

COLLEGE OF ANAESTHETISTS RCSI



**SYLLABUS FOR THE PRIMARY FCARCSI EXAMINATION
EDUCATIONAL PROGRAMME FOR BASIC SPECIALIST TRAINEES IN ANAESTHESIA**

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INTRODUCTION

This document contains the syllabus for the Primary FCARCSI examination. Knowledge is required in the areas of Physiology, Pharmacology, Anatomy and Physics and Measurement. This knowledge provides the scientific basis for progression to further training in Anaesthesia, and is described under the appropriate headings in the document. In addition, Basic Specialist Trainees must acquire clinical skills on which further training and clinical practice can be built. This document also details the clinical skills which it is expected a trainee should have acquired by the end of Basic Specialist training, which normally would be a minimum of two years duration. These clinical skills may also be assessed in the Primary FCARCSI examination.

The syllabus for Physiology, Pharmacology, Anatomy and Physics and Measurement has been arranged in eighteen modules, designed to be covered over a two year period. Where possible, topics in common between the various disciplines have been placed in the same module. Time has been allowed for pre-examination preparation, and for difficulties in programme delivery during employment changeover in July and January, and at peak holiday times in the summer and at Christmas.

It is intended that this programme will be covered by a combination of personal study, and tutorials and lectures provided by individual hospitals and Regional Training Committees. It is recognised that not all of the programme can be delivered in tutorials and lectures because of the difficulty in providing the time and manpower, and that this is particularly true of small anaesthetic departments. It is the responsibility of each regional training committee to determine which elements of the programme are suitable for personal study, which will be available at individual hospitals, and which will be delivered at a regional level. It is important however that the timing of individual modules set out in the programme be adhered to, so that there is no repetition when trainees move to another hospital.

By its nature, much of the material described in "Clinical Skills" will be experiential in nature, and acquired by trainees in the workplace. However individual departments and regional training committees should examine the Clinical Skills material detailed here, to determine what elements would be appropriate for tutorials or formal lectures. Depending on circumstances, trainees may not be exposed to some Clinical Skills, for example in Critical Incidents, or Paediatrics. As far as possible, these shortcomings should be made up by appropriate teaching and simulation. On the other hand, when trainees are employed in specialist hospitals such as Maternity and Paediatric, they should maximise the training opportunity by availing of the specialised education programme available in these hospitals. Such hospitals will, however, be expected to participate in the BST programme detailed in this document.

