Master of Medicine (Emergency Medicine) Parts A, B, and C Syllabus

Based on EMERGENCY MEDICINE CORE CURRICULUM 2021

Contents

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The Emergency Medicine Core Curriculum 2021 is based on the 2019 Model of Clinical Practice of Emergency Medicine.

Disclaimer:

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Section II. Organization of the Chapters

The organization described here applies to Chapters 1 to 19; SP1-3.

After the chapter title, a list of main topics is provided, which serves as the syllabus for MMed Part B&C

Each cluster of topics is given an ID

The topics and sub-topics are then listed

Chapter 8. Hematologic Disorders

Main Topics

8.1	Blood Transfusion
8.2	Hemostatic Disorders
8.3	Lymphomas
8.4	Pancytopenia
8.5	Red Blood Cell Disorders
8.6	White Blood Cell Disorders
8.7	Oncologic Emergencies

EMCC List and Learning Outcome Codes

EM Model 2016	Topic	Code (see below)
EMCC 1-3	HEM 1	
8.1	Blood Transfusion	2
8.1.1	Complications	2
8.2	Hemostatic Disorders	2
1.3.7	Bleeding	
8.2.1	Coagulation defects	2
8.2.1.1	Acquired	2
8.2.1.2	Hemophilias	2
8.2.2	Disseminated intravascular coagulation	3

LO codes are listed on the right of each topic: see the explanation below

Fig. VII.1. Top portion of a chapter

Learning Outcome Codes (LO codes)

Code 1	Code 2	Code 3
• These are "cold topics" uncommonly seen in our practice in Singapore, are managed non-emergently and/or have a low impact on patient outcomes. • Knowledge only of overarching concepts and general principles without fine detail	• These are core topics common in the daily work of emergency physicians and/or core presenting complaints and conditions that significantly impact patient outcomes. • The resident is expected to know the aetiology and pathophysiology and have an evidence-based approach to derive differential diagnoses and propose preliminary investigations. • The resident is expected to elicit the key features in the history and physical examination and to propose differential diagnoses, preliminary investigations and principles of management.	• These are critical topics that are common in the daily work of emergency physicians and/or critical presenting complaints and conditions that have life-threatening, limb-threatening or public health impact. • The resident is expected to know the aetiology and pathophysiology and have an evidence-based approach to derive differential diagnoses and investigations. • The resident is expected to elicit the key features in the history and physical examination, to propose differential diagnoses contextualised to the patient, and to have an evidence-based approach to investigations and ED management.

MMed Part A Syllabus (Applied Basic Science)

The Applied Basic Science topics serve as the curriculum for the primary examination for the Master of Medicine (Emergency Medicine), Singapore. The list is comprehensive but is not intended to be exhaustive.

The basic science curriculum is categorized →

Anatomy and Histology	Development of bone marrow cells into formed elements • Erythrocytes (RBC) • Granulocytes and monocytes • Lymphocytes and lymphoid organs
Biochemistry	• Hemoglobin affinity for and binding to oxygen • Hemostasis and thrombosis (see Cardiovascular Disorders) • Coagulation cascade • Anti-clotting mechanisms / fibrinolysis
Microbiology	NA
Physiology	• RBC, platelet and white blood cell production, circulation, function and senescence

The list in each category focuses on the clinically relevant topics

Fig. VII.2. Mid portion of a chapter

Section III. Chapters

Chapter 1. Signs, Symptoms, and Presentations

		LO Code
1.1	**Abnormal Vital Signs: RESUS 1 in EMCC**	
1.1.1	Hypothermia	1
1.1.2	Fever	3
1.1.3	Bradycardia	3
1.1.4	Tachycardia	3
1.1.5	Bradypnea/Apnea	3
1.1.6	Tachypnea	3
1.1.7	Hypoxia	3
1.1.8	Hypotension	3
1.1.9	Hypertension	3
1.2	**Pain**	
1.2.1	Pain (unspecified)	2
1.2.2	Headache (See 12.3)	3
1.2.3	Eye pain	2
1.2.4	Chest pain	3
1.2.5	Abdominal pain	3
1.2.6	Pelvic and genital pain	3
1.2.7	Neck / Back pain	3
1.2.8	Chronic pain	2
1.2.9	Extremity pain	3
1.3	**General**	
1.3.1	Altered mental status	3
1.3.2	Anuria / Oliguria	2
1.3.3	Anxiety	2
1.3.4	Ascites	2
1.3.5	Ataxia	3
1.3.6	Auditory disturbances	2
1.3.7	Bleeding	3
1.3.8	Congestion/Rhinorrhea	2
1.3.9	Constipation / Obstipation	3
1.3.10	Cough	3
1.3.11	Crying/Fussiness	3
1.3.12	Cyanosis	3
1.3.13	Dehydration	3
1.3.14	Diarrhoea	3
1.3.15	Dysmenorrhea	1
1.3.16	Dysphagia	2
1.3.17	Dysuria	3
1.3.18	Oedema	3
1.3.19	Failure to thrive	2
1.3.20	Fatigue/Malaise	3
1.3.21	Feeding problems	2
1.3.22	Hematemesis	3
1.3.23	Hematuria	3
1.3.24	Haemoptysis	3
1.3.25	Hiccup	1
1.3.26	Jaundice	3
1.3.27	Joint swelling	3
1.3.28	Lethargy	3
1.3.29	Lightheadedness/Dizziness	3

1.3.30	Limp	2	
1.3.31	Lymphadenopathy	2	
1.3.32	Mechanical and indwelling devices, complications		2
1.3.33	Nausea/Vomiting	3	
1.3.34	Occupational exposure	2	
1.3.35	Palpitations	3	
1.3.36	Paralysis	3	
1.3.37	Paresthesia/Dysesthesia	3	
1.3.38	Poisoning	3	
1.3.39	Pruritus	2	
1.3.40	Rash	2	
1.3.41	Rectal bleeding	3	
1.3.42	Shock: **RESUS 1 in EMCC**	3	
1.3.43	Shortness of breath	3	
1.3.44	Sore throat	2	
1.3.45	Stridor	3	
1.3.46	Syncope / Near syncope	3	
1.3.47	Tinnitus	2	
1.3.48	Tremor	2	
1.3.49	Urinary incontinence	2	
1.3.50	Urinary retention	3	
1.3.51	Vaginal bleeding	3	
1.3.52	Vaginal discharge	2	
1.3.53	Vertigo	3	
1.3.54	Visual disturbances	3	
1.3.55	Weakness	3	
1.3.56	Wheezing	3	
1.3.57	Toxidromes	3	
1.3.58	Sudden unexpected infant death (SUID)	3	
1.3.59	Suicidal ideation	3	
1.3.60	Brief resolved unexplained events (BRUE)	2	
1.3.61	Intoxication syndromes	2	
1.3.62	Postsurgical complications	3	

Chapter 2. Abdominal and Gastrointestinal Disorders

Main Topics

2.1	Abdominal Wall
2.2	Oesophagus
2.3	Liver
2.4	Gall Bladder and Biliary Tract
2.5	Pancreas
2.6	Peritoneum
2.7	Stomach
2.8	Small bowel
2.9	Large bowel
2.10	Rectum and Anus
2.11	Spleen
2.12	Post-surgical Complications

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
2.1	Abdominal Wall	
2.1.1	Hernias	2
2.1.2	Hematomas	1
1.3.16	Dysphagia (under 1.3 General)	3
1.3.25	Hiccup (under 1.3 General)	2
2.2	**Oesophagus**	
2.2.1	Infectious disorders	
2.2.1.1	Candida (See 4.4.2.1, 7.5.7)	1
2.2.1.2	Viral oesophagitis	1
2.2.2	Inflammatory disorders	1
2.2.2.1	Oesophagitis	2
2.2.2.2	Gastroesophageal reflux (GERD)	2
2.2.2.3	Toxic effects of caustic (See 17.1.14)	2
2.2.2.3.1	Acid	2
2.2.2.3.2	Alkali	2
2.2.3	Motor abnormalities	1
2.2.4	Structural disorders	
2.2.4.1	Boerhaave's syndrome	2
2.2.4.2	Diverticula	1
2.2.4.3	Foreign body	2
2.2.4.4	Hernias	1
2.2.4.5	Mallory-Weiss syndrome	2
2.2.4.6	Stricture and stenosis	1
2.2.4.7	Tracheoesophageal fistula	1
2.2.4.8	Varices	3
2.2.5	Tumours	1
1.3.4	Ascites (under 1.3 General)	2
1.3.26	Jaundice (under 1.3 General)	3
2.3	**Liver**	
2.3.1	Noninfectious hepatitis/Cirrhosis	3
2.3.1.1	Alcoholic	3
2.3.1.2	Biliary obstructive	3

EM Model	Topic	Code
2.3.1.3	Drug-induced	2
2.3.1.4	Nonalcoholic steatohepatitis (NASH)	1
2.3.2	Hepatorenal failure	3
2.3.3	Infectious disorders	3
2.3.3.1	Abscess	3
2.3.3.2	Hepatitis	3
2.3.3.3	Perihepatitis	1
2.3.4	Tumours	2
2.3.5	Hepatic encephalopathy	3
2.4	**Gall Bladder and Biliary Tract**	
2.4.1	Cholangitis	3
2.4.2	Cholecystitis	3
2.4.3	Cholelithiasis/Choledocholithiasis	3
2.4.4	Tumours	1
2.5	**Pancreas**	
2.5.1	Pancreatitis	3
2.5.2	Tumours	2
2.5.3	Pseudocyst	1
2.6	**Peritoneum**	
2.6.1	Spontaneous bacterial peritonitis	3
2.6.2	Abdominal compartment syndrome	2
1.2.5	Abdominal pain (under 1.2 Pain)	3
1.3.22	Hematemesis (under 1.3 General)	3
2.7	**Stomach**	
2.7.1	Infectious disorders	2
2.7.2	Inflammatory disorders	2
2.7.2.1	Gastritis	2
2.7.3	Peptic ulcer disease	3
2.7.3.1	Haemorrhage	3
2.7.3.2	Perforation	3
2.7.4	Structural disorders	1
2.7.4.1	Congenital hypertrophic pyloric stenosis	1
2.7.4.2	Foreign body	1
2.7.5	Tumours	1
2.7.6	Gastroparesis	2
2.7.7	Cyclical vomiting syndrome	1
1.3.33	Nausea/Vomiting (under 1.3 General)	3
2.8	**Small Bowel**	
2.8.1	Infectious disorders	1
2.8.2	Inflammatory disorders	2
2.8.2.1	Regional enteritis/Crohn’s disease	2
2.8.2.2	Gluten enteropathy/Celiac disease	1
2.8.3	Motor abnormalities	2
2.8.3.1	Obstruction	3
2.8.3.2	Paralytic ileus	2
2.8.4	Structural disorders	1
2.8.4.1	Aortoenteric fistula	1

EM Model	Topic	Code
2.8.4.2	Congenital anomalies	1
2.8.4.3	Intestinal malabsorption	1
2.8.4.4	Meckel's diverticulum	1
2.8.5	Tumours	1
2.8.6	Vascular insufficiency	3
1.3.9	Constipation / Obstipation (under 1.3 General)	3
1.3.14	Diarrhoea (under 1.3 General)	3
1.3.13	Dehydration (under 1.3 General)	3
1.3.41	Rectal bleeding (under 1.3 General)	3
2.9	**Large Bowel**	
2.9.1	Infectious disorders	2
2.9.1.1	Antibiotic-associated	3
2.9.1.2	Bacterial	2
2.9.1.3	Parasitic	1
2.9.1.4	Viral	1
2.9.2	Inflammatory disorders	2
2.9.2.1	Appendicitis	3
2.9.2.2	Necrotizing enterocolitis (NEC)	3
2.9.2.3	Radiation colitis	1
2.9.2.4	Ulcerative colitis	2
2.9.3	Motor abnormalities	1
2.9.3.1	Hirschsprung’s disease	1
2.9.3.2	Irritable bowel	1
2.9.3.3	Obstruction	3
2.9.4	Structural disorders	1
2.9.4.1	Congenital anomalies	1
2.9.4.2	Diverticula	3
2.9.4.3	Intussusception	3
2.9.4.4	Volvulus	3
2.9.5	Tumours	2
2.10.	**Rectum and Anus**	
2.10.1	Infectious disorders	2
2.10.1.1	Perianal/Anal abscess	2
2.10.1.2	Perirectal abscess	2
2.10.1.3	Pilonidal cyst and abscess	2
2.10.2	Inflammatory disorders	2
2.10.2.1	Proctitis	1
2.10.3	Structural disorders	1
2.10.3.1	Anal fissure	1
2.10.3.2	Anal fistula	1
2.10.3.3	Congenital anomalies	1
2.10.3.4	Foreign body	2
2.10.3.5	Haemorrhoids	2
2.10.3.6	Rectal prolapse	2
2.10.4	Tumours	2
2.11	**Spleen**	
2.11.1	Asplenism	1

EM Model	Topic	Code
2.11.2	Splenomegaly	2
2.11.3	Vascular insufficiency/Infarction	1
2.12, 1.3.62	**Post-surgical Complications**	
2.12.1	Bariatric surgery	2
2.12.2	Ostomy	1

Applied Basic Science

Anatomy and Histology	• Anatomy of GI tract where foreign bodies commonly lodge
	• Anatomy of GI tract where perforation occurs: iatrogenic and disease-related
	• Abdominal wall: areas susceptible to hernia formation
	• Oesophagus: constrictions, junction, venous drainage, porto-systemic anastomosis, cell type
	• Stomach: parts and relations, venous and lymphatic drainage, innervation, cell types
	• Small intestine:
	  ○ Duodenum: parts and relations
	  ○ Jejunum and ileum: arterial supply
	  ○ Meckel's diverticulum
	• Large intestine: parts and relations, arterial supply, lymphatic drainage, cell types
	• Rectum and anus: parts and relations, innervation
	• Pancreas: parts and relations, ductal drainage, cell types
	• Liver: surface anatomy, parts and relations, peritoneal reflections and recesses, portal triad, blood supply, portal venous system, cell types
	• Biliary system and gall bladder: parts and relations
	• Spleen: parts and relations, venous drainage

Biochemistry	• Gastrointestinal tract and pancreas:
	  ○ Water and electrolyte handling
	  ○ Acid secretion by stomach cells
	  ○ Digestive enzymes
	  ○ Digestion of the main classes of nutrients: carbohydrates, proteins, and fats
	  ○ Mechanisms involved in the absorption of nutrients
	• Liver and biliary system:
	  ○ Carbohydrate metabolism and endogenous glucose production
	  ○ Lipid metabolism
	  ○ Cholesterol metabolism and excretion
	  ○ Protein synthesis during acute-phase reaction
	  ○ Urea cycle
	  ○ Heme synthesis
	  ○ Metabolism of bile and bilirubin
	  ○ Basic mechanisms of hepatic drug metabolism

Microbiology	• Common microorganisms causing:
	  ○ Peptic ulcer disease
	  ○ Diarrhoeal diseases, enteric fever, antibiotic-associated colitis
	  ○ AIDs related diarrhoea and GI infections
	  ○ Hepatitis and liver abscess
	  ○ Cholangitis and hepatobiliary sepsis
	  ○ Bacterial peritonitis
	• Anorectal sexually transmitted diseases

Physiology	• Gastrointestinal tract and pancreas: ○ See topics in Biochemistry

	○ Motility, propulsion and mixing of food ○ Secretary functions ○ Splanchnic circulation • Liver: ○ Blood flow and vascular resistance, blood reservoir function ○ Lymph flow ○ Blood-cleansing function ○ Metabolic functions
Pathology (and Histopathology)	• Abdominal wall: hernias, stomas • Gastrointestinal tract: ○ Oesophagus: laceration and perforation, obstruction, Barrett's oesophagus, tumour ○ Stomach: ▪ Peptic ulcer haemorrhage, obstruction and perforation ▪ Tumour ▪ Congenital hypertrophic pyloric stenosis ○ Small and large bowel: ▪ Obstruction, intussusception, volvulus ▪ Circulatory: mesenteric arterial embolism, mesenteric arterial thrombosis, non-occlusive mesenteric ischemia, mesenteric venous thrombosis; angiodysplasia ▪ Inflammation, infection: • Necrotizing enterocolitis • Appendicitis • Inflammatory bowel disease • Ano-rectal abscess, fissure, fistula ▪ Diverticulosis, diverticulitis ▪ Large bowel and ano-rectal tumours • Liver, biliary system and gall bladder: ○ Cholestatic disease: paediatric and adult ○ Biliary system obstruction ○ Circulatory disorders: impaired blood flow into and through the liver ○ Tumours in the liver • Pancreas: pseudocyst, tumour • Splenomegaly associated with: ○ Infections ○ Portal hypertension ○ Lympho-hematogenous disorders ○ Immuno-inflammatory disorders
Pathophysiology	• Gastrointestinal tract: ○ Common disorders of secretion, digestion and absorption, e.g. ▪ Gastric barrier, gastritis ▪ Peptic ulceration ▪ Mal-absorption syndrome, lactose intolerance etc. ○ Inflammation, infection: ▪ Gastritis, gastropathy ▪ Enteritis ▪ Colitis ○ Oesophageal and gastric motility disorders: reflux oesophagitis, gastroparesis, dumping syndrome ○ Small and large bowel motility disorders: ileus, megacolon, Hirschsprung disease ○ Diarrhoea: increased secretion, reduced absorption, increased osmotic load, abnormal GI motility

	• Liver, biliary system and gall bladder:
	  ○ Hepatocellular injury, liver failure and cirrhosis
	  ○ Portal hypertension, hepatic encephalopathy
	  ○ Hepatitis
	  ○ Jaundice and cholestatic syndromes:
	  ▪ Conjugation disorders
	  ▪ Cholangitis, cholecystitis and gallstone disease
	  ▪ Cholelithiasis, choledocholithiasis
	  ▪ Cholestasis of pregnancy
	  ○ Alcohol-related liver disease
	  ○ Non-alcoholic fatty liver disease
	  ○ Drug-induced liver disease: common drugs
	  ○ Hepatorenal failure
	• Pancreas: pancreatitis, steatorrhea

