)
- A review of Smoking Cessation (45 min.)

**AUDIO TAPES**
- Congenital Heart Disease Pt.1
- Cardiac Arrhythmia (30 min.)
- Heart Sounds and Murmurs: A practical guide (30 min.)
- Lung Sounds Pt.1-4
- Managing Lipid Disorders: (30 min.)

**SLIDE SHOWS**
- Human Blood Morphology
- Parasites of Man – Malaria

**MICROSCOPIC SLIDES**
- Diseases of the Liver and Bile Ducts

**SLIDE TAPES**
- Chest X-Ray: Pleura, Diaphragm and Lung (18 min.)
- Early Treatment of Acute Myocardial Infarction (26 min.)
- Electrocardiography in ten steps (10 min.)
- Interpretation of Cardiographs (94 min.)

**CD / DVD ROMS**
- ADAM: Interactive Physiology: Respiratory System
- ADAM: Interactive Physiology: Cardiovascular System
- Plasmo CD: the Plasmodium Genomes
Websites

Atherosclerosis

Bronchiectasis
http://www.lung.ca/diseases-maladies/a-z/bronchiectasis-bronchiectasie/index_e.php
http://www.anatomyatlases.org/AnatomicVariants/OrganSystem/Text/LungsTrachea.shtml

High Blood Pressure
http://xnet.kp.org/permanentejournal/summer06/control.html

Hodgkin’s Disease

Pneumonia
http://umm.edu/ency/article/000145.htm

Thalassemia
http://www.cariboo.bc.ca/schs/medtech/rice/thalassemia.html