	Physiology	General Pharmacology	Systematic Pharmacology	Anatomy & Statistics	Physics & Measurement	Perioperative Medicine & Clinical Skills
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<p>1 6 weekd uring 1/7/02 - 25/8/0 2</p>	<p>GENERAL</p> <p>Body organisation</p> <p>Control of internal environment</p> <p>Physiological control mechanisms</p> <p>Physiological variations with age</p> <p>Genes and their expression</p> <p>Cell membranes and receptors</p> <p>Protective mechanisms</p> <p>Acid base balance</p> <p>Significant ions</p> <p>Cell metabolism</p> <p>Enzymes</p>	<p>GENERAL</p> <p>Interatomic and intermolecular bonds</p> <p>Laws of diffusion</p> <p>Diffusion through membranes</p> <p>Receptor function & regulation</p>	<p>Antibiotics</p>	<p>Surface anatomy:</p> <p>Structures in the antecubital fossa</p> <p>Identifying the brachial plexus</p> <p>Structures in the axilla</p>	<p>Mathematical concepts; relationships & graphs</p> <p>Concepts of exponential functions & logarithms; wash-in, wash-out, tear away</p> <p>Basic measurement; linearity, drift, hysteresis, signal to noise ratio, static and dynamic response</p> <p>SI units; fundamental & derived</p> <p>Other units relevant to anaesthesia eg mmHg, bar etc</p>	<p>CRITICAL INCIDENTS</p> <p>Cyanosis, hypoxia, laryngospasm & bronchospasm occurring during induction, maintenance or recovery</p> <p>Failed intubation</p> <p>Difficulty with IPPV and sudden or progressive loss of minute volume</p> <p>Sudden or progressive increase in peak inspiratory pressure</p> <p>Tension pneumothorax</p> <p>Aspiration; on induction, extubation, in recovery, when unconscious</p> <p>Increasing end-tidal CO₂</p> <p>Suddenly decreasing end-tidal CO₂</p> <p>Air/CO₂/fat embolism</p> <p>Rapidly increasing hypertension</p> <p>Sudden hypotension</p> <p>Progressively worsening sinus tachycardia</p> <p>Sudden ECG changes: ST segment, tachydysrhythmia, bradycardia, VEs – V Tach – VF</p> <p>Sudden convulsion; on induction, with caudal/epidural/spinal, in recovery</p> <p>High spinal</p> <p>Anaphylaxis</p> <p>Malignant hyperpyrexia</p> <p>Mis-matched transfusion</p> <p>Sudden cuff deflation during IVRA</p> <p>Inadvertent intra-arterial injection of irritant</p>
<p>2 26/8/ 02 - 22/9/ 02</p>	<p>BODY FLUIDS</p> <p>Body fluid compartments: volume and composition</p> <p>Capillary function, interstitial fluid</p> <p>Lymphatic system</p>	<p>Solubility and partition coefficients</p> <p>Ionization of drugs</p>	<p>Simple analgesics</p> <p>Antihistamines</p>	<p>Surface anatomy:</p> <p>Large veins and other structures in anterior triangle of neck</p> <p>Large veins of leg and structures in femoral triangle</p>	<p>Mass, Force, Work & Power</p> <p>Freezing, boiling, melting points, latent heat, conduction, convection, radiation</p> <p>Laws of thermodynamics</p>	<p>MANAGEMENT OF CARDIAC AND RESPIRATORY ARREST</p> <p>Recognition and diagnosis of causes of cardiorespiratory arrest</p> <p>Causes of cardiorespiratory arrest during induction, maintenance and recovery from anaesthesia</p> <p>Recognition and management of non-cardiac causes of cardiorespiratory arrest</p>

	Special fluids, including CSF, pleural, pericardial, peritoneal			Arteries of arm and leg	Measurement of temperature and humidity Colligative properties, osmometry	Knowledge of specific problems of paediatric resuscitation Equipment checklist ABC Life support algorithms Methods of airway management; mouth-mouth/nose, bag & mask, LMA, intubation Method of chest compression Vascular access Fluid balance assessment /management Arrhythmia recognition and management with drugs, defibrillator, pacemaker Defibrillation and defibrillator settings Deciding when further efforts are futile, ethical aspects Diagnosis of death
3 23/9/02 - 29/9/02 + 28/10/02 - 17/11/02	BLOOD & IMMUNOLOGY Red blood cells Blood groups Haemoglobin & variants Haemostasis & coagulation White blood cells The inflammatory response Immunity & allergy	Drug isomerism Protein binding Oxidation & reduction	Anticoagulants Vitamins K, B12 & Thiamine NSAIDS	Surface anatomy: Landmarks for tracheostomy, cricothyrotomy, chest drain. Abdominal wall and inguinal region Landmarks for suprapubic urinary and peritoneal lavage catheters	Physics of gases & vapours Absolute & relative pressures Gas Laws; triple point, critical temperature & pressure Density & viscosity of gases Vapour pressure Saturated vapour pressure	PRE-OPERATIVE ASSESSMENT Knowledge required Implications for anaesthesia of commoner elective conditions requiring gynaecological, abdominal, orthopaedic, ENT, dental, urological and body surface surgery. Knowledge of sub-specialty practice and specialised techniques is not required unless specified elsewhere. The relevance of trauma, intestinal obstruction and acute abdominal emergencies. The ASA classification and other scoring systems such as Glasgow coma scale (GCS). The interpretation of relevant preoperative investigations Restriction of food and fluid by mouth,