Pharmacology	• Proton pump inhibitors • GI motility stimulants / pro-kinetic agents • Antiemetics • Laxatives • Anti-diarrhoeal / antimotility agents • Drugs used for splanchnic vasoconstriction in variceal haemorrhage • Antimicrobials for intra-abdominal infections • Antimicrobials for diarrhoea in immunocompromised patients • Antibiotics related to healthcare-associated colitis • Common hepato-toxic drugs
Genetics / Immunology	• Autoimmune cholangiopathies • Hirschsprung disease • Gilbert's syndrome
Data Interpretation	• Ascitic fluid analysis for bacterial peritonitis • Serologic markers of viral hepatitis • Liver biochemistry for obstructive versus non-obstructive jaundice
Others	Epidemiology of stomach, colorectal and hepatocellular cancers

Chapter 3. Cardiovascular Disorders and Resuscitation

Main Topics

3.1	Cardiopulmonary Arrest
3.2	Congenital Abnormalities of the Cardiovascular System
3.3	Disorders of Circulation
3.4	Disturbances of Cardiac Rhythm
3.5	Diseases of the Myocardium, Acquired
3.6	Diseases of the Pericardium
3.7	Hypertension
3.8	Tumours
3.9	Valvular Disorders
3.10	Cardiovascular Devices

EMCC List and Learning Outcome Codes: Cardiovascular Disorders

EM Model 2019	Topic	Code
3.1	**Cardiopulmonary Arrest**	3
3.1.2	Pulseless electrical activity	3
3.4	**Disturbances of Cardiac Rhythm (Part 1)**	
3.4.1, 3.4.1.1	Cardiac dysrhythmias: ventricular dysrhythmias associated with cardiac arrest: This session concentrates on VF and	3
19.2	**Procedures and skills for cardiovascular disorders**	
19.2.1	Cardiopulmonary resuscitation	3
19.2.4, 19.2.4.1	Post-resuscitative care and targeted temperature	3
19.2.11	ECMO: indications, contraindications, general principles of initiation	1
3.3	**Disorders of Circulation**	
3.3.1	Arterial: Include Mesenteric Ischemia and Acute Limb	3
3.3.1.1	Aneurysm	3
3.3.1.2	Aortic dissection	3
3.3.1.3	Thromboembolism	3
3.3.2	Venous	3
3.3.2.1	Thromboembolism (See 16.6.2): Focus on DVT. PE	3
3.7	Hypertension	3
3.7.1	Asymptomatic Hypertension (including hypertensive	3
3.7.2	Hypertensive emergency	3
3.4	**Disturbances of Cardiac Rhythm (Part 2)**	
1.3.35	Palpitations	3
1.3.46	Syncope / Near syncope	3
3.4.1	Cardiac dysrhythmias: Include hyper- and hypokalemia and hypocalcemia ECG changes	3
3.4.1.1	Ventricular: This session concentrates on the non-cardiac arrest dysrhythmias	3
3.4.1.2	Supraventricular	3
3.4.2	Conduction disorders	3
3.5	**Diseases of the Myocardium, Acquired (Part 1)**	

1.3.32 3.10.1 3.11.2	Mechanical and indwelling devices, complications: Focus on cardiac devices: Pacemaker/Automatic implantable cardioverter-defibrillator (AICD) Left ventricular assist device (LVAD)	2 3 2
3.5.1	Cardiac failure: Include evidence-based investigations and management	3
3.5.1.1	Cor pulmonale	3
3.5.1.2	High output	3
3.5.1.3	Low output	3
3.5.2	Cardiomyopathy	2
3.5.2.1	Hypertrophic	2
3.5.3	Congestive heart failure	3
3.5	**Diseases of the Myocardium, Acquired (Part 2)**	
1.2.4	Chest pain: Focus on pitfalls in chest pain evaluation	3
3.5.4	Coronary syndromes: • Typical and atypical presentations • Release kinetics and utility of cardiac markers and their implications for use in ED • Management strategies, MOH Performance Indicators, AHA guidelines • Risk stratification	3
3.5.5	Ischemic heart disease	3
3.5.6	Myocardial infarction	3
3.5.7	Myocarditis	3
3.5.8	Ventricular aneurysm	2
3.6	**Diseases of the Pericardium**	
3.6.1	Pericardial tamponade (See 18.1.2.6)	3
3.6.2	Pericarditis	2
3.9	Valvular Disorders	3
3.9.1	Endocarditis	3

EMCC List and Learning Outcome Codes: Resuscitation

1.1 19.2	Abnormal vital signs Resuscitation: Basic procedures (excluding airway)	3 3
19.1	Airway techniques	3
19.2	Hemodynamic Monitoring Update on latest guidelines	3
19.2	Post Resuscitation Syndrome Post Resuscitation Care Therapeutic Hypothermia Update on latest guidelines	3

Applied Basic Science

Anatomy and Histology	• Heart:
	  ○ Chambers, valves, innervation
	  ○ Aorta, superior and inferior vena cava, pulmonary artery
	  ○ Coronary arteries
	  ○ Conducting pathways and nodes
	• Pericardium

	• Mediastinum • Systemic circulation: arteries, veins, capillaries • Key cell types in heart and systemic circulation
Biochemistry	• Cardiac biomarkers • Evolving sensitivity in cardiac markers • Calcium, sodium and potassium homeostasis in the myocardium • Lipid metabolism and atherogenesis • Hemostasis and thrombosis: formation of primary and secondary plaque, the role of fibrinolysis

Microbiology	• Endocarditis:
	  ○ Common and atypical microorganisms
	  ○ Microorganisms in intravenous drug users
	• Myocarditis
	• Others, e.g. rheumatic Fever, mycotic aneurysm

Physiology	• Total blood volume, cardiac output, stroke volume, mean arterial pressure
	• Cardiac cycle: electrical and mechanical changes
	• Electrocardiogram: interpretation of normal ECG
	• Blood pressure, stroke volume, heart rate and cardiac output regulation:
	  ○ Hormonal control
	  ○ Mechanical factors
	• Peripheral vasculature: blood flow, transcapillary exchange (intravascular and extravascular)
	• Smooth muscle contraction and relaxation

Pathology (and Histopathology)	• Myocardial ischemia and infarction: acute and chronic changes
	• Arterial: atherosclerosis, aneurysm, dissection
	• Venous: venous thrombosis and embolism
	• Endocarditis, myocarditis and pericarditis: infective, sterile
	• Paediatric/congenital heart disease:
	  ○ Common acyanotic lesions
	  ○ Common cyanotic lesions
	  ○ Fetal circulation
	• Myxoma

Pathophysiology	• Cardiac failure
	• Ischemic heart disease and acute coronary syndrome
	• Congenital heart disease: hemodynamic and shunt effects
	• Valvular heart disease: rheumatic and non-rheumatic
	• Cardiac dysrhythmias:
	  ○ Pulseless
	  ○ With pulse: re-entry circuit, conduction abnormalities, accessory pathways
	• Cardiomyopathy
	• Arterial: hypertension
	• Shock: cardiogenic, obstructive, hypovolaemic, distributive

Pharmacology	• Cardiac rhythm: anti-arrhythmic • Blood pressure: anti-hypertensive • Myocardial infarction: anti-anginal, antiplatelet, thrombolytic, anticoagulant, oxygen, opioid • Cardiac failure: diuretics, angiotensin-converting enzyme inhibitors/angiotensin II receptor antagonists, cardiac glycosides, calcium sensitizer, vasodilator • Shock: vasoactive drugs

Genetics / Immunology	• Genetics: relevant connective tissue disease

Data Interpretation	• ECGs as listed above
	• Common investigations for chest pain evaluation
	• TIMI Score
	• Imaging
	  ○ Chest x-ray: fluid overload, heart failure, pulmonary oedema, implanted cardiac devices
	  ○ Bedside ultrasound: focused cardiac ultrasound
	  ○ CT aortogram: aortic dissection, aneurysm
	  ○ Coronary angiogram: common STEMI

Others	Epidemiology of out of hospital cardiac arrest

Chapter 4. Cutaneous Disorders

Main Topics

4.1	Cancers of the Skin
4.2	Ulcerative Lesions
4.3	Dermatitis
4.4	Infections
4.5	Maculopapular Lesions
4.6	Papular/Nodular Lesions
4.7	Vesicular/Bullous Lesions
4.8	Purpuric Rash

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.39	Pruritus (under General 1.3)	2
1.3.40	Rash (under General 1.3)	2
4.1	Cancers of the Skin	
4.1.1	Basal cell	1
4.1.2	Kaposi's sarcoma	1
4.1.3	Melanoma	1
4.1.4	Squamous cell	1
4.2	Ulcerative Lesions	
4.2.1	Decubitus	2
4.2.2	Venous stasis	2
4.2.3	Diabetic foot ulcers	3
4.3	Dermatitis	
4.3.1	Atopic Eczema	2
4.3.2	Contact	2
4.3.3	Psoriasis	2
4.3.4	Seborrhea	2
4.4	Infections	
4.4.1	Bacterial	3
4.4.1.1	Abscess	3
4.4.1.2	Cellulitis	3
4.4.1.3	Erysipelas	3
4.4.1.4	Impetigo	3
4.4.1.5	Necrotizing infection	3
4.4.2	Fungal	2
4.4.2.1	Candida (See 2.2.1.1, 7.4.6)	2
4.4.2.2	Dermatophytes	1
4.4.3	Ectoparasites	1
4.4.4	Viral	2
4.4.4.1	Aphthous ulcers	1
4.4.4.2	Childhood exanthems (See 10.6.8, 10.6.9)	1
4.4.4.3	Herpetic infections (See 10.6.4, 10.6.5, 13.1.3.1)	2
4.4.4.4	Human papillomavirus (HPV) (See 13.1.3.2)	1
4.4.4.5	Molluscum contagiosum	1
4.5	**Maculopapular Lesions**	
4.5.1	Erythema multiforme	3
4.5.2	Pityriasis rosea	2
4.5.3	Urticaria	2

EM Model	Topic	Code
4.5.4	Drug eruptions	3
4.6	**Papular/Nodular Lesions**	
4.6.1	Hemangioma/Lymphangioma	1
4.6.2	Lipoma	1
4.6.3	Sebaceous cyst	1
4.6.4	Erythema nodosum	2
4.7	**Vesicular/Bullous Lesions**	
4.7.1	Pemphigus	2
4.7.2	Staphylococcal scalded skin syndrome	3
4.7.3	Stevens-Johnson syndrome	3
4.7.4	Toxic epidermal necrolysis	3
4.7.5	Bullous pemphigoid	2
4.8	**Purpuric Rash**	
4.8.1	Henoch-Schönlein purpura (HSP)	2
4.0	• Top 5 Dermatologic Emergencies • Biologics and other new treatment modalities for skin conditions	3 2

Applied Basic Science

Anatomy and Histology	• Primary layers: epidermis, dermis, hypodermis • Sublayers of the epidermis: stratum corneum, lucidum, granulosum, spinosum, basale/germinativum • Melanocytes and pigment • Components of the dermis: cells including fibroblasts, macrophages, and adipocytes; matrix components including elastin and collagen; neurovascular plexuses; adnexal appendages including hair follicle unit, sebaceous glands, sweat glands • Anatomical differences between glabrous (Hairless) and non-glabrous skin
Biochemistry	• Process of keratinization: biochemical and morphological changes of keratinocytes • Sebaceous lipogenesis and androgen metabolism in acne
Microbiology	• Skin and soft tissue infections o Bacterial: *Staphylococcus aureus* (including toxin-mediated Staphylococcus Scalded Skin Syndrome), MRSA, *Streptococcus* (Group A and B), *Pseudomonas aeruginosa, Clostridium* and anaerobes (in necrotizing fasciitis) o Virus: *Herpes* viruses, Human Papilloma Viruses, Molluscum Contagiosum, childhood exanthems o Fungus: Dermatophytes, *Candida* • Skin infections in the immunocompromised: Non-Tuberculous Mycobacterium (NTM) • Skin infections in specific environments: o Water exposure: *Burkholderia pseudomallei, Mycobacterium marinum, Vibrio vulnificus, Pseudomonas aeruginosa* o Institutionalized populations: Scabies • Bacteriology of acne/acne flares
Physiology	• Functions of the skin: protection, sensation, heat regulation, control of evaporation, water resistance • Melanin and the pigment deposition process
Pathology (and Histopathology)	Common diagnostic features in skin biopsy and direct immunofluorescence (DIF):

	• Stevens-Johnson Syndrome (SJS), Toxic Epidermal Necrolysis • Bullous pemphigoid • Autoimmune cutaneous vasculitis • Common skin lesions/tumours, including malignancies

Pathophysiology	• Atopic dermatitis: filaggrin deficiency and decreased retention of trans-epidermal water leading to defective skin barrier function
	• Psoriasis: hyper-proliferation and abnormal differentiation of keratinocytes with increased cell turnover; dysregulation of the immune system involving T-Cells and cytokine release perpetuating chronic inflammation
	• Wound healing: primary vs secondary intention
	• Mechanisms of drug-induced reaction
	  ○ Role of haptens and antigen-presenting cells (APC)
	  ○ Hypersensitivity reactions (Type I-IV; see Immune System Disorders)
	  ○ Differences in latency period between drug intake and the onset of rash in Cutaneous Adverse Drug Reactions (CADR), e.g. Drug Reaction with Eosinophilia and Systemic symptoms (DRESS)
	• Venous stasis and ulcer formation

Pharmacology	• Common antimicrobial agents (with co-existing anti-inflammatory properties)
	• Principles of topical corticosteroid usage: vehicle selection, potency classification (US/UK)
	• Adverse effects of systemic agents
	  ○ Steroid toxicity
	  ○ Steroid-sparing agents, e.g. Methotrexate, Cyclosporine A, biologics
	• Antihistamines
	• Topical agents
	• Common pharmaceutical agents causing cutaneous adverse drug reaction

Genetics / Immunology	• Immunology/immunogenetics of:
	  ○ Psoriasis
	  ○ Atopic Dermatitis
	  ○ Pemphigus and pemphigoid
	  ○ Henoch-Schonlein purpura (HSP)
	• Carbamazepine associated Cutaneous Adverse Drug Reactions

Data Interpretation	Rule of 9s for body surface area assessment

Chapter 5. Endocrine, Metabolic, and Nutritional Disorders

Main Topics

5.1	Acid-base Disturbances
5.2	Adrenal Disease
5.3	Fluid and Electrolyte Disturbances
5.4	Glucose Metabolism
5.5	Nutritional Disorders
5.6	Parathyroid Disease
5.7	Pituitary Disorders
5.8	Thyroid Disorders
5.9	Tumours of Endocrine Glands

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
5.1	Acid-base Disturbances	
5.1.1	Metabolic or respiratory	3
5.1.1.1	Acidosis	3
5.1.1.2	Alkalosis	3
5.1.2	A mixed acid-base balance disorder	3
5.2	Adrenal Disease	
5.2.1	Corticoadrenal insufficiency	3
5.2.2	Cushing’s syndrome	3
5.3	Fluid and Electrolyte Disturbances	
5.3.1	Calcium metabolism	3
5.3.2	Fluid overload/Volume depletion	3
5.3.3	Potassium metabolism	3
5.3.4	Sodium metabolism	2
5.3.5	Magnesium metabolism	2
5.3.6	Phosphorus metabolism	1
5.4	Glucose Metabolism	
5.4.1	Diabetes mellitus (DM)	3
5.4.1.1	Type I	3
5.4.1.2	Type II	3
5.4.1.3	Complications in glucose metabolism	3
5.4.1.3.1	Diabetic ketoacidosis	3
5.4.1.3.2	Hyperglycemia	3
5.4.1.3.3	Hyperosmolar hyperglycaemic state	3
5.4.1.3.4	Hypoglycemia	3
5.5	Nutritional Disorders	
5.5.1	Vitamin deficiencies	1
5.5.2	Wernicke-Korsakoff syndrome	2
5.5.3	Malabsorption	1
5.5.4	Malnutrition	2
5.6	Parathyroid Disease	2
5.7	Pituitary Disorders	1
5.7.1	Panhypopituitarism	1
5.8	Thyroid Disorders	
5.8.1	Hyperthyroidism	3
5.8.2	Hypothyroidism	2
5.8.3	Thyroiditis	2

EM Model	Topic	Code
5.8.4	Thyroid Storm	3
5.9	Tumours of Endocrine Glands	
5.9.1	Adrenal	1
5.9.1.1	Pheochromocytoma	2
5.9.2	Pituitary	1
5.9.3	Thyroid	1

Applied Basic Science

Anatomy and Histology	• Hypothalamus, anterior and posterior pituitary gland, adrenal glands • Thyroid and parathyroid glands • Pancreas, islets of Langerhans, beta-cells • Parietal cells of the stomach • Bone structure
Biochemistry	• Hydrogen ion, bicarbonate and other buffer systems in the body • Iron absorption and transfer in the body
Physiology	• Function and regulation of the hormones from the anterior pituitary: TSH, ACTH, LH, FSH, prolactin and growth hormone • Function and regulation of the hormones from the posterior pituitary: antidiuretic hormone and oxytocin • Role of the other hormones secreted by the hypothalamus: dopamine, growth-hormone-releasing hormone, somatostatin • The hypothalamic-pituitary-adrenal axis and the regulation of glucocorticoids and adrenal sex hormones • Steroid and adrenal sex hormones synthesis and their effects • Catecholamine (epinephrine, norepinephrine and dopamine) secretion, regulation and their effects • Hypothalamic-pituitary-thyroid axis and the regulation of thyroid hormone • Thyroid hormone synthesis, the function of the thyroid gland, the role of iodine and thyroid hormone effects • Hypothalamic-pituitary-gonadal axis and the regulation of sex hormones • Sex hormone (testosterone, estrogen and progesterone) synthesis and their effects • Hormones that affect plasma glucose concentration: chiefly insulin and glucagon – their regulation and effects • Hormones secreted by the pancreatic islets: insulin, glucagon, somatostatin, pancreatic polypeptide • Role of thyroid hormone, glucocorticoid, catecholamine and growth hormone on carbohydrate metabolism • Aldosterone secretion and its effect • Potassium homeostasis • Sodium and water homeostasis • Magnesium homeostasis • Calcium and phosphate homeostasis, regulation and role of parathyroid hormone and calcitonin • Regulation of bone resorption and formation • Role of vitamins and their absorption in the body

Pathology (and Histopathology)	• Necrosis/infarction of the pituitary gland and adrenal glands • Hypoplasia of the adrenal gland • Inflammatory conditions of the thyroid: thyroiditis • Tumours of the endocrine glands: adrenal, pituitary and thyroid
Pathophysiology	• Metabolic acid-base disorders • Respiratory acid-base disorders (see Thoracic-Respiratory Disorders) • Mixed acid-base disorders • Effects of panhypopituitarism • Cortico-adrenal insufficiency • Cushing's syndrome • Thyroid gland: hyperthyroidism and hypothyroidism • Adrenal glands: over-production of catecholamines • Diabetes mellitus emergencies: diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state (HHS), hypoglycemia • Hyperaldosteronism • Potassium imbalance: hyper- and hypokalemia • Sodium: hyponatraemia • Fluid imbalance: overload and depletion (see Cardiovascular Disorders) • Calcium imbalance: hyper- and hypocalcemia • Hyperparathyroidism • Osteoporosis and bone resorption • Effects of malabsorption and key vitamin deficiencies

Pharmacology	• Steroids: prednisolone, dexamethasone, hydrocortisone
	• Drugs affecting potassium shift and potassium-binding
	• Diabetes medications: oral agents
	  ○ Biguanides
	  ○ Sulfonylureas
	  ○ Acarbose
	  ○ Newer agents: DPP-4 inhibitors, GLP-1 receptor agonists, SGLT2 inhibitors
	• Insulin: basal, short-, medium- and long-acting
	• Fluids: crystalloids (isotonic, hypertonic), colloids and dextrose 5%
	• Bisphosphonates
	• Thyroxine
	• Drugs for hyperthyroidism: carbimazole, propylthiouracil

Genetics / Immunology	• Genetics: Hypokalaemic periodic paralysis • Immunology: Type 1 DM, autoimmune thyroiditis
Data Interpretation	• Arterial and venous blood gas: acidosis • Arterial blood gas, serum ketone: euglycemic DKA • Serum calcium: hypercalcemia of malignancy • Thyroid function test
Others	• Epidemiology of diabetes mellitus and its complications • Thyroid storm risk assessment tools

Chapter 6. Environmental Disorders

Main Topics

6.1	Bites and Envenomation
6.2	Dysbarism
6.3	Electrical Injury
6.4	High-altitude Illness
6.5	Submersion Incidents
6.6	Temperature-related Illness
6.7	Radiation Emergencies

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
6.1	**Bites and Envenomation (See 18.1.3.2)**	
6.1.1	Arthropods	
6.1.1.1	Insects	
6.1.1.2	Arachnida	
6.1.1.3	Types of Arthropod of clinical importance locally	1
6.1.1.4	Clinical effects and management of Arthropod exposure	2
6.1.2	Mammals	2
6.1.2.1	Mammalian Bite:	2
6.1.2.2	Types of animal and characteristics of bite	2
6.1.2.3	Types of animal and flora	2
6.1.2.4	Management	2
6.1.3	Marine organisms (See 17.1.28)	1
6.1.3.1	Marine Envenomation:	1
6.1.3.2	Types of marine envenomation of clinical importance	1
6.1.3.3	Management of marine envenomation	2
6.1.4	Reptiles	1
6.1.4.1	Snake Envenomation	1
6.1.4.2	Local species	1
6.1.4.3	Toxic effect of snake venom	1
6.1.4.4	Management strategy	2
6.2	**Dysbarism**	
6.2.1	Air embolism	2
6.2.2	Barotrauma	2
6.2.3	Decompression syndrome	2
6.3	**Electrical Injury (See 18.1.3.3.1)**	2
6.3.1	Lightning	2
6.7	**Radiation Emergencies**	1
6.4	**High-altitude Illness**	
6.4.1	Acute mountain sickness	1
6.4.2	Barotrauma of ascent	1
6.4.3	High-altitude cerebral oedema	2
6.4.4	High altitude pulmonary oedema	2
6.5	**Submersion Incidents**	2
6.6	**Temperature-related Illness**	
6.6.1	Heat	3
6.6.1.1(SG)	Heat exhaustion	3
6.6.1.2(SG)	Heat stroke	3

EM Model	Topic	Code
6.6.2	Cold	1
6.6.2.1	Frostbite	1
6.6.2.2	Hypothermia	1
6.6.1	**Heat Injury Revisited**: Hyperthermia, Heat exhaustion, Heat stroke	3
6.2	**Dysbarism Revisited:** Air embolism, Barotrauma, Decompression syndrome	2

Applied Basic Science

Anatomy and Histology	• Characteristic features used in the identification of snake bites, including the location of fang marks, the shape of the head and tail • Stinging apparatus of bees, marine organisms, e.g. jellyfish ○ Knowledge of anatomy guides the method of stinger removal as part of first-aid measures • Air-containing anatomical cavities involved in dysbarism including alveoli apparatus, gastrointestinal tract, inner and middle ear system, facial sinuses and dental cavities • Main types of ionizing radiation including α (alpha), β (beta) and γ (gamma): penetrative attributes of γ radiation account for potential cellular injury and tissue damage

Biochemistry	• Boyle's and Henry's gas laws and their respective clinical applications
	  ○ Boyle's law: Rapid volume expansion of gas in the anatomical cavities (lungs) during rapid ascent leading to lung barotrauma/pneumothorax
	  ○ Henry's law: Liberation of gas bubbles from their initially dissolved state due to changes in the partial pressure of the gas during ascent, e.g. decompression sickness
	• Hyperbaric oxygen and recompression gas laws
	• Electrolyte derangements in hypothermia: trans-cellular shifts of ions and molecules and cold diuresis
	• Electrolyte derangements in heat injury

Microbiology	• Microbiology of common mammalian bites
	  ○ Aerobic: *Pasteurella multocida*, *Staphylococcus* and *Streptococcus* sp., *Corynebacterium* sp.
	  ○ Anaerobic: *Eikenella corrodens, Bacteroides fragilis, Peptostreptococcus, Capnocytophaga canimorsus*
	  ○ Others: Hepatitis B and C*,* HIV*, Treponema pallidum,* HSV-1, HSV-2

Physiology	• Adaptations to hypobaric hypoxia: Increased ventilation rate, sympathetic drive, pulmonary hypoxic vasoconstriction and hematologic changes (increased haemoglobin concentration)
	• Altitude acclimatization: ventilation, blood, fluid balance, cardiovascular system, exercise capacity
	• Derangements in hypothermia states
	  ○ Increased insulin resistance
	  ○ Coagulopathy
	  ○ Impaired leucocyte function
	• Mechanisms involved in thermoregulation:
	  ○ Radiation: Transfer of heat from a warmer to a colder object
	  ○ Evaporation: (i) Increased sweat production and (ii) Increased respiratory rate (water vapour component during expiration)
	  ○ Convection/Conduction: (i) Vasodilation of cutaneous vasculature allows heat to be dissipated from the core to the peripheral skin

	surface, (ii) Behavioural heat control, e.g. finding a cooler environment, bathing/swimming o Reduced heat production • Heat acclimatization, i.e. maximization of heat removal processes
Pathology (and Histopathology)	• Main classifications of snake venom o Hematotoxins (Viper) o Neurotoxins (Cobra, Coral snake) o Myotoxins (Sea snake) • Ultraviolet keratitis, aka snow blindness • Cutaneous manifestations of lightning injury: Lichtenberg figures, flash burns, punctate burns, contact burns, superficial erythema, blistering burns, linear burns • Cellular injury/changes from radiation exposure o Triggering of programmed cell death (apoptosis) and inhibition of cell repair/renewal o Necrosis at higher doses of radiation o Redistribution of cells to other tissue compartments
Pathophysiology	• Barotrauma of descent • Arterial gas embolism (AGE): o Crossing of air bubbles from the venous to the arterial system o Embolization of vessels leading to end-organ ischemia • Decompression sickness: o Tissue is loaded with oxygen and nitrogen in its dissolved state during descent (Henry's Law) o Dissolved gas is subsequently liberated as gas bubbles during ascent, resulting in vessel embolism and end-organ ischemia • Multi-system involvement in electrical injuries, in particular o Cardiovascular: Arrhythmias, hypotension, cardiac arrest o Respiratory: Respiratory arrest due to depolarization and paralysis of the medullary respiratory centre o Neurologic: Altered mental status, amnesia and transient paralysis (keraunoparalysis) o Musculoskeletal, skin and soft tissues: Burns, rhabdomyolysis and subsequent development of compartment syndrome • High altitude syndromes o Acute hypoxia o Acute mountain sickness (AMS) related to hypobaric hypoxia and High-altitude cerebral oedema (HACE) related to vasogenic oedema o High-altitude pulmonary oedema related to high microvascular pressure • Submersion injuries: o "Wet drowning" vs "dry drowning" pathophysiology o Non-cardiogenic pulmonary oedema: Fluid aspiration leading to washout of surfactant o Cerebral hypoxia and subsequent oedema is the major determinant of morbidity and mortality o Concomitant hypothermia results in cardiac arrhythmias, e.g. sinus bradycardia • Heat injury, i.e. body's thermoregulatory responses unable to maintain homeostasis • Acute Radiation Syndrome: o Four overlapping organ-system toxicities: cerebrovascular, gastrointestinal, hematopoietic, and cutaneous syndromes o Absolute lymphocyte count and the velocity/rate of decline and

	onset of emesis are clinically useful markers of toxicity
Pharmacology	• Antimicrobial agents for common mammalian bites ○ Amoxicillin/clavulanic acid is the choice; alternatives include erythromycin or clindamycin and a fluoroquinolone, e.g. ciprofloxacin or levofloxacin • Indications for antivenin/antivenom and its associated adverse reactions in the treatment of snake bites • Hyperbaric oxygen therapy for decompression sickness and air embolism • Acetazolamide (carbonic anhydrase inhibitor) for altitude sickness • Dexamethasone for acute mountain sickness • Fluid and electrolyte management in heat injury

Data Interpretation	• Heat injury:
	  ○ Electrolyte abnormalities, renal and hepatic injury
	  ○ Muscle damage
	  ○ Hemoconcentration and hematologic abnormalities
	• Absolute lymphocyte count: clinically useful markers of radiation toxicity

Others	• Types of individuals at risk for heat injury:
	  ○ Related to physical exertion, e.g. military training
	  ○ Related to high environmental heat stress, e.g. heat wave
	  ○ Confinement hyperpyrexia, e.g. child left in a car
	• Types of a lightning strike: (i) direct hit, (ii) side splash, (iii) contact strike, (iv) ground current, (v) upward streamer
	• Classification of decompression illness
	• Principle of Reverse Triage in the management of multiple casualties with electrical injuries

Chapter 7. Head, Ear, Eye, Nose, Throat Disorders

Main Topics

7.1	Ear
7.2	Eye
7.3	Nose
7.4	Oropharynx/Throat
7.5	Tumours

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.47	Tinnitus (under 1.3 General - cover Approach)	2
1.3.53	Vertigo (under 1.3 General - cover Approach)	3
1.3.6	Auditory disturbances (under 1.3 General)	1
7.1	**Ear**	
7.1.1	Foreign body	2
7.1.1.1	Impacted cerumen	1
7.1.2	Labyrinthitis	2
7.1.3	Mastoiditis	2
7.1.4	Ménière's disease	2
7.1.5	Otitis externa	2
7.1.5.1	Infective	2
7.1.5.1.1	Malignant	2
7.1.6	Otitis media	3
7.1.7	Perforated tympanic membrane (See 18.1.11.2)	2
7.1.8	Perichondritis	2
1.2.3	Eye pain (under 1.2 Pain - Cover Approach)	3
1.3.54	Visual disturbances (under 1.3 General - cover Approach)	3
7.2	**Eye**	
7.2.1	External eye	2
7.2.1.1	Burn confined to the eye (See 18.1.10.2)	3
7.2.1.2	Conjunctivitis	2
7.2.1.3	Corneal abrasions (See 18.1.10.1)	2
7.2.1.4	Disorders of the lacrimal system	2
7.2.1.5	Foreign body	2
7.2.1.6	Disorders of the eyelids	2
7.2.1.7	Keratitis	2
7.2.2	Anterior pole	
7.2.2.1	Glaucoma	3
7.2.2.2	Hyphema (See 18.1.10.5)	3
7.2.2.3	Iritis (See 18.1.10.9)	2
7.2.2.4	Hypopyon	2
7.2.3	Posterior pole	
7.2.3.1	Choroiditis/Chorioretinitis	2
7.2.3.2	Optic neuritis	2
7.2.3.3	Papilloedema	3
7.2.3.4	Retinal detachments and defects (See 18.1.10.8)	2
7.2.3.5	Retinal vascular occlusion	2
7.2.4	Orbit	2

EM Model	Topic	Code
7.2.4.1	Cellulitis	2
7.2.4.1.1	Preseptal	2
7.2.4.1.2	Septal/Orbital	3
7.2.4.2	Endophthalmitis	2
1.3.8	Congestion/Rhinorrhea (under 1.3 General)	1
7.3	**Nose**	
7.3.1	Epistaxis	3
7.3.2	Foreign body	2
7.3.3	Rhinitis	1
7.3.4	Sinusitis	2
1.3.44	Sore throat (under 1.3 General - cover Approach)	3
1.3.45	Stridor (under 1.3 General - cover Approach)	3
7.4	**Oropharynx/Throat**	
7.4.1	Dentalgia	1
7.4.2	Diseases of the oral soft tissue	2
7.4.2.1	Ludwig's angina	3
7.4.2.2	Stomatitis	1
7.4.3	Diseases of the salivary glands	1
7.4.3.1	Sialolithiasis	2
7.4.3.2	Suppurative parotitis	1
7.4.4	Foreign body	3
7.4.5	Gingival and periodontal disorders	1
7.4.6	Larynx/Trachea	
7.4.6.1	Epiglottitis (See 16.1.1.2)	3
7.4.6.2	Laryngitis	2
7.4.6.3	Tracheitis	2
7.4.6.4	Tracheostomy complications	2
7.4.7	Oral candidiasis (See 2.2.1.1, 4.4.2.1)	2
7.4.8	Odontogenic infections/ abscesses	2
7.4.9	Peritonsillar abscess	3
7.4.10	Pharyngitis/Tonsillitis	3
7.4.11	Retropharyngeal abscess	3
7.4.12	Temporomandibular joint disorders	2
7.5	**Tumours**	**1**
7.5.1	Nasopharyngeal carcinoma	2

Applied Basic Science

Anatomy and Histology	• Eye: external eye, anterior pole, posterior pole, orbit and surrounding structures • External ear: pinna, ear canal and tympanic membrane • Middle ear: tympanic cavity, 3 ossicles, auditory tube, round and oval window • Inner ear: vestibule, semicircular canals, cochlea. • Sinuses: maxilla, sphenoid, ethmoid, frontal, paranasal • Nose: anterior and posterior nasal cavity • Throat: nasopharynx, oropharynx, laryngopharynx, tonsillar fossa, where foreign bodies lodge • Salivary glands: parotid, submandibular and sublingual • Oral cavity: gums, teeth, temporomandibular joint

	• Large airways: larynx, trachea • The neck: zones and contents
Microbiology	Typical micro-organisms related to • Skin infection of the external ear, nose and neck • Otitis media and mastoiditis • Pharyngitis and tonsillitis • Rhinitis • Sinusitis • Eye infections, orbital cellulitis, preseptal cellulitis and endophthalmitis • Infections of the glottic region: epiglottitis, retropharyngeal abscess, tracheitis • Dental abscesses • Oral candidiasis
Physiology	Eye: • Neural pathways transmitting visual information • Focusing light/objects on the retina • Eye movements and how it affects the eye • Neural pathways in the consensual reflex of the eyes • Aqueous humour flow and intra-orbital pressure Ear • Sensing of balance in the inner ear • Pathway of auditory impulses from air movement to the neural pathways Throat • Regulation and secretion of saliva • Neural pathway for swallowing • Phonation and speech
Pathology (and Histopathology)	Inflammation and infectious conditions of • Ear: labyrinthitis, vestibular neuronitis, otitis externa, otitis media, perichondritis etc. • Eye: endophthalmitis, orbital cellulitis, preseptal cellulitis, conjunctivitis etc. • Oro-pharynx: pharyngitis/tonsillitis-abscess, laryngitis, epiglottitis, necrotizing fasciitis, tracheitis, dental abscess etc. Tumours: nasopharyngeal carcinoma
Pathophysiology	• Neural pathway disruption and visual field defects • Disruption of the consensual reflex and relative afferent pupillary defects • Conditions associated with loss of eye movement • Raised intra-orbital pressure • Inflammation of the salivary glands • Swelling and obstruction of the upper airway
Pharmacology	• Antimicrobials for EENT infections • Eye drops: lubricant, analgesia, antihistamine, steroids, cycloplegic / dilation and anti-microbial • Nose: hemostatic agent, thrombogenic agents, nasal tampon • Eardrops: for earwax, antimicrobial and steroid • Vestibular sedatives: betahistine, prochlorperazine, antihistamine
Genetics / Immunology	• Atopy: allergic rhinitis, conjunctivitis • Angioedema of the airway

Chapter 8. Hematologic Disorders

Main Topics

8.1	Blood Transfusion
8.2	Hemostatic Disorders
8.3	Lymphomas
8.4	Pancytopenia
8.5	Red Blood Cell Disorders
8.6	White Blood Cell Disorders
8.7	Oncologic Emergencies

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
8.1	Blood Transfusion	2
8.1.1	Complications	3
8.2	Hemostatic Disorders	2
1.3.7	Bleeding	3
8.2.1	Coagulation defects	2
8.2.1.1	Acquired	2
8.2.1.2	Haemophilias	2
8.2.2	Disseminated intravascular coagulation	3
8.2.3	Platelet disorders	2
8.2.3.1	Thrombocytopenia	3
8.2.3.2	Idiopathic thrombocytopenic purpura	2
8.2.3.3	Thrombotic Thrombocytopenic Purpura	2
8.3	**Lymphomas**	2
1.3.31	Lymphadenopathy	2
8.4	Pancytopenia	3
8.5	**Red Blood Cell Disorders**	
8.5.1	Anaemias	3
8.5.1.1	Aplastic	2
8.5.1.2	Haemoglobinopathies	2
8.5.1.2.1	Sickle cell disease	1
8.5.1.3	Hemolytic	3
8.5.1.4	Hypochromic	2
8.5.1.4.1	Iron deficiency	3
8.5.1.5	Megaloblastic	3
8.5.2	Polycythemia	2
8.5.3	Methaemoglobinaemia (See 17.1.29 Toxicology)	2
8.6	**White Blood Cell Disorders**	
8.6.1	Leukemia	2
8.6.2	Multiple myeloma	2
8.6.3	Leukopenia	2