						<p>cessation of smoking, correction of dehydration</p> <p>Assessment of difficulties in airway management and the importance of the 'shared airway'.</p> <p>Implications for anaesthesia of common medical conditions (ischaemic heart disease, hypertension, diabetes, asthma, rheumatoid arthritis etc)</p> <p>Anaesthetic implications of current drug therapy and whether it should be continued, modified stopped or changed peri-operatively.</p> <p>Need for and methods of perioperative antithrombotic treatment</p> <p>The importance of an anaesthetic history and genetic diseases in anaesthesia with respect to suxamethonium apnoea, anaphylaxis and malignant hyperpyrexia</p> <p>Assessment of post-operative analgesic needs</p> <p>Assessment of whether ICU or HDU care will be required post-operatively</p> <p>The importance of consent and the issues surrounding it</p> <p>Dangers of repeat anaesthesia</p> <p>Experience to be gained</p> <p>HISTORY TAKING</p> <p>Anaesthetic history, personal and familial</p> <p>Previous airway/intubation difficulties</p> <p>Medication, current and past</p> <p>Allergies and previous drug reactions</p> <p>Tobacco and alcohol consumption</p> <p>Previous anaesthetic exposure and surgery</p> <p>Respiratory status and symptoms (especially COPD & asthma)</p> <p>Cardiovascular status and symptoms (especially IHD & hypertension)</p>
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<p>30/9 /02 - 27/1 0/02</p>	<p>EXAMINATION BREAK</p>					
<p>4 18/1 1/02 - 15/1 2/02</p>	<p>EXCITABLE TISSUES Origin of membrane potentials Factors influencing membrane potential Passive and active changes in membrane potential Properties of local potentials Properties of action potentials and variations in different tissues Nerves; Propagated and non-propagated changes in membrane potential, conduction of action potential, synaptic mechanisms Functional subdivisions of compound nerves</p>	<p>MODE OF DRUG ACTION Drug-receptor interaction dynamics Agonists, antagonists, partial agonists, inverse agonists</p>	<p>Local anaesthetics</p>	<p>Spinal nerves and dermatomes Brachial plexus and nerves of the arm</p>	<p>Basic concepts of electricity & magnetism Resistance, capacitance, inductance, impedance Amplifiers; bandwidth, filters, A/D & D/A conversion Amplification of biological potentials; ECG, EMG, EEG Sources of and methods of reducing electrical interference Measurement of neuromuscular blockade</p>	<p>PRE-OPERATIVE ASSESSMENT DATA INTERPRETATION Clinical: Respiratory function tests Electrocardiographs Central venous pressure measurement Systolic, diastolic and mean arterial pressure Exercise tests Interpreting fluid balance and other charts Radiological (showing clear abnormalities) : Chest radiographs Films showing long bone, skull, vertebral and rib fractures Simple CAT and MRI scans of head demonstrating fractures/ haemorrhage Neck and thoracic inlet films Films showing abdominal fluid levels/air Laboratory: Haematology (including coagulation and sickle tests) Urea and electrolytes pH and blood gases Liver function tests Thyroid function SPECIAL GROUPS Children (aged 5 years and over) The elderly Day case patients PLANNING Deciding on an anaesthetic technique</p>

						<p>appropriate to the findings. Ensuring the necessary resources are available for safe patient care</p> <p>COMMUNICATION Consent for: general anaesthesia (including a discussion of the risks) epidural/caudal/spinal/regional/local blocks ((including a discussion of the risks) Explanation of need for preoperative routine and specialised tests (including hepatitis screening, HIV testing and sickle cell status) Explanation of pain management, side effects and complications of: oral/sublingual/rectal/subcutaneous/IM/IV/nasal/transdermal drugs epidural/regional techniques/local blocks inhalational analgesia patient controlled analgesia Discussion of preoperative medication choices Explanation of postoperative expectations and care Communication with other professionals</p>
<p>5 6 week s durin g 16/1 2/02 - 9/2/0 3</p>	<p>EXCITABLE TISSUES Muscle types; skeletal, smooth, cardiac Skeletal neuromuscular junction & transmission Muscle; propagated and non-propagated changes in membrane potential Skeletal muscle microstructure and</p>	<p>MODE OF DRUG ACTION Efficacy & potency Tolerance Metabolic pathways; enzymes Drug/enzyme interaction Michaelis –Menten Relationship Enzyme inducers and</p>	<p>Neuromuscular blockers Anticholinesterases</p>	<p>Intercostal nerves Nerves of the abdominal wall Nerves of the leg and foot</p>	<p>Processing, storage and display of physiological measurements Bridge circuits Principles of pressure transducers Resonance, damping and frequency response Units of pressure</p>	<p>PREMEDICATION Knowledge Required Rationale for use of premedicant drugs. Choice of drugs, advantages and disadvantages Rationale for antacid and prokinetic premedication Rationale for antithrombotic therapy. Understanding of causes of delayed gastric emptying.</p>

	<p>excitation-contraction coupling Skeletal muscle contraction Motor Units Mechanisms of neuromuscular transmission and contraction in smooth muscles</p>	<p>inhibitors</p>			<p>Direct and indirect methods of blood pressure measurement</p>	<p>Experience to be gained Assessment of level of anxiety and addressing patient's concerns Recognition of situations leading to delayed gastric emptying Checking a patient prior to premedication and on arrival in the anaesthetic room/theatre</p> <p>SPECIAL GROUPS Children (aged 5 years and over) The elderly Day case patients Pregnancy The acutely ill</p> <p>COMMUNICATION Able to reassure patient and allay anxiety Explain (as appropriate) problems/complications to patients/relatives concerning: difficult intubation & dentition sore throat, nausea and vomiting thrombophlebitis post-spinal headache suxamethonium apnoea and pains anaphylaxis malignant hyperpyrexia</p>
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<p>6 10/2/ 03 - 2/3/0 3 + 31/3/ 03 - 6/4/0 3</p>	<p>HEART & CIRCULATION Cardiac muscle action potential Cardiac muscle microstructure and excitation-contraction coupling Pacemaker tissues Rhythmicity of the heart Conduction tissues The cardiac cycle; phases, pressures, mechanical events, electrical events, relation to ECG and heart sounds Pressure Volume relationships</p>	<p>MODE OF DRUG ACTION Mechanism of drug action Ion channels; types and relation to receptors Gating mechanisms Signal transduction; cell membrane/ receptor/ion channel to intracellular molecular target, second messengers</p>	<p>Drugs acting on the heart and cardiovascular system (including inotropes, vasodilators, vasoconstrictors, antiarrhythmics, diuretics)</p>	<p>Heart; chambers, valves, conducting system, blood and nerve supply</p>	<p>Principles of pulmonary artery and wedge pressure measurement Cardiac output measurement by Fick principle Cardiac output measurement by thermodilution Other methods of measuring cardiac output Basic principles of ultrasound and the Doppler effect</p>	<p>INDUCTION OF GENERAL ANAESTHESIA Knowledge required Intravenous and inhalational induction of anaesthesia; advantages and disadvantages of each technique Indications for tracheal intubation Selection of tube type (oral, nasal, armoured etc), diameter and length Management of difficult intubation and failed intubation Methods of confirming placement of the endotracheal tube; oesophageal and endobronchial intubation, complications Insertion and use of oral airways, face masks and laryngeal mask airway Causes of regurgitation and vomiting during induction, prevention and management of pulmonary aspiration Cricoid pressure Induction of anaesthesia in special circumstances, (head injury, full stomach, upper airway obstruction, shock) Drugs: pharmacology and dosages of induction agents, relaxants, analgesics, and inhalational agents Side effects of drugs used and their interactions Monitoring during induction Recognition and management of anaphylactic and anaphylactoid reactions including follow up and patient information Management of intra-arterial injection of harmful substances (e.g. antibiotics, thiopentone) Management of asthma, COPD, hypertension, IHD, rheumatoid arthritis Problems of the obese patient</p>
<p>3/3/</p>	<p>EXAMINATION</p>					