8.7	**Oncologic Emergencies** • Causes of oncologic emergencies, their presentation, relevant investigations, acute management • Use of isolation • Use of antibiotics • When can patients with fever be discharged from ED • Acute management of cord compression • Problems associated with oncology patients, porta cath pain management, active resuscitation vs palliative, social discharge, JCI - care of terminally ill & dying patients, survivor risk • Post-radiation complications • Update on latest guidelines	3
8.7.1	Febrile Neutropenia	3
8.7.2	Hypercalcemia of malignancy	3
8.7.3	Hyperviscosity Syndrome	3
8.7.4	Malignant Pericardial Effusion	3
8.7.5	Spinal Cord Compression (See 12.10)	3
8.7.6	Superior Vena Cava syndrome	3
8.7.7	Tumour Haemorrhage	3
8.7.8	Tumour Lysis Syndrome	3
8.2.1.1, 8.1 8.5.1.3	*Coagulopathy of trauma and massive transfusion protocol *Masterclass in FBC and PBF interpretation *Hemolytic crisis management *Emergencies related to immunotherapy and common targeted cancer therapy	3

Applied Basic Science

Anatomy and Histology	Development of bone marrow cells into formed elements • Erythrocytes (RBC) • Granulocytes and monocytes • Lymphocytes and lymphoid organs
Biochemistry	• Haemoglobin affinity for and binding to oxygen • Hemostasis and thrombosis (see Cardiovascular Disorders) • Coagulation cascade • Anti-clotting mechanisms/fibrinolysis
Physiology	• RBC, platelet and white blood cell production, circulation, function and senescence • Haemoglobin synthesis and catabolism • Polypeptide chains in haemoglobin variants • Coagulation factors production, circulation, function and senescence
Pathology (and Histopathology)	• Erythrocytosis and polycythemia • Leukemia • Myeloproliferative disorders • Lymphoproliferative disorders • Plasma cell dyscrasia: multiple myeloma

Pathophysiology	• RBC and haemoglobin disorders and dysfunction:
	  ○ Anaemia: loss, lysis, reduced production
	  ○ Polycythemia
	  ○ Haemoglobinopathies
	  ○ Thalassemias
	• Abnormal oxygen binding to haemoglobin
	• Thrombocytopenia and platelet dysfunction

	• Bone marrow dysfunction • Clotting disorder/coagulopathy: congenital and acquired • Common complications of hematopoietic neoplasms
Pharmacology	• Rh immune globulin • Common drugs to avoid in G6PD deficiency • Antiplatelet • Anticoagulant • Thrombolytic • Blood and blood components • Prothrombin complex concentrate • Common complications of chemotherapy
Genetics / Immunology	• The ABO system • Transfusion reaction • The Rhesus system

Chapter 9. Immune System Disorders

Main Topics

9.1	Collagen Vascular Disease
9.2	Hypersensitivity
9.3	Transplant-related Problems
9.4	Immune Complex Disorders
9.5	Medication-induced Immunosuppression

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.20	Fatigue/Malaise (Under 1.3 General)	3
1.3.28	Lethargy (Under 1.3, General)	3
9.1	**Collagen Vascular Disease**	
9.1.1	Raynaud's disease	2
9.1.2	Reactive arthritis (See 11.3.1.6)	2
9.1.3	Rheumatoid arthritis (See 11.3.1.3)	2
9.1.4	Scleroderma	2
9.1.5	Systemic lupus erythematosus (SLE)	2
9.1.6	Vasculitis	2
9.2	**Hypersensitivity**	
9.2.1	Allergic reaction	3
9.2.2	Anaphylaxis	3
9.2.3	Angioedema	3
9.2.4	Drug allergies	3
9.3	**Transplant-related Problems**	
9.3.1	Immunosuppression	2
9.3.2	Rejection	1
9.4	**Immune Complex Disorders**	
9.4.1	Mucocutaneous lymph node syndrome (Kawasaki	1
9.4.2	Rheumatic fever	2
9.4.3	Sarcoidosis	1
9.4.4	Post-streptococcal glomerulonephritis (See 15.3.1)	2
9.5	**Medication-induced Immunosuppression**	
9.5.1	Chemotherapeutic agents	2
9.5.2	Steroids	3
9.5.3	Targeted immune modulators	2

Applied Basic Science

Anatomy and Histology	• Hematopoietic system: development of myeloblast, monoblast, lymphoblast • Primary lymphoid organs: bone marrow, thymus • Secondary lymphoid organs: lymph node, spleen, mucosa-associated lymphoid tissues (MALT) • Lymph drainage

Biochemistry	• Innate immunity
	  ○ Cytokines, complement system, adhesion molecules
	• Adaptive immunity
	  ○ Antigen receptors for T and B cells
	  ○ Immunoglobulin: structure, types and function

Microbiology	Micro-organisms related to: • Rheumatic fever and post-streptococcal glomerulonephritis

	• Infections in asplenic state / functional asplenia: *S pneumonia, H influenza, N meningitides*
	• Infections in immunosuppressed host: Gram-negatives, encapsulated Gram positives, herpes zoster, opportunistic micro-organisms
	• Infections in T-cell defect/impaired cell-mediated immunity:
	  ○ Bacteria: *Listeria, Salmonella, Legionella, Norcardia*
	  ○ Mycobacteria: TB and others
	  ○ Fungi: *Pneumocystis jiroveci, Cryptococcus, Histoplasma capsulatum, Coccidiodes*
	  ○ Parasites: *Toxoplasmosis, Strongyloides*
	  ○ Virus: CMV, VZV, HSV
	• Reactive arthritis: *Chlamydia, Salmonella, Shigella, Yersinia, Campylobacter*
	• Transplant:
	  ○ 1st month: (i) surgical and site infections and (ii) healthcare-associated infections
	  ○ 1-6 months: (i) immuno-modulating viruses, e.g. CMV, Hep B and C, BK polymyxoma, EBV etc. and (ii) opportunistic infections, e.g. *Pneumocystis jiroveci, Listeria,* fungi
	  ○ 6 months or later:
	  ▪ Healthy transplant: community-acquired infections
	  ▪ Chronic viral infection: hepatitis (associated with hepatocellular carcinoma), EBV (associated with lymphoproliferative diseases), VZV, HSV etc.
	  ▪ Chronic rejection: fungi (*Pneumocystis jiroveci, Candida, Cryptococcus),* bacteria (*Listeria, Norcardia, mycobacteria),* parasites (*Toxoplasmosis, Strongyloides)*

Physiology	• Innate immunity:
	  ○ Inflammatory response
	  ○ Phagocytosis
	• Adaptive immunity:
	  ○ Humoral immune response, antibody formation
	  ○ Cellular immune response, T lymphocyte action
	  ○ Thymic education and self-tolerance
	  ○ Immunologic memory
	• Vaccination

Pathology (and Histopathology)	• Innate Immunity
	  ○ Types and function of effector cells
	  ○ Neutrophil and macrophage response to infection
	  ○ Role of dendritic cell
	• Adaptive immunity
	  ○ Role of T cell and B cell
	• Joint inflammation: osteonecrosis, bursitis, enthesopathy, myositis, synovitis

Pathophysiology	• Failure of the immune system / abnormal immune response:
	  ○ Hypersensitivity: types and mechanism
	  ○ Autoimmunity:
	  ▪ General mechanisms
	  ▪ Systemic Lupus Erythematosus
	  ▪ Systemic sclerosis (scleroderma)
	  ▪ Raynaud's Disease
	  ▪ Vasculitis
	  ○ Immunodeficiency:
	  ▪ Congenital: B-cell disorders, T-cell disorders, combined disorders

	▪ Acquired: HIV and AIDS o Immune complex disorders: ▪ Kawasaki syndrome ▪ Post-streptococcal glomerulonephritis o Complement system disorders: ▪ Hereditary angioedema ▪ Paroxysmal nocturnal haemoglobinuria • Transplant: transplant rejection, graft-versus-host reaction
Pharmacology	• Anaphylaxis management: adrenaline, steroid, antihistamine • Antihistamines: H_1 receptor antagonists • Glucocorticoids • Traditional DMARDs: o Cyclophosphamide o Methotrexate o Azathioprine o Cyclosporine o Tacrolimus o Mycophenolate o Leflunomide o Sulfasalazine o Hydroxychloroquine • Biologics[1]: o Anti-cytokine/anti-tumour necrosis factor (TNF) – Etanercept, Infliximab, o B-cell depletors or inhibitors - Rituximab • Vaccine types: live attenuated, inactivated, toxoid, subunit/recombinant/polysaccharide/conjugate • SLE-inducing drugs: hydralazine, procainamide
Genetics / Immunology	• Syndromes association with HLA-B27 • Anti-phospholipid antibodies in SLE
Others	• Singapore immunization schedule • Vaccination for asplenic patients

[1] Biologics nomenclature — Abbreviations placed at the ends of the names convey specific information relating to their structure:

●"-cept" refers to fusion of a receptor to the Fc part of human immunoglobulin G1 (IgG1)

●"-mab" indicates a monoclonal antibody (mAb)

●"-ximab" indicates a chimeric mAb i.e. an antibody made by fusing antigen binding region of one animal species e.g. mouse with the effector domain from another species e.g. rabbit

●"-zumab" indicates a humanized mAb i.e. antibody made in the laboratory by combining a human antibody with a small part of a mouse or rat monoclonal antibody

●"-umab" indicates a fully human mAb

Chapter 10. Systemic Infectious Disorders

Main Topics

10.1	Bacterial
10.2	Biological Warfare Agents
10.3	Fungal Infections
10.4	Protozoan/Parasites
10.5	Tick-Borne
10.6	Viral
10.7	Emerging Infections/Pandemics
10.8	Drug Resistance

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
10.1	**Bacterial**	
10.1.1	Bacterial food poisoning	2
10.1.1.1	Botulism	1
10.1.2	Chlamydia	2
10.1.3	Gonococcus	3
10.1.4	Meningococcus	3
10.1.5	Mycobacterium	1
10.1.5.1	Atypical mycobacteria	3
10.1.5.2	Tuberculosis (TB)	3
10.1.6	Other bacterial diseases	2
10.1.6.1	Gas gangrene (See 11.6.3)	3
10.1.7	Sepsis/Bacteremia	3
10.1.7.1	Shock	3
10.1.7.2	Toxic shock syndrome	3
10.1.8	Spirochetes	2
10.1.8.1	Syphilis	2
10.1.9	Tetanus	2
10.2	Biological Warfare Agents	2
10.3	**Fungal Infections**	2
10.4	**Protozoan/Parasites**	
10.4.1	Malaria	3
10.4.2	Toxoplasmosis	2
10.5	**Tick-Borne**	
10.5.1	Ehrlichiosis	1
10.5.2	Lyme disease	1
10.6	**Viral**	
10.6.0(SG)	For Singapore: Dengue fever	3
10.6.1	Infectious mononucleosis	2
10.6.2	Influenza/Parainfluenza	2
10.6.3	Hantavirus	1
10.6.4	Herpes simplex (See 4.4.4.3, 13.1.3.1)	2
10.6.5	Herpes zoster/Varicella (See 4.4.4.4)	2
10.6.6	HIV/AIDS	2
10.6.7	Rabies	2
10.6.8	Roseola (See 4.4.4.2)	2
10.6.9	Rubella (See 4.4.4.2)	2

EM Model	Topic	Code
10.7	Emerging Infections/Pandemics	2
10.8	Drug Resistance	1

Applied Basic Science

Anatomy and Histology	• Central nervous system: brain, meninges • Head and neck: eye, ear, nose, oropharynx/throat • Respiratory tract: airways, lungs • Cardiac: pericardium, myocardium, endocardium • Gastrointestinal tract: oesophagus, liver, gallbladder/biliary tract, stomach, small bowel, large bowel, rectum and anus • Genitourinary tract: female genital tract, male genital tract, urinary tract • Skin and soft tissue • Musculoskeletal: joints, long bones, spine
Biochemistry	• Microbe-host interaction
Microbiology	• Bacteria o Gram-positive organisms: Staphylococci, Streptococci, Enterococci, Bacillus, Corynebacterium, Listeria, Nocardia o Gram-negative organisms: Neisseria, Moraxella, Acinetobacter, E. coli, Shigella, Salmonella, Citrobacter, Klebsiella, Enterobacter, Serratia, Morgenella, Yersinia, Pseudomonas, Burkholderia, Haemophilus, Brucella, Bordetella, Pasturella, Vibrio, Campylobacter o Anaerobes: Clostridium, Actinomyces, Bacteroides o Obligate intracellular bacteria: Chlamydia, Coxiella, Bartonella, Ehrlichia, Rickettsia, Legionella, Mycoplasma o Mycobacteria o Spirochetes: Treponema, Leptospira, Borrelia • Viruses o Human herpes viruses: HSV1, HSV2, VZV, EBV, CMV, Roseola, HHV7, Kaposi sarcoma o Influenza/Parainfluenza o Coronavirus: SARS-CoV, SARS-CoV-2, MERS-CoV o Paramyxoviruses: measles, mumps o Adenovirus o Rotavirus o Enterovirus o Hepatitis o Human papilloma virus o Retroviruses: HIV o Rhabdovirus: rabies o Rubivirus: rubella o Flavivirus: dengue o Poxvirus: molluscum contagiosum, small pox, monkey pox o Viral haemorrhagic fevers: yellow fever, Lassa fever, ebola • Fungi o Dermatophytes: trichophyton, microsporum, Epidermophyton o Aspergillus o Blastomycosis o Candida o Coccidioides o Cryptococcus o Histoplasma o Pneumocystis jirovecii o Sporothrix

	• Parasites/Protozoan
	  ○ Malaria
	  ○ Toxoplasmosis
	• Micro-organisms causing infections in T-cell defects/impaired cell-mediated immunity:
	  ○ Bacteria: *Listeria, Salmonella, Legionella, Norcardia*
	  ○ Mycobacteria: TB and others
	  ○ Fungi: *Pneumocystis jiroveci, Cryptococcus, Histoplasma capsulatum, Coccidiodes*
	  ○ Parasites: *Toxoplasmosis, Strongyloides*
	  ○ Virus: CMV, VZV, HSV

Physiology	• Normal immune response
	  ○ Innate response
	  ○ Adaptive response

Pathology (and Histopathology)	• CNS: Encephalitis, brain abscess, meningitis • Head and neck: neck space infections, sinusitis, rhinitis, pharyngitis, otitis externa/media, conjunctivitis, keratitis, peri-orbital/orbital cellulitis, ophthalmitis • Respiratory tract: laryngitis, laryngotracheitis (croup), bronchiolitis, bronchitis, pneumonia, empyema • Cardiac: pericarditis, myocarditis, endocarditis • GIT: oesophagitis, hepatitis, liver abscess, cholecystitis, cholangitis, gastroenteritis, colitis, perianal abscess • Genitourinary tract: vaginitis/vulvovaginitis, cervicitis, pelvic inflammatory disease, urethritis, epididymitis, orchitis, cystitis, pyelonephritis, renal abscess • Skin and soft tissue: Erysipelas, impetigo, cellulitis, abscess, necrotizing fasciitis, gas gangrene, herpetic infections • MSK: septic arthritis, osteomyelitis, epidural abscess
Pathophysiology	• Sepsis and septic shock: dysregulated host response • Drug resistance

Pharmacology	• Antimicrobials
	  ○ Penicillins
	  ○ Cephalosporins
	  ○ Macrolides
	  ○ Fluoroquinolones
	  ○ Aminoglycosides
	  ○ Carbapenems
	  ○ Sulphonamides
	  ○ Others: vancomycin, linezolid, polymyxins
	• Antivirals
	• Antifungals
	• Common anti-helminthics
	• Vaccines
	• Immuno/Chemoprophylaxis
	  ○ Malaria prophylaxis
	  ○ Post-exposure rabies prophylaxis
	  ○ Post-exposure HIV prophylaxis

Genetics / Immunology	• Immunodeficiency / Immunosuppression: see Chapter 10

Data Interpretation	• Imaging
	  ○ Chest x-ray abnormalities in HIV/AIDS patient
	  ○ CT / MRI brain abnormalities in HIV/AIDS patient

Others	• Biological warfare agents
	  ○ Anthrax
	  ○ Botulinum toxin
	  ○ Smallpox
	  ○ Ebola
	  ○ Plague
	  ○ Francisella tularensis
	  ○ Arenaviruses
	• Evolving concepts of early goal-directed therapy for sepsis
	• Principles of infection control, personal protection and exposure management

Chapter 11. Musculoskeletal Disorders (Non-Traumatic)

Main Topics

11.1	Bony Abnormalities
11.2	Disorders of the Spine
11.3	Joint Abnormalities
11.4	Muscle Abnormalities
11.5	Overuse Syndromes
11.6	Soft Tissue Infections

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.2.7	Neck & Back pain (See General 1.2 Pain)	3
1.3.27	Joint swelling (See General)	3
11.1	**Bony Abnormalities**	
11.1.1	Aseptic/Avascular necrosis	2
11.1.2	Osteomyelitis	2
11.1.3	Tumours	2
11.2	**Disorders of the Spine**	
11.2.1	Disc disorders	2
11.2.2	Inflammatory/Infectious spondylopathies	2
11.2.3	Radiculopathy (See 12.7.3)	3
11.2.4	Spinal stenosis	2
11.2.5	Cervical pain	3
11.2.6	Thoracic pain	3
11.2.7	Lumbosacral pain	3
11.2.7.1	Cauda equina syndrome (See 18.1.15.1)	3
11.2.7.2	Sacroiliitis	1
11.2.7.3	Sciatica	3
11.2.7.8	Discitis	2
11.3	**Joint Abnormalities**	
11.3.1	Arthritis	3
11.3.1.1	Septic	3
11.3.1.2	Crystal arthropathies	3
11.3.1.3	Rheumatoid (See 9.1.3)	3
11.3.1.4	Juvenile	2
11.3.1.5	Osteoarthrosis	3
11.3.1.6	Reactive arthritis (See 9.1.2)	2
11.3.2	Developmental dysplasia of the hip	1
11.3.3	Slipped capital femoral epiphysis	2
11.4	**Muscle Abnormalities**	
11.4.1	Myositis	1
11.4.2	Rhabdomyolysis	3
11.5	**Overuse Syndromes**	
11.5.1	Bursitis	2
11.5.2	Muscle strains	2
11.5.3	Peripheral nerve syndrome	2
11.5.3.1	Carpal tunnel syndrome	2
11.5.4	Tendinopathy	2
11.5.5	Stress reaction fracture	3

EM Model	Topic	Code
11.6	Soft Tissue Infections	
11.6.1	Fasciitis	3
11.6.2	Felon	2
11.6.3	Gangrene (See 10.1.6.1)	3
11.6.4	Paronychia	3