03 - 30/3 /03	BREAK					
7 7/4/0 3 - 4/5/0 3	HEART & CIRCULATION Regulation of cardiac function; extrinsic and intrinsic The Starling relationship Control of cardiac output Heart failure and fluid challenge Normal ECG and common arrhythmias, ischaemic changes Neural and humoral control of systemic blood pressure, blood volume and blood flow at rest and during physiological disturbances	MODE OF DRUG ACTION Action of gases and vapours Osmotic effects, pH effects Adsorption and chelation	Drugs acting on the autonomic nervous system; cholinergic and adrenergic agonists and antagonists	Great vessels Main peripheral arteries and veins Autonomic nervous system	Principles of cardiac pacemakers Principles of defibrillators Basic principles and safety of Lasers Electrical Safety Electrical hazards; causes and prevention Electrocution, fires and explosions Diathermy and its safe use	INDUCTION OF GENERAL ANAESTHESIA Experience to be gained IV and inhalational Induction of anaesthesia in patients with elective and urgent conditions requiring gynaecological, abdominal, orthopaedic, ENT, dental, urological and body surface surgery. (Knowledge of sub-specialty practice and specialised techniques is not required unless specified elsewhere). Checking patient into the anaesthetic room or theatre Safety checking of equipment Obtaining vascular access - suitability of sites and technique of intravenous injection Airway assessment and optimising the patient's position for airway management Airway management with mask and oral/nasal airways Introduction and checking correct placement of laryngeal mask airway. Appropriate choice and passage of oral and nasal endotracheal tubes Intubation up to grade II Cormack-Lehane Use of gum elastic bougie and stilette Identifying correct/incorrect placement of tube (oesophagus/main bronchus) Interpretation of capnograph trace Failed intubation drill Rapid sequence induction/cricoid pressure Checking difficult intubation kit and paediatric intubation set

						<p>Use of monitoring equipment, including application of ECG electrodes Managing of cardiovascular and respiratory changes during and after induction of general anaesthesia</p> <p>COMMUNICATION Safety first Always knowing the whereabouts of senior assistance Being clear in explanations to patient and staff Being reassuring to patients during induction of anaesthesia Being polite, calm and having a professional approach</p>
<p>8 5/5/0 3 - 1/6/0 3</p>	<p>HEART & CIRCULATION Structure and function of large arteries, arterioles, capillaries, venules and veins. Rheology; pressure/flow/resistance relationships in the peripheral circulation Special circulations including pulmonary, coronary, cerebral, renal, hepatic.</p>	<p>MODE OF DRUG ACTION Mechanisms of drug interactions; Inhibition and promotion of drug uptake Competitive protein binding Receptor Interactions Effect of metabolites and other degradation products</p>	<p>Plasma volume expanders Antihypertensives</p>	<p>Sympathetic innervation Sympathetic chain, ganglia & plexuses Stellate ganglion Parasympathetic innervation</p>	<p>Newtonian & non-newtonian fluids Laminar & turbulent flow Poiseuille's equation Bernoulli principle Measurement of volume and flow in gases and liquids</p>	<p>INTRAOPERATIVE CARE Knowledge required Techniques of maintenance of general anaesthesia involving both spontaneous and controlled ventilation (except sub-specialty and highly specialised practice) Definition of and methods of sedation Management of the shared airway Effects and hazards of the pneumoperitoneum induced for laparoscopic surgery Drugs: Pharmacology, uses and dosages of induction agents used for IV maintenance, relaxants, analgesics, inhalational agents Methods of producing muscle relaxation Choice of spontaneous and controlled ventilation and methods of monitoring them Minimum monitoring standards Additional monitoring for sick patients (e.g. CVP, urine flow) Detection and prevention of awareness.</p>

						<p>Management of important critical incidents occurring during anaesthesia (Module 1)</p> <p>Diagnosis and treatment of pneumothorax</p> <p>Principles of fluid balance</p> <p>Blood & blood products; synthetic colloids; crystalloids.</p> <p>Management of massive haemorrhage, volume expansion, blood transfusion (hazards including incompatibility reaction)</p> <p>Correct intraoperative positioning on theatre table, care of pressure points, avoidance of nerve injury: complications of supine and prone positions</p> <p>Management of asthma, COPD, hypertension, IHD, rheumatoid arthritis, jaundice, steroid therapy, diabetes</p> <p>Content of the anaesthetic record</p> <p>Modification of technique in repeat anaesthesia</p> <p>Understanding basic surgical operations</p>
<p>9 2/6/0 3 - 30/6/ 03</p>	<p>RENAL TRACT Renal blood flow Glomerular filtration Plasma clearance Tubular functions and formation of concentrated and dilute urine Renal regulation of fluid and electrolyte balance and role in systemic blood pressure Renal regulation of acid base balance Micturition</p>	<p>PHARMACOKINETIC S & PHARMACODYNAMICS Drug uptake from; GIT, lungs, transdermal, subcutaneous, IM, IV, epidural, intrathecal routes. Ocular, nasal and sublingual uptake</p>	<p>Diuretics Drugs acting on the respiratory system (including respiratory stimulants and bronchodilators)</p>	<p>Cervical, thoracic and lumbar vertebrae Sacrum and sacral hiatus Ligaments of vertebral column Surface anatomy of vertebral spaces Length of cord in adult and child</p>	<p>Principles of surface tension Pneumotachograph and other respirometers Measurement of gas and vapour concentrations (of O₂, CO₂, N₂O, volatile agents) using spectroscopy, paramagnetic analyser, fuel cells, oxygen electrode and mass spectrometry</p>	<p>INTRAOPERATIVE CARE Experience to be gained Maintenance of appropriate levels of anaesthesia with inhalational and intravenous agents in patients with elective and urgent conditions requiring gynaecological, abdominal, orthopaedic, ENT, dental, urological and body surface surgery. Knowledge of sub-specialty practice and specialised techniques is not required unless specified elsewhere. Transferring the patient from trolley to operating table Positioning the patient</p>

	<p>Assessment of renal function</p> <p>Pathophysiology of acute renal failure</p> <p>Role in erythropoiesis</p>					<p>Airway control: recognition and correction of problems</p> <p>Laryngoscopy and intubation and its problems</p> <p>Detection and correction of airway obstruction</p> <p>Use of oral airways, facemasks and laryngeal mask airway</p> <p>Sharing the airway</p> <p>Management of appropriate intermittent positive pressure ventilation.</p> <p>Methods of pain relief during maintenance</p> <p>Management of effects of drugs used during anaesthesia</p> <p>Management of hypo and hypertension</p> <p>Provision of intra-operative fluids; transfusion of blood and blood products</p> <p>Management of diabetes</p> <p>Methods of detection of awareness</p> <p>Management of appropriate muscle relaxation.</p> <p>Management of any critical incidents which occur during anaesthesia</p> <p>Interpretation and limitations of monitoring equipment</p>
<p>10</p> <p>6 weeks during 1/7/03</p>	<p>RESPIRATION</p> <p>Gaseous exchange in the lungs and tissues; O₂ & CO₂ transport, hypoxia, hyper and hypocapnia, hyper & hypobaric pressures, alveolar air</p> <p>Functions of haemoglobin in oxygen carriage and acid base balance</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS</p> <p>Bioavailability</p> <p>Factors influencing the distribution of drugs: perfusion, solubility, molecular size, protein binding, ionisation</p> <p>Influence of drug formulation on disposition</p>	<p>Sedatives</p> <p>Hypnotics</p>	<p>Mouth, nose, pharynx, larynx, trachea and main bronchi, segmental bronchi, structure of bronchial tree; differences in child</p> <p>Blood supply, innervation and lymphatic drainage of airway and respiratory tract</p>	<p>Measurement of pH, pCO₂, pO₂</p> <p>Measurement of CO₂ production/ oxygen consumption/ respiratory quotient</p> <p>Simple pulmonary function tests; peak flow, spirometry</p> <p>Capnography</p> <p>Pulse oximetry</p>	<p>POSTOPERATIVE AND RECOVERY CARE</p> <p>Knowledge Required</p> <p>Causes and treatment of failure to breathe at end of operation</p> <p>Distinguishing between opiate excess, continued anaesthetic effect and/or residual paralysis</p> <p>Care of the unconscious patient</p> <p>Monitoring the patient in recovery</p> <p>Interpretation of nerve stimulator patterns</p> <p>Oxygen therapy, indications and</p>