Applied Basic Science

Anatomy and Histology	• Bones, joints, cartilage, muscles, tendons, ligaments, connective tissue, blood and nerve supply of the spine, pelvis, upper and lower limbs
	• Structure of a short and long bone, including the epiphysis, blood and nerve supply
	• Structure of the vertebral column:
	  ○ Features of the different parts of the vertebral column, i.e. cervical, thoracic and lumbosacral spine
	  ○ Features of the spinal canal
	  ○ Nervous output from the spine
	• Structure of larger synovial joints of the limbs, including articular surfaces, capsule, supporting ligaments, tendons, blood and nerve supply
	• Structure of smaller joints of the wrists, hands, feet and between vertebrae, as well as their blood and nerve supply
	• Histological features of a synovial joint
	• Muscles of the larger synovial joints of the limbs
	• Muscles of the smaller joints of the wrists, hands and feet

Biochemistry	• Extra-cellular composition of bones, cartilage and muscles • Extra-cellular composition of synovial fluid

Microbiology	• Microbiology of key infections
	  • Cellulitis
	  • Necrotizing fasciitis
	  • Gangrene
	  • Abscesses
	  • Tenosynovitis
	  • Infected open fractures
	  • Osteomyelitis
	  • Infected prostheses and implants
	• Pathophysiology of different types of arthritis: inflammatory-infectious, degenerative and metabolic

Physiology	• Mechanics of the bones, cartilage, muscles and tendon involved in joint function • Bone growth, modelling and re-modelling • Phases of wound healing

Pathology (and Histopathology)	• Childhood and adolescent disorders: congenital hip dislocation, slipped capital femoral epiphysis
	• Joints: septic, crystal and other inflammatory/reactive arthropathies, osteoarthritis
	• Spine disorders comprising
	  ○ Infective: osteomyelitis, discitis
	  ○ Inflammatory spondylopathies
	  ○ Degenerative: prolapsed intervertebral disc, spinal canal stenosis, cauda equina syndrome, chronic spinal pain syndromes, radiculopathy and sciatica

	• Repetitive stress injuries comprising
	  ○ Bursitis
	  ○ Tendinitis and tenosynovitis
	  ○ Muscle strains
	  ○ Carpal tunnel syndrome
	  ○ Stress fractures
	• Avascular osteonecrosis
	• Bone tumours: benign vs malignant - primary and secondary

Pathophysiology	• Inflammation in soft tissue, cartilage, joint and bone • Overuse with repetitive stress and overloading of joints, bones and synovial sheaths • Degeneration in cartilage, joint and bone • Nerve entrapment • Disruption of blood supply: acute and chronic • Osteoporosis
Pharmacology	• Analgesics • Anti-inflammatory: steroids and non-steroidal • Common disease-modifying antirheumatic drugs (DMARDs) for inflammatory arthropathies like rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis and systemic lupus erythematosus • Antimicrobials for soft tissue, joint, bone, wet gangrene and tuberculosis involving the musculoskeletal system • Anti-osteoporotic drugs
Genetics / Immunology	• Genetics: HLA B27 associated inflammatory arthropathies (ankylosing spondylitis, Reiter's syndrome and psoriatic arthritis) • Immunology: rheumatoid arthritis, juvenile rheumatoid arthritis, psoriatic arthritis
Imaging	• X-rays: special views of certain joints and bones • Indications for CT and/or MRI in MSK disorders
Data interpretation	• Synovial fluid analysis for joint effusion
Others	• Epidemiology of osteoarthritis, rheumatoid arthritis and osteoporosis

Chapter 12. Nervous System Disorders

Main Topics

12.1	Cranial Nerve Disorders
12.2	Demyelinating Disorders
12.3	Headache
12.4	Hydrocephalus
12.5	Infections/Inflammatory Disorders
12.6	Movement Disorders
12.7	Neuromuscular Disorders
12.8	Other Conditions of the Brain
12.9	Seizure Disorders
12.10	Spinal Cord Compression
12.11	Stroke
12.12	Transient Cerebral Ischemia
12.13	Tumours
12.14	Delirium

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
12.1	Cranial Nerve Disorders	
12.1.1	Idiopathic facial nerve paralysis (Bell's palsy)	3
12.1.2	Trigeminal neuralgia	2
12.2	Demyelinating Disorders	
12.2.1	Multiple sclerosis	2
12.3	Headache with red flags (See 1.2.2)	
12.3.1	Primary headache syndromes (tension, cluster etc.)	3
12.3.2	Vascular	3
12.4	Hydrocephalus	
12.4.1	Normal pressure	2
12.4.2	VP shunt with complications	2
12.5	**Infections/Inflammatory Disorders**	
12.5.1	Encephalitis	2
12.5.2	Intracranial and intraspinal abscess	3
12.5.3	Meningitis	3
12.5.3.1	Bacterial	3
12.5.3.2	Viral	2
12.5.3.3	Fungal	1
12.5.4	Acute flaccid myelitis/transverse myelitis	2
12.5.5	Neuritis	2
1.3.5	Ataxia (under 1.3 General)	3
1.3.48	Tremor (under 1.3 General)	3
1.3.29	Light-headedness/Dizziness (under 1.3 General)	3
1.3.37	Paresthesia/Dysesthesia (under 1.3 General)	3
12.6	**Movement Disorders**	
12.6.1	Dystonic reaction	2
12.6.2	Chorea/Choreiform	2
12.6.3	Tardive dyskinesia	2
12.7	**Neuromuscular Disorders**	
12.7.1	Guillain-Barré syndrome	2
12.7.2	Myasthenia gravis	3

12.7.3	Peripheral neuropathy	2
12.8	Other Conditions of the Brain	
12.8.1	Dementia (See 14.5.3)	2
12.8.2	Parkinson's disease	3
12.8.3	Idiopathic intracranial hypertension	1
12.8.4	Cerebral venous sinus thrombosis	2
12.8.5	Posterior reversible encephalopathy syndrome (PRES)	2
12.8.6	Transient global amnesia	1
12.9	**Seizure Disorders**	
12.9.1	Epileptiform	3
12.9.1.1	Neonatal	3
12.9.1.2	Febrile	3
12.9.1.3	Status epilepticus	3
12.9.1.4	Nonconvulsive	2
12.9.1.5	Drug-induced	2
12.9.2	Seizure mimics	3
12.10	Spinal Cord Compression/weakness/paralysis	3
12.11	Stroke	3
12.11.1	Haemorrhagic	3
12.11.1.1	Intracerebral	3
12.11.1.2	Subarachnoid	3
12.11.2	Ischemic	3
12.11.2.1	Embolic	3
12.11.2.2	Thrombotic	3
12.12	Transient Cerebral Ischemia	3
12.13	Tumours	2
12.14	Delirium / Altered mental status	3
12.14.1	Excited delirium syndrome	2
12.11, 12.12	• Stroke mimics • Investigation and management options for different stroke presentations: acute stroke, wake-up stroke etc. • Controversies in the management of TIA • Posterior circulation stroke • Malignant infarct	3

Applied Basic Science

Anatomy and Histology	• The functional unit of the nervous system: neuron, specificity, size and type of each group of neurons • The basic structure of the neuron • Components of the nervous system and cell types: Neuron, muscle fibre, motor unit Neurotransmitters Brain: cerebral cortex, cranial nerves, cerebellum, spinal cord Motor system, sensory system, balance system • Blood supply brain and spinal cord: arterial and venous • Skull and vertebral column in relation to the brain, spinal cord and nerve roots • Meninges and cerebrospinal fluid • Blood brain barrier • Anatomy: Circle of Willis

Biochemistry	Neurotransmitters: acetylcholine, adrenaline, 5-hydroxytryptamine, GABA, opioid, peptides, prostaglandins, histamine, dopamine, glutamate
Microbiology	Microbiological agents (bacteria, viruses and fungal) causing neurological infections: meningitis, encephalitis, brain and spinal abscesses in: • Immuno-competent adults • Immunocompromised host
Physiology	• Brain and roles of the different zones in the brain • Key cranial nerves and actions • Motor unit and motor system • Sensory unit and sensory system • Balance and gait

Pathology (and Histopathology)	• Demyelination
	• Increased intracranial pressure and cerebral oedema
	• Circulatory disturbances:
	  ○ Hypoxia, cerebral infarction and stroke territories
	  ○ Intracranial haemorrhage with resultant cerebral oedema, hydrocephalus
	• Ageing, atrophy/degenerative changes, dementia, Parkinson's disease and chorea
	• Tumours

Pathophysiology	• Infection and inflammation • Seizures and epilepsy • Encephalopathy • Disorders of motor pathways: motor neuron disease, upper vs lower motor neuron disorders • Disorders of sensory pathways • Mixed motor and sensory disorders: syringomyelia, vitamin B12 deficiency, Friederich's ataxia • Neuropathy • Common developmental anomalies
Pharmacology	• Antimicrobials and chemoprophylaxis for meningococcal infection • Anticonvulsants: acute and long-term, reversal • Sedatives • Analgesics and gabapentin • Medications for Parkinson's disease, acute dystonia and EPSE of antipsychotic medication • Medications for dementia
Genetics / Immunology	• Alzheimer's Dementia • Parkinson's disease • Motor neuron disease • Myasthenia gravis
Others	Epidemiology of stroke
Imaging	• Neuroimaging: See R4-5 Neuroimaging
Data interpretation	CSF FEME
Assessment tools	• F.A.S.T. • NIH Stroke Scale (NIHSS) • E-NIHSS score for Posterior circulation stroke assessment

Chapter 13. Obstetrics And Gynaecology

Main Topics

13.1	Female Genital Tract
13.2	Normal Pregnancy
13.3	Complications of Pregnancy
13.4	High-risk Pregnancy
13.5	Normal Labour and Delivery
13.6	Complications of Labour
13.7	Complications of Delivery
13.8	Postpartum Complications
13.9	Contraception
18.2	Trauma in Pregnancy

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.2.6	Pelvic & genital pain (under 1.2 Pain)	3
1.3.15	Dysmenorrhea (under 1.3 General)	2
1.3.51	Vaginal bleeding (under 1.3 General)	3
1.3.52	Vaginal discharge (under 1.3 General)	2
13.1	**Female Genital Tract**	
13.1.1	**Cervix**	
13.1.1.1	Cervicitis and endocervicitis	2
13.1.1.2	Tumours	1
13.1.2	**Infectious disorders**	
13.1.2.1	Pelvic inflammatory disease	3
13.1.2.1.1	Fitz-Hugh-Curtis syndromes	1
13.1.2.1.2	Tuboovarian abscess	2
13.1.2.2	Urethritis	2
13.1.3	**Lesions**	
13.1.3.1	Herpes simplex (See 4.4.4.3, 10.6.4)	2
13.1.3.2	Human papillomavirus (HPV) (See 4.4.4.5)	1
13.1.4	Ovary	2
13.1.4.1	Cyst	2
13.1.4.2	Torsion	2
13.1.4.3	Tumours	1
13.1.5	**Uterus**	
13.1.5.1	Abnormal bleeding	2
13.1.5.2	Endometriosis	2
13.1.5.3	Prolapse	2
13.1.5.4	Tumours	1
13.1.5.4.1	Gestational trophoblastic disease	1
13.1.5.4.2	Leiomyoma	2
13.1.6	**Vagina and vulva**	
13.1.6.1	Bartholin’s cyst	1
13.1.6.2	Foreign body	1
13.1.6.3	Vaginitis/Vulvovaginitis	2
13.2	**Normal Pregnancy**	1
13.3	**Complications of Pregnancy**	
13.3.1	Abortion	2
13.3.2	Ectopic pregnancy	3

13.3.3	Hemolysis, elevated liver enzymes, low platelets (HELLP)	2
13.3.4	Haemorrhage, antepartum	3
13.3.4.1	Abruptio placentae (See 18.2.1)	3
13.3.4.2	Placenta previa	3
13.3.5	Hyperemesis gravidarum	2
13.3.6	Gestational hypertension	2
13.3.6.1	Eclampsia	3
13.3.6.2	Preeclampsia	3
13.3.7	Infections	2
13.3.8	Rh iso-immunization	2
13.3.9	First trimester bleeding	2
13.3.10	Gestational diabetes	2
EMCC 1-3	**OBGYN 3**	
13.4	High-risk Pregnancy	1
13.4.1	Assisted reproductive therapies	1
13.4.2	Pre-existing medical problems	2
13.5	Normal Labour and Delivery	1
13.6	**Complications of Labour**	
13.6.1	Fetal distress	2
13.6.2	Premature labour (See 18.2.3)	2
13.6.3	Premature rupture of membranes	2
13.6.4	Rupture of the uterus (See 18.2.4)	2
13.7	**Complications of Delivery**	
13.7.1	Malposition of fetus	2
13.7.2	Nuchal cord	2
13.7.3	Prolapse of cord	2
13.8	**Postpartum Complications**	
13.8.1	Endometritis	2
13.8.2	Haemorrhage	3
13.8.3	Mastitis	2
13.8.4	Pituitary infarction	2
13.8.5	Amniotic fluid embolism	2
13.9	**Contraception**	1

Applied Basic Science

Anatomy and Histology	• External genitalia: labia majora and minora, urethral opening
	• Vagina: fornices, layers of episiotomy: vaginal epithelium, transverse perineal muscle, bulbospongiosus muscle, perineal skin
	• Cervix: ectocervix, endocervix and cell types; external os, cervical canal, internal os; pap smear
	• Uterus
	  ○ Uterine changes and size estimation corresponding to gestational age
	  ○ Common sites for ectopic pregnancy
	• Parts, layers
	• Position
	• Size estimation corresponding to gestational age
	• Gravid uterus and placenta
	• Ovary: cell types: stages of ovum and follicle, blood supplies
	• Fallopian tubes: parts

	• Rectouterine pouch/cul-de-sac of Douglas • Vesicouterine pouch • Pelvic outlet: fetal head presentations
Biochemistry	• Beta-HCG • Prolactin • Insulin and carbohydrate metabolism in pregnancy • Renin-aldosterone system changes in pregnancy • Acid-base changes in pregnancy • Kleihauser-Betke test , i.e. acid elution test
Microbiology	• Vulvovaginal infections: o Genital herpes: HSV 1 versus HSV 2 o Genital warts: HPV o Vulval ulcer: *Treponema palladium* o Bartholinitis: *E. coli*, staphylococcus, gonococcus o Vaginal discharges: trichomonas, candida, bacterial vaginosis • Pelvic inflammatory diseases: o Chlamydia o Gonococcus o Post-abortion: staphylococcus, streptococcus, *E. coli*, anaerobe • Pregnancy-related o Bacterial: group B streptococcus, gonorrhoea, syphilis, toxoplasmosis o Viral: rubella, herpes, hepatitis B, CMV, HIV, varicella
Physiology	• Menstrual cycle and hormones: Luteinizing hormone (LH), follicle-stimulating hormone (FSH), gonadotropin-releasing hormone (GnRH), estrogen, progesterone o Ovarian cycle o Uterine cycle • Conception, implantation and placental development • Changes in pregnancy o Cardiovascular: cardiac output, heart rate, blood pressure, venous pressure, ECG o Respiratory: minute ventilation and tidal volume o GI: gastric emptying, intestinal displacement o Renal: GFR, renal blood flow, serum creatinine and urea • Three stages of labour • Lactation and milk ejection reflex
Pathology (and Histopathology)	• Cervical intraepithelial neoplasia (CIN) and cervical cancer • Trophoblastic tumours o Hydatidiform mole o Invasive mole o Choriocarcinoma
Pathophysiology	• Endometriosis • Polycystic ovarian disease • Ectopic pregnancy • Gestational diabetes • Preeclampsia/eclampsia and HELLP syndrome • Antepartum haemorrhage • Post-partum haemorrhage • Sheehan syndrome, i.e. postpartum pituitary gland necrosis • Ovarian hyperstimulation syndrome (OHSS)
Pharmacology	• Progesterone in menorrhagia • Anti-emetics • Antihypertensives in pregnancy and eclampsia

	• Magnesium in preeclampsia/eclampsia
	• Analgesia in labour
	  o Entonox
	  o Narcotics
	  o Epidural
	• Tocolytics
	  o Terbutaline
	  o Nifedipine
	• Oxytocin
	• Anti-microbial therapy
	• Contraceptives
	• Anticoagulants in venous thromboembolic diseases in pregnancy
	• Common teratogens and agents with toxic effects on the newborn: anticonvulsants, warfarin, NSAIDS, sulfonamides, fluoroquinolones, ACE inhibitors, oral hypoglycemic agents etc.

Data interpretation	• Kleihauser-Betke test , i.e. acid elution test • Laboratory tests in HELLP syndrome • Cardiotocography (CTG)
Genetics / Immunology	• The Rhesus system and iso-immunization • HPV and cervical cancer

Chapter 14. Psychobehavioural Disorders

Main Topics

14.1	Substance Use Disorders
14.2	Mood Disorders and Thought Disorders
14.3	Factitious Disorders
14.4	Neurotic Disorders
14.5	Organic Psychoses
14.6	Patterns of Violence/Abuse/Neglect
14.7	Personality Disorders
14.8	Psychosomatic Disorders
14.9	Feeding and Eating Disorders

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
14.1	**Addictive Behaviour**	
14.1.1	Alcohol dependence	2
14.1.2	Drug dependence	2
14.1.3	Eating disorders	1
14.1.4	Substance abuse	1
14.1.5	Tobacco dependence	1
14.2	**Mood Disorders and Thought Disorders**	
14.2.1	Acute psychosis: include physical restraints and pharmacological agents	3
14.2.2	Bipolar disorder	2
14.2.3	Depression	2
14.2.3.1, 1.3.59	Suicidal risk / Suicide ideation	3
14.2.4	Grief reaction	1
14.2.5	Schizophrenia	1
14.3	**Factitious Disorders**	
14.3.1	Drug-diversion behaviour	2
14.3.2	Munchausen syndrome/Munchausen by proxy	2
14.4	**Neurotic Disorders**	
1.3.3	Anxiety	2
14.4.1	Anxiety/Panic	2
14.4.2	Obsessive-compulsive	1
14.4.3	Phobic	1
14.4.4	Post-traumatic stress	1
14.4.5	Insomnia	2
14.5	**Organic Psychoses**	
14.5.1	Chronic organic psychotic conditions	1
14.5.1.1	Alcoholic psychoses	3
14.5.1.2	Drug psychoses	2
14.5.2	Delirium	3
14.5.3	Dementia (See 12.8.1)	2
14.5.4, 1.3.61	Intoxication and/or withdrawal	3
14.5.4.1	Alcohol (See 17.1.2)	3
14.5.4.2	Hallucinogens (See 17.1.17)	2
14.5.4.3	Opioids (See 17.1.1.3)	3
14.5.4.4	Sedatives/Hypnotics/Anxiolytics (See 17.1.35)	3
14.5.4.5	Sympathomimetics and cocaine (See 17.1.36; 17.1.15)	3

EM Model	Topic	Code
14.5.4.6	Anticholinergic (See 17.1.4)	3
14.6	**Patterns of Violence/Abuse/Neglect**	
14.6.1	Interpersonal violence	2
14.6.1.1	Child, intimate partner, elder	2
14.6.2	Homicidal Risk	1
14.6.3	Sexual assault	1
14.6.4	Staff/Patient safety	2
14.7	**Personality Disorders**	**1**
14.8	**Psychosomatic Disorders**	
14.8.1	Hypochondriasis	1
14.8.2	Hysteria/Conversion	1

Applied Basic Science

Biochemistry	• Neurotransmitters related to
	  ○ Alcohol use and disorder
	  ○ Addiction
	  ○ Psychosis and schizophrenia
	  ○ Depression, bipolar and mood disorders, suicidality
	  ○ Anxiety disorders
	• Alcohol and aldehyde dehydrogenase

Pharmacology	• Antidepressants • Antipsychotics for the acute phase of psychosis and schizophrenia • Benzodiazepines • Mood stabilizers, lithium and medications for an acute manic episode • Other agents, e.g. anti-convulsants (See Nervous System Disorders), beta-blockers (see Cardiovascular Disorders)
Genetics / Immunology	Genetic overlap between bipolar disorder, major depressive disorder, anxiety disorders, schizophrenia etc.