						<p>techniques</p> <p>Management of cyanosis, hypo- and hypertension, shivering and stridor.</p> <p>Postoperative fluid balance and prescribing</p> <p>Assessment of pain and methods of pain management</p> <p>Methods of treating postoperative nausea and vomiting</p> <p>Causes and management of post-operative confusion</p> <p>Management of asthma, COPD, hypertension, IHD, rheumatoid arthritis, jaundice, steroid therapy, diabetes</p> <p>Management of the obese patient</p> <p>Recovery room equipment</p> <p>Prevention, diagnosis and management of postoperative pulmonary atelectasis, deep vein thrombosis and pulmonary embolus</p> <p>Criteria for discharge of day-stay patients</p>
<p>11</p> <p>25/8/03</p> <p>-</p> <p>21/9/03</p>	<p>RESPIRATION</p> <p>Pulmonary ventilation; spirometry, volumes, flows, dead space</p> <p>Mechanics of ventilation</p> <p>Ventilation perfusion relationship; normal physiologic variation throughout lungs and V/Q abnormalities, shunt.</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS</p> <p>Distribution to organs and tissues; body compartments</p> <p>Influence of specialised membranes; tissue binding and solubility</p> <p>Distribution in CSF and extradural space</p>	<p>Antidepressants</p> <p>Anticonvulsants</p>	<p>Pleura</p> <p>Mediastinum and its contents</p> <p>Lungs and lobes; gross</p> <p>Microstructure of lungs</p> <p>Diaphragm and other muscles of respiration, including innervation</p>	<p>Physical principles underlying anaesthetic machine function; pressure regulators, flowmeters, vaporisers, breathing systems</p> <p>Detection and prevention of delivery of low PO₂ gas mixture</p> <p>Detection of gas supply failure</p>	<p>POSTOPERATIVE AND RECOVERY CARE</p> <p>Experience to be gained</p> <p>Recovery from anaesthesia in patients with elective and urgent conditions requiring gynaecological, abdominal, orthopaedic, ENT, dental, urological and body surface surgery. Knowledge of sub-specialty practice and specialised techniques is not required unless specified elsewhere.</p> <p>Clear instructions during handover of patient to recovery staff</p> <p>Assessment of full return of protective reflexes</p> <p>Assessment of adequacy of ventilation/reversal</p>

						<p>Recognition of residual relaxant action Use of nerve stimulator. Extubation and airway protection in presence of potentially full stomach Prescription of postoperative fluids Assessment of fluid balance and need for urethral catheterisation Evaluation and management of post-operative confusion Assessment of postoperative pain Prescription of postoperative pain regimen Treatment of nausea and vomiting Stabilisation before discharge from Recovery Continuation of care until discharge from Recovery, and beyond as appropriate Criteria for discharge of patients to ward Criteria for discharge of day-stay patients</p> <p>COMMUNICATION Clear communication Responding rapidly to calls for help Follow up of sick patients on the ward before going home</p>
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<p>12 22/9/03 - 28/9/03 + 27/10/03 - 16/11/03</p>	<p>RESPIRATION Control of breathing Acute and chronic ventilatory failure, including effect of oxygen therapy Effect of IPPV on the lungs Non-respiratory function of the lungs</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS Modes of drug elimination; direct excretion, metabolism in organs of excretion (phase I and II mechanisms), renal excretion and urinary pH, non-organ drug breakdown</p>	<p>Anaesthetic gases and vapours</p>	<p>Thoracic inlet and 1st rib Interpretation of normal chest X-ray</p>	<p>Chemistry of CO₂ absorption compounds Principles of lung ventilators Disconnection monitors</p>	<p>INTENSIVE & HIGH DEPENDENCY CARE Knowledge required An understanding of the potential benefits of high dependency and intensive care Common causes of admission to high dependency and intensive care Method of examination of the unconscious patient The principles of brain stem death diagnosis An understanding of sepsis and the basic patterns of failure of the major organs The common causes of cardiac and respiratory arrest The anatomy of the oropharynx, larynx, trachea & bronchial tree Basic anatomy of neck, upper thorax, arms, wrists, inguinal region and foot relevant to securing venous and arterial access Method of inserting a chest drain and relief of tension pneumothorax Understanding of the pharmacology and choice of intravenous fluids appropriate for use in major fluid loss The recognition of basic cardiac dysrhythmias and the current therapies (physical (carotid sinus massage), electrical (defibrillation & countershock), electrolytic (Mg⁺⁺,</p>
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						<p>Ca++), and pharmacological (adrenaline, atropine, lignocaine and 2nd line drugs)</p> <p>Pharmacology of the common inotropes, major analgesics, muscle relaxants and sedative and anaesthetic induction agents used in the critically ill, including their common side effects and contraindications</p> <p>Thromboprophylaxis in intensive and high dependency patients</p> <p>Choice of antibiotics</p> <p>Use of diuretics for cardiac and respiratory failure and to maintain urine output</p> <p>Basic cardiac physiology</p> <p>Basic physiology of respiration and the consequences of positive pressure ventilation</p> <p>An understanding of common blood gas abnormalities</p> <p>An understanding of mechanical lung ventilation in use in critically ill patients, with a knowledge of the vocabulary</p> <p>An understanding of the uses and limitations of monitoring equipment</p> <p>The content of an ICU record</p> <p>An insight into likely outcome based upon severity scoring</p> <p>The grief response</p>
29/9 /03 - 26/10/03	EXAMINATION BREAK					
13 17/1 1/03 -	NERVOUS SYSTEM Cerebral metabolism Factors determining intracranial pressure	PHARMACOKINETIC S & PHARMACODYNAMICS	Intravenous anaesthetic agents	Brain and subdivisions CSF origin, circulation and reabsorption Spinal meninges	Manufacture and storage of O2, N2O, CO2, compressed air Pipeline and suction	INTENSIVE & HIGH DEPENDENCY CARE Experience to be gained Cardiopulmonary resuscitation