Chapter 15. Renal and Urogenital Disorders

Main Topics

15.1	Acute and Chronic Renal Failure
15.2	Complications of Renal Dialysis
15.3	Glomerular Disorders
15.4	Infection
15.5	Male Genital Tract
15.6	Nephritis
15.7	Structural Disorders
15.8	Tumours

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.23	Hematuria (under 1.3 General)	3
1.3.2	Anuria / Oliguria (under 1.3 General)	3
1.3.18	Oedema (under 1.3 General)	3
15.1	Acute Renal Failure	3
15.1	Chronic Renal Failure	2
15.2	Complications of Haemo- and Peritoneal dialysis	2
15.3	Glomerular Disorders	
15.3.1	Glomerulonephritis (See 9.4.4)	2
15.3.2	Nephrotic syndrome	2
15.4	Infection	3
15.4.1	Cystitis	3
15.4.2	Pyelonephritis	3
15.4.3	Asymptomatic bacteriuria	1
1.3.17	Dysuria (under 1.3 General)	3
1.3.49	Urinary incontinence (under 1.3 General)	2
1.3.50	Urinary retention (under 1.3 General)	2
15.5	Male Genital Tract	
15.5.1	Genital lesions	2
15.5.2	Hernias	2
15.5.3	Inflammation/Infection	2
15.5.3.1	Balanitis/Balanoposthitis	2
15.5.3.2	Epididymitis/Orchitis	2
15.5.3.3	Gangrene of the scrotum (Fournier's gangrene)	3
15.5.3.4	Prostatitis	2
15.5.3.5	Urethritis	2
15.5.4	Structural	1
15.5.4.1	Paraphimosis/Phimosis	1
15.5.4.2	Priapism	2
15.5.4.2.1	Priapism: Medication-induced	1
15.5.4.3	Prostatic hypertrophy (BPH)	2
15.5.4.4	Torsion	3
15.5.5	Testicular masses	1
15.5.6	Tumours	1
15.5.6.1	Prostate	1
15.5.6.2	Testis	1
15.6	**Nephritis**	2
15.6.1	Hemolytic uremic syndrome	2

EM Model	Topic	Code
15.7	**Structural Disorders**	
15.7.1	Calculus of urinary tract	2
15.7.2	Obstructive uropathy	2
15.7.3	Polycystic kidney disease	2
15.8	**Tumours**	1

Applied Basic Science

Anatomy and Histology	• Adrenal Gland • Kidney: cortex, nephrons, tubules and loop, medulla, blood vessels; collecting system and pelvis • Ureter and bladder • Male urogenital tract • Inguinal canal and related structures
Biochemistry	• Renin-angiotensin-aldosterone system • Renal function, creatinine clearance, glomerular filtration • Urine volume and analysis • Specific types of the calculus of the urinary tract
Microbiology	Microorganisms related to • Genital lesions • Cystitis • Pyelonephritis • Asymptomatic bacteriuria • Balanitis/balanoposthitis • Epididymitis/orchitis • Gangrene of the scrotum (Fournier's gangrene) • Prostatitis • Urethritis • Vascular access infection and line sepsis in renal replacement therapy
Physiology	• Aldosterone secretion and its effect • Potassium homeostasis • Sodium and water homeostasis • Vitamin D, calcium and phosphate homeostasis, regulation and role of parathyroid hormone and calcitonin • Urine production and collection, bladder emptying and urinary continence
Pathology (and Histopathology)	• Hernias • Paraphimosis, phimosis, priapism • Benign prostatic hypertrophy • Testicular and appendix torsion, masses and tumours • Calculus of urinary tract, obstructive uropathy • Renal and urinary tract tumours • Polycystic kidney disease
Pathophysiology	• Hematuria • Proteinuria • Acute kidney injury, acute renal failure and complications • Chronic renal failure and complications • Renal dialysis / renal replacement therapy • Glomerular disorders: glomerulonephritis, nephrotic syndrome • Nephritis: hemolytic uremic syndrome • Calculus formation and passage • Urinary tract infection (UTI) and vesicoureteral reflux

	• Urinary incontinence • Urinary retention
Pharmacology	• Antimicrobials for: genital lesions, cystitis, uncomplicated pyelonephritis, complicated UTI etc. • Diuretics, mannitol • ADH agonist • Medications for chronic kidney disease and its complication: anaemia, mineral bone disease • Medications for benign prostatic hypertrophy • Nephrotoxic drugs and agents and mechanisms of toxicity
Genetics / Immunology	Polycystic kidney disease
Other	Epidemiology of UTI

Chapter 16. Thoracic-Respiratory Disorders

Main Topics

16.1	Acute Upper Airway Disorders
16.2	Disorders of Pleura, Mediastinum, and Chest Wall
16.3	Acute Respiratory Distress Syndrome
16.4	Obstructive/Restrictive Lung Disease
16.5	Physical and Chemical Irritants/Insults
16.6	Pulmonary Embolism/Infarct
16.7	Pulmonary Infections
16.8	Tumours (include breast tumour)
16.9	Pulmonary Hypertension

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.10	Cough	3
1.3.12	Cyanosis	3
16.1	Acute Upper Airway Disorders	
16.1.1	Infections	3
16.1.1.2	Epiglottitis (See 7.5.6.1)	3
16.1.2	Obstruction	3
16.1.3	Tracheostomy / Complications	2
1.3.24	Haemoptysis	3
1.3.43	Shortness of breath	3
16.2	Disorders of Pleura, Mediastinum, and Chest Wall	
16.2.1	Costochondritis	1
16.2.2	Mediastinitis	1
16.2.3	Pleural effusion	3
16.2.4	Pleuritis	2
16.2.5	Pneumomediastinum	2
16.2.6	Pneumothorax (See 18.1.2.7)	3
16.2.6.1	Simple	3
16.2.6.2	Tension	3
16.2.6.3	Open	3
16.2.7	Empyema	2
1.3.56	Wheezing	3
16.3	Acute Respiratory Distress Syndrome	2
16.4	Obstructive/Restrictive Lung Disease	
16.4.1	Asthma/Reactive airway disease	3
16.4.2	Bronchitis and bronchiolitis	3
16.4.3	Bronchopulmonary dysplasia	1
16.4.4	Chronic obstructive pulmonary disease	3
	Bronchiectasis	3
16.4.5	Cystic fibrosis	1
16.4.6	Environmental / Industrial Exposure	2
16.4.7	Foreign body	3
16.6	Pulmonary Embolism/Infarct	3
16.6.1	Septic emboli	2
16.6.2	Venous thromboembolism (See 3.3.2.1)	3
16.6.3	Fat emboli	2
16.7	Pulmonary Infections	

16.7.1	Lung abscess	2
16.7.2	Pneumonia	3
16.7.2.1	Aspiration	3
16.7.2.2	Community-acquired	3
16.7.2.3	Healthcare-associated	3
16.7.3	Pulmonary tuberculosis	3
16.7.4	Respiratory syncytial virus (RSV)	2
16.7.5	Pertussis	1
16.3	Noncardiogenic Pulmonary Oedema	3
16.5	Physical and Chemical Irritants/Insults	
16.5.1	Pneumoconiosis	1
16.5.2	Toxic effects of gases, fumes, and vapours (See	2
16.8	Tumours	
16.8.1	Breast	2
16.8.2	Pulmonary	2
16.9	Pulmonary Hypertension	2
19.1.5	Non-invasive ventilatory management* (see below)	3

Applied Basic Science

Anatomy and Histology	• Trachea, pharynx, larynx, tonsils, uvula, vallecula, epiglottis, vocal cords, glottic opening • Thoracic wall: ribs, sternum, thoracic apertures, muscles, diaphragm, neurovascular bundle • Pleura, thoracic cavity, costo-diaphragmatic recesses • Lungs, lobes, tracheobronchial tree, conducting and respiratory airway/bronchiole • Key cell types in bronchiole and alveolus • Pulmonary artery and circulation • Breast, lymph nodes
Biochemistry	• Hydrogen ion and bicarbonate buffer system • Gas exchange, oxygenation, removal of carbon dioxide • Arterial and venous blood gases • Respiratory component of acid-base balance
Microbiology	• Immune-competent host: o Community-acquired: typical vs atypical microorganisms o Aspiration related microorganisms o Healthcare-associated microorganisms o Microorganisms associated with structurally damaged lungs • Immunocompromised host: microorganisms associated with HIV and non-HIV host • Tuberculosis • Microorganisms associated with paediatric respiratory infections
Physiology	• Inspiration and expiration mechanics, compliance • Lung volumes and capacities: tidal volume, vital capacity, residual volume, functional residual capacity, peak flow • Airway resistance, surfactant, dead space • Bronchoconstriction and dilation and autonomic nervous system control • Ventilation and perfusion ratio
Pathology (and Histopathology)	• Tracheo-laryngo-bronchitis and bronchiolitis: viral infection, inflammation, mucus production, secondary bacterial infection, interstitial and alveolar injury

	• Pleural effusion: infective/inflammatory vs non-inflammatory (haemo-, hydro-, chylothorax) • Empyema/lung abscess: pathologic risk factors • Asthma: atopic vs non-atopic, TH2 and IgE response, eosinophil • COPD: oxidative stress, inflammation, protease-antiprotease imbalance, alveolar wall injury, mucus hyper-secretion • Bronchiectasis: bronchiole obstruction and destruction, infection and inflammation • Restrictive lung disorder: epithelial injury, interstitial pneumonia, fibrosis • Pulmonary infection: bronchopneumonia vs lobar pneumonia, inflammation • Pulmonary embolism / infarct: thrombophilia, embolisation, lung infarction • Breast tumour: common cell types, lymphatic drainage • Pulmonary tumour: primary vs secondary, common cell types, risk factors, SVC obstruction
Pathophysiology	• Atelectasis • Foreign body effects • Major airway airflow obstruction • Pneumothorax, pneumomediastinum: a breach in the aero-digestive tract, airflow, valve effect • Asthma: triggers, inflammation, bronchospasm and reversibility, infection • COPD: Primary insult, abnormal host response, recurrent inflammation and infection, alveolar destruction, small airway remodelling • Hypoxia, hypoxemia, hypercarbia, respiratory failure • Ventilation and perfusion mismatch • Virchow's triad, venous thromboembolism • Obstruction to pulmonary artery flow/circulation: acute and chronic

Pharmacology	• Oxygen
	• Bronchodilators, anti-inflammatory agents, magnesium sulfate
	• Antimicrobials for respiratory and pulmonary infections
	• Rapid Sequence Intubation medications:
	  ○ Sedatives, induction agents
	  ○ Muscle relaxants/Paralytics: depolarizing, non-depolarizing
	  ○ Dissociative agent

Genetics / Immunology	• Genetics: Breast cancer • Immunology: Asthma – atopy

Data Interpretation	• POCT
	  ○ ECG
	  ○ Blood gas (arterial or venous)
	• Imaging
	  ○ CXR, CT pulmonary angiogram, bedside ultrasound

Assessment tools	Asthma severity tools Pneumonia severity tools
Others	Epidemiology of asthma, COPD, breast cancer, lung cancer

Chapter 17. Toxicologic Disorders

Main Topics

Topics in grey are those that Singapore has de-emphasized

17.1.1	Alcohol
17.1.2	Analgesics
17.1.3	Anticholinergics
17.1.4	Anticoagulants/Antithrombotics
17.1.5	Anticonvulsants
17.1.6	Antidepressants
17.1.7	Antiemetics
17.1.8	Antimicrobials
17.1.9	Antipsychotics
17.1.10	Carbon monoxide
17.1.11	Cardiovascular drugs
17.1.12	Cholinergics
17.1.13	Cyanides, hydrogen sulfide
17.1.14	Heavy metals
17.1.15	Herbicides, insecticides, and rodenticides
17.1.16	Household/Industrial chemicals
17.1.17	Hypoglycemics/Insulin
17.1.18	Lithium
17.1.19	Local anaesthetics
17.1.20	Marine toxins
17.1.21	Methaemoglobinaemia
17.1.22	Mushrooms/Poisonous plants
17.1.23	Nutritional supplements
17.1.24	Recreational drugs
17.1.25	Sedatives/Hypnotics
17.1.26	Stimulants/Sympathomimetics

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
1.3.38	Poisoning (See 1.3 General)	3
1.3.34	Occupational exposure (See 1.3 General)	1
17.1	**Drug and Chemical Classes**	
17.1.1	Alcohol (See 14.5.4.1)	3
17.1.1.1	Ethanol	3
17.1.1.2	Glycol	1
17.1.1.3	Isopropyl	1
17.1.1.4	Methanol	1
17.1.2	Analgesics	3
17.1.2.1	Acetaminophen aka paracetamol	3
17.1.2.2	Nonsteroidal anti-inflammatories	2
17.1.2.3	Opiates and related narcotics (See 14.5.4.3)	3
17.1.2.4	Salicylates	2
17.1.3	Anticholinergics	3
17.1.3.1	Antihistamines	2
17.1.4	Anticoagulants/Antithrombotics	2
17.1.4.1	Direct thrombin inhibitors	2
17.1.4.2	Factor Xa inhibitors	3
17.1.4.3	Heparins	2

EM Model	Topic	Code
17.1.4.4	Vitamin K antagonists	3
17.1.5	Anticonvulsants	2
17.1.6	Antidepressants	2
17.1.6.1	Bupropion	2
17.1.6.2	Selective serotonin reuptake	2
17.1.6.3	Tricyclic antidepressants	3
17.1.7	Antiemetics	2
17.1.8	Antimicrobials	1
17.1.8.1	Antibiotics	1
17.1.8.1.1	Isoniazid	1
17.1.8.2	Antimalarials	1
17.1.8.3	Antiretrovirals	1
17.1.9	Antipsychotics	2
17.1.10	Carbon monoxide	2
17.1.11	Cardiovascular drugs	2
17.1.11.1	Antiarrhythmics	2
17.1.11.1.1	Digitalis	2
17.1.11.2	Antihypertensives	2
17.1.11.3	Beta-blockers	2
17.1.11.4	Calcium channel blockers	2
17.1.12	Cholinergics	1
17.1.12.1	Nerve agents	3
17.1.12.2	Organophosphates	3
17.1.13	Cyanides, hydrogen sulfide	2
17.1.14	Heavy metals	1
17.1.15	Herbicides, insecticides, and rodenticides	2
17.1.16	Household/Industrial chemicals	2
17.1.16.1	Caustic agents (See 2.2.2.3)	2
17.1.16.2	Hydrocarbons	2
17.1.16.3	Inhaled irritants	1
17.1.17	Hypoglycemics/Insulin	3
17.1.18	Lithium	1
17.1.19	Local anaesthetics	3
17.1.20	Marine toxins (See 6.1.3)	1
17.1.21	Methaemoglobinaemia (See 8.5.3)	2
17.1.22	Mushrooms/Poisonous plants	1
17.1.23	Nutritional supplements	1
17.1.23.1	Iron	2
17.1.23.2	Performance-enhancing and weight-loss drugs	2
17.1.24	Recreational drugs	2
17.1.24.1	Cannabis	2
17.1.24.1.1	Cannabinoid hyperemesis syndrome/cyclic vomiting	2
17.1.24.2	Synthetic cannabinoids	2
17.1.24.3	Hallucinogens	2
17.1.24.4	Gamma-hydroxybutyrate (GHB)	2
17.1.25	Sedatives/Hypnotics (See 14.5.4.4)	2
17.1.26	Stimulants/Sympathomimetics (See 14.5.4.5)	2
17.1.26.1	Amphetamines	2
17.1.26.2	Cocaine	2

EM Model	Topic	Code
17.1.27	Chemical warfare agents	2

Applied Basic Science

Anatomy and Histology	• Liver: structural organization • Kidney: functional anatomy
Biochemistry	• Hydrogen ion, bicarbonate and other buffer systems in the body • Arterial and venous blood gases • Respiratory tract gas exchange • Haemoglobin affinity for and binding to oxygen • Coagulation cascade and platelet aggregation • Biotransformation: cytochrome p450 • Neurotransmitters: acetylcholine, norepinephrine, epinephrine, dopamine, serotonin, GABA, glycine, glutamate, adenosine • Opioid receptors
Physiology	• Neurotransmission: membrane potentials, ion channel, nerve conduction • Cardiac electrophysiology: sodium, potassium, calcium channels, cardiac cycle, action potential • Circulation and vascular hemodynamics: autonomic system, adrenergic receptors, calcium channels and intracellular calcium-effects on contractility, volume status, systemic vascular resistance, cardiac output • Renin-angiotensin-aldosterone system • Gastrointestinal: pH regulation in the stomach, gastric emptying, enterohepatic circulation • Neurophysiology of micturition: autonomic and somatic innervation, physiology of bladder filling and micturition
Pathology (and Histopathology)	• Morphological types of drug-induced liver injury: steatosis, acute hepatocellular necrosis, fibrosis and cirrhosis, veno-occlusive disease
Pathophysiology	• Withdrawal principles: tolerance, dependence, withdrawal • Cardiac toxins: mechanism of dysrhythmia initiation and propagation • Respiratory: airway reactivity, pulmonary oedema • Hypersensitivity reactions • Acid-base abnormalities • Electrolytes abnormalities • Abnormal haemoglobin (carboxyhaemoglobin, methaemoglobin, hemolysis due to oxidation injury in G6PD deficiency) and abnormal oxygen binding to haemoglobin • Heparin-induced thrombocytopenia • Liver injury: immune-mediated effects on the biliary tract, direct hepatotoxic effects of drugs and metabolites, NAPQI formation in paracetamol toxicity • Alteration of consciousness and seizures: inhibitory and excitatory neurotransmitters • Neurotoxicity and alteration of endogenous neurotransmission: neuronopathy, axonopathy, myelinopathy • Nephrotoxicity: glomerular injury, acute tubular necrosis, nephrotic syndrome, interstitial nephritis, vasculitis • Functional toxic renal disorder: renal tubular acidosis • Effects of drugs on the physiology of micturition
Pharmacology	• Pharmacokinetics principles: absorption, distribution, metabolism, excretion

	• Pharmacology of
	  ○ Paracetamol
	  ○ Salicylate
	  ○ Ethanol and common toxic alcohols
	  ○ Antipsychotics
	  ○ Antidepressants
	  ○ Cardiovascular drugs
	  ○ Oral hypoglycemic agents
	  ○ Insulin
	  ○ Anticoagulants
	  ○ Opioids
	  ○ Local anaesthetics
	  ○ Organophosphates and related nerve agents
	  ○ Cyanide
	  ○ Carbon monoxide
	  ○ Inhaled irritants: chlorine, ammonia
	  ○ Caustic agents: alkaline vs acidic
	  ○ Anticonvulsants
	  ○ Iron
	  ○ Stimulants/sympathomimetics (methamphetamine, cocaine, MDMA)
	  ○ Antihistamine
	  ○ Antiemetics
	• Key receptor/enzyme targets in specific poisoning and pharmacological interventions
	• Chemical warfare agents: mechanism of toxicity -
	  ○ Nerve agents
	  ○ Vesicants, aka blistering agents
	  ○ asphyxiants
	  ○ Cyanides/blood agents
	• Incapacitating agents

Genetics / Immunology	• Pharmacogenetics: genetic polymorphism of cytochrome p450 system • HLA association with hypersensitivity reaction: HLA1502 and carbamazepine/phenytoin
Data Interpretation	• Neuroimaging to rule out non-toxicologic causes • Xrays/CT in drug ingestions, e.g. bodypackers, radio-opaque drugs • Investigations to rule out non-toxicologic causes • Selected serum drug levels • ECG findings: tachy-brady arrhythmias, QRS widening, QT prolongation and torsades • Arterial blood gas: acid-base abnormalities in specific poisonings, e.g. toxic alcohols, salicylates • Drug level normogram: paracetamol • Recognizing toxidromes

Chapter 18. Traumatic Disorders

Main Topics

18.1.1	Abdominal trauma
18.1.2	Thoracic trauma
18.1.3	Cutaneous trauma
18.1.4	Facial trauma
18.1.5	Genitourinary trauma
18.1.6	Head trauma
18.1.7	Spine trauma
18.1.8	Extremity bony trauma
18.1.9	Neck trauma
18.1.10	Ophthalmologic trauma
18.1.11	Otologic trauma
18.1.12	Paediatric fractures
18.1.13	Pelvic fracture
18.1.14	Soft-tissue extremity injuries
18.1.15	Spinal cord and nervous system trauma
18.2	Trauma in Pregnancy
18.3	Multi-system Trauma

EMCC List and Learning Outcome Codes

EM Model	Topic	Code
18.1.1	Abdominal trauma	3
18.1.1.1	Diaphragm	2
18.1.1.2	Hollow viscus	3
18.1.1.3	Penetrating	3
18.1.1.4	Retroperitoneum	2
18.1.1.5	Solid organ	3
18.1.1.6	Vascular	3
18.1.1.7	Abdominal wall	2
18.1.2	Thoracic trauma	3
18.1.2.1	Aortic dissection/Disruption	3
18.1.2.2	Contusion	
18.1.2.2.1	Cardiac contusion	2
18.1.2.2.2	Pulmonary contusion	3
18.1.2.3	Fracture	
18.1.2.3.1	Clavicle fracture	2
18.1.2.3.2	Ribs fracture/Flail chest	3
18.1.2.3.3	Sternum fracture	2
18.1.2.3.4	Scapular fracture	2
18.1.2.4	Hemothorax	3
18.1.2.5	Penetrating chest trauma	3
18.1.2.6	Pericardial tamponade (See 3.6.1)	3
18.1.2.7	Pneumothorax (See 16.2.6)	3
18.1.2.7.1	Simple pneumothorax	3
18.1.2.7.2	Tension pneumothorax	3
18.1.2.7.3	Open pneumothorax	3
18.1.3	Cutaneous trauma	2
18.1.3.1	Avulsions	2
18.1.3.2	Bite wounds (See 6.1)	3

EM Model	Topic	Code
18.1.3.3	Burns	3
18.1.3.3.1	Electrical burns (See 6.3)	2
18.1.3.3.2	Chemical burns (See 16.5.2)	2
18.1.3.3.3	Thermal burns	3
18.1.3.4	Lacerations	3
18.1.3.5	Puncture wounds	3
18.1.3.6	Nail injuries	3
18.1.4	Facial trauma	3
18.1.4.1	Dental fracture	2
18.1.4.2	Le Fort fracture	3
18.1.4.3	Mandibular fracture	3
18.1.4.4	Orbital fracture	3
18.1.4.5	Nasal fracture	2
18.1.4.5.1	Septal hematoma, nasal	2
18.1.4.6	Zygomaticomaxillary complex fracture	2
18.1.5	Genitourinary trauma	2
18.1.5.1	Bladder	2
18.1.5.2	External genitalia	2
18.1.5.3	Renal	2
18.1.5.4	Ureteral	2
18.1.5.5	Urethral	2
18.1.6	Head trauma	3
18.1.6.1	Intracranial injury	3
18.1.6.1.1	Concussion	3
18.1.6.1.2	Intracranial haemorrhage	3
18.1.6.2	Scalp lacerations/Avulsions	3
18.1.6.3	Skull fractures	2
18.1.7	Spine trauma	3
18.1.7.1	Dislocations/Subluxations of the spine	2
18.1.7.2	Fractures of the spine	3
18.1.7.3	Sprains/Strains of the spine	2
18.1.8	Extremity bony trauma	3
18.1.8.1	Dislocations/Subluxations, extremity	3
18.1.8.2	Fractures (open and closed), extremity	3
18.1.9	Neck trauma	3
18.1.9.1	Laryngotracheal injuries	3
18.1.9.2	Penetrating neck trauma	3
18.1.9.3	Vascular injuries, neck	3
18.1.9.4	Strangulation	2
18.1.10	Ophthalmologic trauma	
18.1.10.1	Corneal abrasions/Lacerations (See 7.2.1.3)	3
18.1.10.2	Corneal burns (See 7.2.1.1)	2
18.1.10.2.1	Acid burns, cornea	2
18.1.10.2.2	Alkali burns, cornea	2
18.1.10.2.3	Ultraviolet burns, cornea	1
18.1.10.3	Periorbital lacerations	2
18.1.10.3.1	Eyelid lacerations	2
18.1.10.3.2	Lacrimal duct lacerations	2
18.1.10.4	Foreign body (See 19.4.4.8)	2

EM Model	Topic	Code
18.1.10.5	Hyphema (See 7.2.2.2)	2
18.1.10.6	Penetrating globe injuries	3
18.1.10.7	Retinal detachments (See 7.2.3.4)	2
18.1.10.8	Traumatic iritis (See 7.2.2.3)	2
18.1.10.9	Retrobulbar hematoma	1
18.1.10	Otologic trauma	1
18.1.10.1	Hematoma, ear	2
18.1.10.2	Perforated tympanic membrane (See 7.1.7)	2
18.1.12	Paediatric fractures	2
18.1.12.1	Epiphyseal	2
18.1.12.1.1	Salter-Harris classification	2
18.1.12.2	Greenstick fracture	2
18.1.12.3	Torus fracture	2
18.1.12.4	Apophyseal avulsion fracture	2
18.1.13	Pelvic fracture	3
18.1.14	Soft-tissue extremity injuries	3
18.1.14.1	Amputations/Replantation	2
18.1.14.2	Compartment syndromes	3
18.1.14.3	High-pressure injection	2
18.1.14.4	Injuries to joints	3
18.1.14.5	Penetrating trauma	3
18.1.14.6	Periarticular	2
18.1.14.7	Sprains/Strains, extremity	3
18.1.14.8	Tendon injuries	2
18.1.14.8.1	Lacerations/Transections, tendon	2
18.1.14.8.2	Ruptures, tendon	2
18.1.14.8.2.1	Achilles tendon	2
18.1.14.8.2.2	Patellar tendon	2
18.1.14.9	Vascular injuries	3
18.1.15	Spinal cord and nervous system trauma	3
18.1.15.1	Cauda equina syndrome (11.2.7.1)	3
18.1.15.2	Injury to nerve roots	2
18.1.15.3	Peripheral nerve injury	2
18.1.15.4	Spinal cord injury	3
18.1.15.4.1	Spinal cord injury without radiologic abnormality	2
18.2	Trauma in pregnancy	3
18.2.1	Abruptio placentae (see 13.3.4.1)	2
18.2.2	Resuscitative hysterotomy (Perimortem C-section) (See	2
18.2.3	Premature labour (see 13.6.2)	2
18.2.4	Rupture of the uterus (see 13.6.4)	2
18.3	Multi-system Trauma	3
18.3.1	Blast injury	2
18.3.2	Falls	2
18.3.3	Motor vehicle collision	3
18.3.4	Assault	2
19	Disaster preparedness	
19.1	Mass casualty incident planning – scene and department	

EM Model	Topic	Code
19.2	Disaster triage, bioterrorism, blast and crush injuries, chemical agents, radiation injuries	

Applied Basic Science

Anatomy and Histology	• Abdominal trauma: abdominal boundaries, retroperitoneal space, solid organs, hollow viscous, diaphragm, normal E-FAST windows • Thoracic trauma: lungs, diaphragm, heart, mediastinum, cardiac box • Cutaneous trauma: skin layers, nail growth plate • Facial trauma: facial bones, course of the facial nerve, mental nerve, zygomaticomaxillary complex, blood supply to the cartilaginous nasal bone • Genitourinary trauma: kidney, bladder, prostate, anatomical divisions of the urethra • Head trauma: scalp, calvaria, the base of the skull; meninges, extradural, subdural, subarachnoid spaces; key cranial nerves origin, course and innervations; course of intracranial arteries; herniation points; fontanelle and sutures in an infant • Spine trauma: spinal column and lines, anatomic differences between different regions of vertebrae • Extremity bony trauma – Upper Limb: shoulder, elbow, wrist joints, all bones, brachial plexus and branches, muscles of the rotator cuff, course of brachial, radial and ulnar arteries. • Extremity bony trauma – Lower Limb: hip, knee, ankle, all bones, course and innervations of the sciatic, femoral nerves, femoral neurovascular bundle. • Neck trauma: airway anatomy, vascular bundle, anterior and posterior triangles, zones of the neck • Ophthalmologic trauma: external eye, anterior and posterior chambers, innervation of the ciliary body, optic nerve course, extraocular muscles and innervation, bones of the orbital rim • Otologic trauma: auricular canal structure and division into the external, middle and inner ear, components of the pinna, blood supply to pinna/cartilaginous structure • Paediatric fractures: maturation of ossification centres see also chapter on The Paediatric Patient • Pelvic fracture: pelvic bone and girdle, pelvic plexus and major arteries • Soft-tissue extremity injuries: compartments of forearm, leg and foot • Spinal cord and nervous system trauma: somatotropic arrangement of the spinal cord, cauda equina, sympathetic and parasympathetic nervous system • Trauma in Pregnancy: see the chapter on Obstetrics and Gynaecology
Biochemistry	• Soft-tissue extremity injuries: metabolic consequences of crush injuries • Hydrofluoric burns: chelation of ions , e.g. Ca^{2+}(calcium) and Mg^{2+}(Magnesium) leading to electrolyte abnormalities
Microbiology	• Soft-tissue extremity injuries: common micro-organisms in wounds • Tetanus
Physiology	• Abdominal trauma: mechanics of respiration (diaphragm) • Thoracic trauma: mechanics of respiration (intercostals) and ventilation • Cutaneous injuries: temperature regulation • Head trauma: blood-brain barrier; Munroe-Kellie doctrine, cerebral perfusion and intracranial pressure maintenance; cerebral auto-regulation and intracranial pressure (ICP) homeostasis

	• Extremity bony trauma: intra-compartment pressure • Trauma in Pregnancy: see the chapter on Obstetrics and Gynaecology

Pathology (and Histopathology)	• Abdominal trauma: solid organ injuries, diaphragmatic injuries, hollow viscus injuries and wall hematoma, retroperitoneal injuries (blunt and penetrating)
	• Thoracic trauma: tracheobronchial injuries, pulmonary injuries, pneumo- and haemothorax, rib fractures, high-impact bony injuries (blunt and penetrating), cardiac injuries, tamponade, aortic tear
	• Cutaneous trauma: avulsion, bites, lacerations, puncture
	• Skin body surface area and classification of burns:
	  ○ Blister formation in partial thickness burns due to involvement of the papillary dermis
	  ○ Insensate skin in full-thickness burns due to involvement of the hypodermis (location of the neurovascular bundle)
	• Facial trauma: Dental injuries, Le Fort, mandibular, nasal, zygomaticomaxillary complex
	• Genitourinary trauma: bladder and urethral injuries
	• Head trauma: fracture – depressed, base of skull; haemorrhage - EDH, SDH, SAH; contusion, coup-countercoup; cerebral oedema, midline shift, mass effect; herniation; pneumocephalus; diffuse axonal injury
	• Spine trauma: fractures, dislocations, subluxations, ossification of posterior longitudinal ligament, strains/sprains
	• Extremity bony trauma: fractures and dislocations of bones and joints, strains/sprains, amputation
	• Neck trauma: airway compromise, hard and soft signs of vascular, aerodigestive and airway injuries, laryngotracheal injuries, blunt cerebrovascular injuries, penetrating trauma, strangulation
	• Ophthalmologic trauma: corneal and conjunctival injuries, including burns, hyphema, eyelid injuries, lacrimal duct injuries, blowout fractures, blunt and penetrating globe trauma, foreign body, retinal detachment, retrobulbar hematoma, traumatic iritis
	• Otologic trauma: external ear injuries and hematoma, tympanic membrane perforation/rupture
	• Paediatric fractures: physeal injuries and long-term complications, Salter-Harris classification; torus, greenstick, bowing fractures, apophyseal avulsion fractures, see also chapter on The Paediatric Patient
	• Pelvic fracture: mechanism and injury patterns
	• Soft-tissue extremity injuries: degloving injuries, crush injuries, high-pressure jet injuries, tendon injuries, strains/sprains
	• Spinal cord and nervous system trauma: spinal cord syndromes, diffuse axonal injury, spinal cord injury without radiological abnormality (SCIWORA) in paediatrics
	• Trauma in Pregnancy: see Obstetrics and Gynaecology

Pathophysiology	• Airway and breathing
	  ○ Airway injury, inhalational injury, severe maxillofacial injury and intubation
	  ○ Thoracic trauma: tension pneumothorax, flail chest
	  ○ Facial trauma: airway issues (obstruction from tissue swelling or bleeding, mandibular fractures)
	• Circulation:
	  ○ Shock: haemorrhagic, obstructive
	  ○ Abdominal trauma: abdominal compartment syndrome, blunt and penetrating injuries, deceleration injuries, abnormal E-FAST findings, blood pressure control in aortic injuries

	○ Thoracic trauma: deceleration injuries, massive haemothorax, cardiac tamponade ○ Facial trauma: massive blood loss in Le Fort fractures ○ Head trauma: hypotension from scalp/subgaleal (adults and infants) and intracranial blood loss (infants) ○ Extremity bony trauma: blood loss from femoral fracture, compartment syndrome and complications, fat embolism ○ Pelvic fracture: massive haemorrhage ○ Spinal cord and nervous system trauma: neurogenic shock • Disability: ○ Head trauma: lucid interval; raised intracranial pressure, loss of auto-regulation; effects of hypoxemia, hyperventilation ○ Spine trauma: spinal shock ○ Soft-tissue extremity injuries: metabolic consequences of crush injuries, reperfusion injuries • Exposure & environmental control: ○ Cutaneous trauma: electrical, chemical and thermal burns, fluid loss ○ "Lethal triad": acidosis, coagulopathy and hypothermia • Facial trauma: nasal septal hematoma, entrapment of extraocular muscles and nerves • Ophthalmologic trauma: raised intraocular pressure, orbital compartment syndrome • Otologic trauma: conductive and sensorineural hearing loss, barotrauma • Trauma in Pregnancy: see the chapter on Obstetrics and Gynaecology
Pharmacology	• Airway and Breathing: ○ Oxygen ○ Medications for RSI • Circulation: ○ Crystalloids ○ Colloids ○ Massive transfusion protocol and blood components ○ Tranexamic acid • Disability / Head trauma: mannitol, hypertonic saline, anti-epileptics • Fluid management in burns injury ○ Calculation of affected body surface area, e.g. Wallace's rule of nines or Lund-Browder chart (for paediatric patients) ○ Formulae used in the estimation of initial fluid requirements, e.g. Parkland, Modified Brooke • Analgesic agents • Cutaneous trauma: anti-tetanus toxoid injection, tetanus immunoglobin • Calcium gluconate in the management of hydrofluoride burns and modes of administration • Extremity bony trauma: intravenous regional anaesthesia (aka Bier's block), digital blocks • Ophthalmologic trauma: topical anaesthetics, mydriatics, cycloplegics • Soft-tissue extremity injuries and open fractures: antibiotics selection • Reversal of direct oral anticoagulants, prothrombin complex concentrate, cryoprecipitate
Data Interpretation	• Trauma "pan scan": pros and cons • Viscoelastic haemorrhagic assays, e.g. Thromboelastography (TEG) and rotational thromboelastometry (ROTEM) • Carboxyhaemoglobin level • Focused Assessment with Sonography for Trauma (FAST) and eFAST

	• The applicability and clinical utility of diagnostic peritoneal lavage (DPL) • Tools to assess airway difficulty • Physiologic classification of haemorrhage • Mild traumatic brain injury: clinical decision rules for CT scan • International Standards for Neurological Classification of Spinal Cord Injury • Spine trauma: clinical decision rules for imaging • Injuries of the ankle and knee: clinical decision rules for imaging • Indications for early intubation in burns patient • Rule of 9s for body surface area calculation
Others	• Head trauma: epidemiology of minor head injury in elderly, neuroimaging and resource utilization • Epidemiology of osteoporotic hip fracture, morbidity and mortality, and resource utilization

Chapter 19. Procedures and skills tested in MMed Part C

	Procedures and Skills
19.1	**Airway Techniques** 19.1.1 Intubation , i.e. endotracheal intubation 19.1.2 Airway adjuncts 19.1.3 Surgical airway, specifically cricothyrotomy 19.1.4 Mechanical ventilation 19.1.5 Non-invasive ventilatory management
19.2	**Resuscitation** 19.2.1 Cardiopulmonary resuscitation 19.2.1.1Adult medical and non-trauma resuscitation 19.2.1.2Adult trauma resuscitation 19.2.2 Neonatal Resuscitation 19.2.3 Paediatric resuscitation: 19.2.3.1Paediatric medical and non-trauma resuscitation 19.2.3.2Paediatric trauma resuscitation 19.2.4 Post-resuscitative care 19.2.4.1 Therapeutic hypothermia (or targeted temperature management) 19.2.5 Blood, fluid, and component therapy 19.2.6 Central venous access 19.2.7 Intraosseous line placement 19.2.8 Defibrillation: see Cardioversion and Pacing below
19.3	**Anaesthesia and Acute Pain Management** 19.3.1 Local anaesthesia 19.3.2 Regional anaesthesia 19.3.3 Procedural sedation 19.3.4 Analgesia
19.4	**Diagnostic and Therapeutic Procedures** 19.4.1 Abdominal and gastrointestinal 19.4.1.1 proctoscopy 19.4.1.2 Nasogastric tube 19.4.2 Cardiovascular and Thoracic 19.4.2.1 Cardiac pacing, cardioversion, defibrillation 19.4.2.2 Cardioversion 19.4.2.3 ECG interpretation 19.4.2.4 Pericardiocentesis 19.4.2.5 Thoracentesis 19.4.2.6 Thoracostomy: tube thoracostomy 19.4.3 Cutaneous 19.4.3.1 Escharotomy 19.4.3.2 Incision and drainage 19.4.3.3 Trephination, nails 19.4.3.4 Wound closure techniques 19.4.3.5 Wound management 19.4.4 Head, ear, eye, nose, and throat 19.4.4.1 Control of epistaxis 19.4.4.2 Laryngoscopy 19.4.4.3 Slit lamp examination

	19.4.4.4 Tonometry 19.4.5 Systemic infectious 19.4.5.1 Personal protection equipment & techniques 19.4.5.2 Universal precautions & exposure management 19.4.6 Musculoskeletal 19.4.6.1 Arthrocentesis 19.4.6.2 Compartment pressure measurement 19.4.6.3 Fracture/Dislocation immobilization techniques 19.4.6.4 Fracture/Dislocation reduction techniques 19.4.6.5 Spine immobilization techniques 19.4.7 Nervous system 19.4.7.1 Lumbar puncture 19.4.8 Obstetrics and Gynaecology 19.4.8.1 Delivery of newborn: vaginal delivery 19.4.9 Psychobehavioural 19.4.9.1 Psychiatric screening examination 19.4.9.2 Violent patient management/Restraint 19.4.10 Renal and urogenital 19.4.10.1 Bladder catheterization 19.4.10.1.1 Urethral catheter 19.4.11 Toxicologic 19.4.11.1 Decontamination 19.4.11.2 Antidote administration
19.5	**Ultrasound**: see the chapter on Emergency Ultrasound 19.5.1 Diagnostic ultrasound 19.5.2 Procedural ultrasound

Special Populations

Chapter SP1. The Geriatric Patient

Main Topics

	Topics	Code
SP1.1	Epidemiology	1
SP1.2	Definition	1
SP1.3	Approach to the Geriatric Patient in ED SP1.3.1 History SP1.3.2 Physical Examination	3
SP1.4	Comprehensive Geriatric Assessment	2
SP1.5	Depression, Dementia, Delirium and Altered Mental Status	3
SP1.6	Falls, Gait and Balance	3
SP1.7	Infections	3
SP1.8	Pain Assessment and Management	3
SP1.9	Prescribing and Therapeutics	3
SP1.10	Trauma SP1.10.1 Co-morbid Diseases that Affect an Older Person's Response to Trauma SP1.10.2 Common Mechanisms of Injury SP1.10.3 Primary Survey, Resuscitation and Management Using the ABCDE Principles SP1.10.4 Specific Injuries: Traumatic Brain Injury, Rib Fractures, Pelvic Fracture SP1.10.5 Non-Accidental Injury and Maltreatment of Elderly Persons	 3 3 3 3 2
SP1.11	Palliative Care in ED SP1.11.1 Aims of Palliative Care SP1.11.2 Conditions Appropriate for Palliative Care SP1.11.3 Symptom Assessment and Management SP1.11.4 Goals of Care SP1.11.5 Communicating Difficult News SP1.11.6 Disposition	 3 3 3 3 3 3

Chapter SP2. The Obese Patient

Main Topics

	TOPICS	CODE
SP2.1	Epidemiology	1
SP2.2	Definition	1
SP2.3	Assessment and Management: • Airway • Breathing • Circulation	3
SP2.4	Drugs: • General Comments • Pharmacokinetics and Pharmacodynamics • Dosing Adjustments • Weight-Based Dosing Recommendations	2
SP2.5	Equipment in Prehospital Care and Hospitals	1
SP2.6	Phlebotomy and Vascular Access	2
SP2.7	Trauma	2
SP2.8	Obesity in the Elderly	1
SP2.9	Co-morbid Conditions	2
SP2.10	Bariatric Surgery: • Types of Procedures • Complications after Bariatric Bypass	1

Chapter SP3. The Paediatric Patient

	Topics	Code
PEDS 1	**Introduction & Conditions Affecting Neonates and Infants**	
	Differences in approach to paediatric patients: Anatomical and physiological considerations (to be repeated in SR level under "Paediatric Major Trauma")	
	Communications During a Peds Consult In The ED: Simulation, speaking with parents	
	Assessment of a Sick Child at the ED • Appearance, Work of breathing, Circulation • Primary Assessment • History, Physical assessment • Investigations • Differentials for sick neonate	3
1.3.33	**Neonatal Conditions** Vomiting, abdominal distension • History, associated symptoms • The severity of vomiting, the status of hydration • Abdominal examination findings • Investigations • Discharge advice for home care • Causes of obstruction (high obstruction, low obstruction, infants vs older children)	**3**
1.3.60	Brief Resolved Unexplained Event (BRUE) • Definition and approach • Differential diagnosis including physiological, cardiac, gastroenterology, respiratory, neurological and NAI	**2**
2.2.2.2	Gastro-oesophageal reflux disease	2
1.3.26	Unconjugated hyperbilirubinaemia, conjugated hyperbilirubinaemia • Unconjugated: physiological, breast milk jaundice, breastfeeding jaundice; hemolysis; metabolic; congenital • Conjugated: extrahepatic; intrahepatic • Investigations • Management • Complications	3
2.7.4.1	Pyloric stenosis: as a cause of vomiting	3
2.9.2.2	Necrotising Enterocolitis: as a cause of vomiting/abdominal pain	3
2.9.3.1	Hirschsprung disease: as a cause of vomiting/abdominal pain/constipation	1
2.9.4.4	Volvulus: as a cause of vomiting/abdominal pain	3
1.1.2	Neonatal pyrexia: As differential for sick child/neonate History including birth history, immunisations, maternal setup for sepsis Micro-organisms Investigations Management	3
	Inborn error of metabolism (as a differential diagnosis for the sick neonate)	1
1.3.11	Approach to a Crying Child: Ddx: from head to toe by examination	2

	• Examination - vitals (fever suggestive of sepsis), irritability, abnormal cry (post DPT, meningitis, neonatal abstinence syndrome) • Head (bulging fontanelle - meningitis/raised ICP, cephalohematoma/facial bruising - NAI) • Eye (retinal haemorrhage, corneal abrasions, FB) • Ear (OM) • Abdomen (distension, mass - intussusception, I/O, pyloric stenosis, anal fissure - GE) • Genitalia (testicular torsion, hernia • Extremities (digit - hair tourniquet, bruising - NAI)	
PEDS 2	**Respiratory and Cardiology**	
7.5.6.1	Epiglottitis (See 16.1.1.2) Differentials of stridor Differentials of wheezing Presentation – drooling, hot potato voice, tripod position, biphasic stridor Common micro-organisms Management	3
16.1.1.1	Croup Presentation – gradual onset, coryza, barking cough Common organisms Management Westley croup score	3
Resp	Interpretation of Chest X-rays: Radiographic findings of common paediatric conditions, including • Cardiomegaly • Pneumothorax • Pleural effusion • Pneumonia • Asthma • Non-accidental injuries	2
16.1.1	URTI, Croup, Epiglottitis (See 7.4.6.1): as above	3
7.4.6.3	Bacterial tracheitis Presentation – fever, toxic appearance, stridor Common organisms Management XR – subglottic tracheal narrowing with shaggy rough appearing tracheal lining	1
7.4.11	Retropharyngeal abscess Presentation, XR findings, management	3
16.4.1	Asthma Presentation, history taking Indicators of the severity of asthma Complications Management – including steroids, magnesium sulphate, supportive therapy, positive pressure ventilation	3
16.4.2	Bronchiolitis Infection of lower airways Age range, at-risk infants Presentation, micro-organisms Complications Severity – Respiratory index score Management	3
16.7.2	Pneumonia and Chronic Lung Disease CXR changes for pneumonia	3

	Indications for imaging	
16.7.5	Pertussis Presentation: catarrhal stage, paroxysmal stage, convalescent stage Common micro-organisms Management Complications	2
3.2	Approach to a Cyanosed Child / Congenital Heart Disease Neonatal cyanosis causes - Congenital heart disease - Respiratory disorders - Sepsis - Haemoglobinopathy Duct-dependent / independent congenital cardiac disease Management of tet spell, i.e. cyanosis after exertion Eisenmenger reaction	2
3.5.1	Approach to Child in Heart Failure Causes Management (oxygen may be a potent pulmonary vasodilator, diuresis, inotropes/vasodilators)	3
3.5.7	Myocarditis Presentation, physical findings (including signs of heart failure), investigations, management (including judicious fluid resuscitation)	3
CVM	Interpretation of Paediatric ECGs Normal ECG findings in children Red flags for ECG, causes of sudden cardiac death	2
PEDS 3	**Fever, Rash and Neurology**	
1.1.2	Fever in children - approach, investigations, management: Infective vs noninfective causes Vaccinations Paediatric assessment – appearance, work of breathing, circulation Source/causes Antipyretics Appropriate antibiotics for age and source, the role of hydrocortisone	3
1.3.40, 4.4.4.2	Differentiate exanthems associated with serious life-threatening health conditions from more innocent rashes: History taking, Approach to rashes and exanthem	2
	Measles: as cause for childhood exanthems	2
10.6.5	Varicella: as cause for childhood exanthems	2
10.6.8	Roseola (See 4.4.4.2): as cause for childhood exanthems	2
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4.5.1	Erythema multiforme	3
4.7.2	Staphylococcal scalded skin syndrome	3
10.1.7.2	Toxic shock syndrome	3
10.6	Dengue fever, systemic viral infection	3
9.4.1	Kawasaki syndrome, aka mucocutaneous lymph node syndrome: Type of vasculitis Differentials Diagnostic criteria Atypical presentations Complications Management	2

10.1.4	Meningococcaemia: as part of the approach to sick child/neonate	3
4.3	Napkin dermatitis	1
4.3.1	Atopic dermatitis	2
4.4.1.4	Impetigo	2
4.5.3	Henoch Schonlein Purpura: Autoimmune vasculitis Age range History and associations, triad description and time course Organ involvement and complications Investigations and management	2
4.5.6	Urticaria	2
4.5.7, 4.7.3	Drug eruptions and Stevens Johnsons syndrome	3
4.4.4.3 , 7.4.2.2	Herpetic gingivostomatitis	2
1.3.31	Lymphadenitis	2
15.4	Urinary Tract Infection - diagnosis and treatment: Approach to suspected febrile UTI in < 2 year old/not toilet trained vs toilet trained Interpretation of investigations Outpatient management of uncomplicated febrile UTI and exclusion criteria	3
10.6.1	Infectious Mononucleosis: as cause for childhood exanthems	2
12.9.1.2	Febrile seizure (under 12.9 Seizures): Management (including Status Epilepticus) Airway, Breathing (suction secretions, left lateral, supportive) Circulation, IV access Disability – abort seizures, check glucose Types of drugs in children < 1 year old vs > 1 year old Environment – check temperature, rashes Physical examination, including signs of meningism, neurocutaneous disorder, toxic exposure, NAI Reversible causes History taking	3
12.9.1.1	Neonatal seizure (under 12.9 Seizures)	3
12.9.1.3	Status epilepticus (under 12.9 Seizures): as above	3
12.9.1.4	Non-convulsive seizure	2
12.9.1	Epilepsy	3
1.3.1	Altered mental state	3
1.2.2	Headache: History, red flags Physical examination (with fever vs without fever) Signs of raised ICP Aetiology, life-threatening causes Guidelines for admission and discharge	3
12.5.1, 12.5.3	Encephalitis, meningitis	3
1.3.55	Weakness: Common childhood neurological syndromes including Trisomy 21, Motor Neurone Diseases	2
12.1.1	Bell's palsy, aka idiopathic facial nerve paralysis	2

12.5.4, 12.5.5	Transverse myelitis, acute polyneuritis	2
12.7	Myasthenia	2
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1.2.5	Approach to abdominal pain: Surgical, medical and gynaecological causes Examination findings Investigations, recognition of the abnormal AXR Indications for admission Management pearls and pitfalls	3
13.1.6	Imperforate hymen (as a differential of abdominal pain)	2
2.1.1	Inguinal hernia	2
1.3.22, 1.3.41, 2.7.3.2	Bleeding GIT: hematemesis, rectal bleeding	3
2.8.4.4	Meckel's diverticulum: age groups, pathophysiology	1
2.9.2.1	Appendicitis: Special tests in children; bedside US findings	3
2.9.4.3	Intussusception: Description of the classical triad Imaging findings Management	3
2.10.3.1	Anal fissure	1
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1.3.33	Approach To Vomiting: As above in PEDS 1	3
2.8.1, 2.9.1	Management of GE (Including electrolyte and glucose management): Differentials of GE Fluid status Management for high-risk/severe dehydration Oral rehydration therapy regime, use of antiemetics	3
1.3.13	Approach to dehydration: as above, also covered in fluid replacement therapy	3
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5.9.1	Neuroblastoma	1
15.8	Wilm's tumour	1
8.2.1	Coagulation/Bruising In Children, Haemophilia: Clinical characteristics of haemophilia A and B Assessment and Management Antifibrinolytic therapy Factor VIII/IX doses for bleeds DDAVP/FVIII plasma concentrate for vonWillebrand Disease	2
8.2.3	Thrombocytopenia, ITP: Presentation Diagnostic evaluation	2
8.5.1	Anaemia: Presentation Diagnostic evaluation Interpretation of peripheral blood film Diagnostic approach and classification of anaemia	3

8.6	Leukaemia, leukopenia: Presentation Diagnostic evaluation	3
8.7	Febrile neutropaenia: Management of the patient with profound neutropenia and fever Examination findings (including thrush, rashes, and multiorgan involvement) Investigations KIV antibiotics	3
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11.3.3	Slipped Capital Femoral Epiphysis: Age range, gender predilection Presentation and time course X-Ray findings Management, complications	2
11.3.4	Transient synovitis: Presentation, time course Physical findings Management	2
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MSK	Interpretation of Paediatric Limb and Pelvic Xrays: Common paediatric orthopaedic fractures, Salter-Harris classification	3
19.3.3	Paediatric Procedural Sedation: Include Consent Taking Selection of patients Options (IV/IM, inhalational) Fasting guidelines Contraindications Dosages of medications Monitoring and discharge Complications and management	3
19.3	Pain Management in Children	2
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	Pathophysiology of ligamentous and growth plate injury in children	1
18.1.12.1.1	Salter-Harris Classification	2
18.1.14.2	Recognition of compartment syndrome	3
18.1.12	Recognition of indirect signs of fractures (fluid, fat pad, bony relationships and angles)	2
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18.1.12	Clavicle, proximal humerus, humeral shaft, supracondylar, distal radius and ulna, radial head, Monteggia, metacarpal, phalangeal: covered in Xray interpretation	2
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14.6.1.1, 14.6.3	Non-Accidental Injury, including Munchausen by Proxy and Sexual Abuse: History - Type of injury - Social history - Developmental history Physical examination - Stigmata of abuse Type of injuries associated with NAI Screening for occult NAI	2
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	Patterns of injury in children with respect to anatomic and physiologic differences by age: as above	1
19.2	Priorities in the management of the injured child: as above	3
19.2	Thermal regulation in major trauma: as above	3
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19.2	Principles of fluid management and blood products in major trauma: Resuscitation, Maintenance, Replacement Types of fluids	3
19.1	Paediatric airway issues in major trauma: Differences in anatomy	3

	- Head (nose, occiput, tongue) - Neck (larynx, epiglottis, cricoid cartilage) - Airways (Lower airways) Differences in physiology - Tidal volume, functional residual capacity - Metabolic rate, O2 consumption	
	Imaging and ancillary studies in major trauma: Difficulty in the assessment of frightened child Diagnostic aids including CT, FAST	1
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19.2	Neonatal Resuscitation: Assessment of sick child - Appearance, Work of breathing, Circulation - Primary Assessment - History, Physical assessment - Investigations - Differentials for sick neonate	3
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7.1.5	Otitis externa: Management, Outpatient antibiotic use	2
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1.3.57	**Toxicology:** Management of acute paediatric poisoning Resuscitation and stabilization Risk assessment Toxidromes Decontamination Enhanced elimination Specific antidotes Discharge criteria	**3**