14/1 2/03	Motor function and pathways; spinal and peripheral Neurological reflexes Maintenance of posture Special senses	Pharmacokinetic analysis; concept of a pharmacokinetic compartment, apparent volume of distribution, clearance, clearance concept applied to whole body and individual organs		Subarachnoid and extradural spaces Contents of extradural space	systems Gas cylinders	Maintenance of a clear airway using bag and mask Insertion of an endotracheal tube, via the oral route Examination and care of the unconscious patient Insertion of adequate peripheral venous access sufficient to manage major haemorrhage Insertion of central venous and arterial cannulae Institution and maintenance of controlled mechanical ventilation in a critically ill patient Ability to summarise and provide a succinct analysis of the patient's medical history, ongoing therapies and expected problems to medical and nursing colleagues Good communication with patients, relatives and staff COMMUNICATION Understanding of the needs and behaviour of worried and grieving relatives Commitment to good communication Willingness to accept failures of therapy Involving others with specialist skills Recognition of team approach
14 6 week s durin g 15/1 2/03 - 8/2/0	NERVOUS SYSTEM Sensory receptors, nociception Afferent nociceptive pathways Nociceptive modulation at periphery, at dorsal horn and supraspinally Visceral pain Neuropathic pain	PHARMACOKINETIC S & PHARMACODYNAMICS Pharmacokinetic analysis contd; Simple 1 and 2 compartment models, concepts of wash-in and wash-out curves, physiological	Opioids and related drugs Opioid antagonists	Spinal cord structure and pathways Cranial nerves Base of skull Trigeminal ganglion	Minimum monitoring requirements Pre-use checks of anaesthetic machine, breathing systems and monitoring apparatus	REGIONAL ANAESTHESIA Knowledge required Pharmacology of local anaesthetics & spinal opioids Anatomy of spine, nerve roots, cauda equina, intercostal nerves, brachial plexus, femoral nerve, inguinal canal, nerves at wrist and ankle, nerve supply of larynx Dermatomes and levels for common

4	<p>Influence of therapy on nociceptive mechanisms Autonomic nervous system; motor and sensory innervation and reflex responses involving the cardiovascular, respiratory, digestive and urinary systems</p>	<p>models based on perfusion and partition coefficients, effect of organ blood flow, Fick principle</p>				<p>operations (e.g. inguinal hernia, haemorrhoids) Technique of spinal and epidural (including caudal) anaesthesia: single shot and catheter techniques Management of the complications of spinal and epidural (including caudal) analgesia (associated hypotension, shivering, nausea & anxiety) Management of accidental total spinal blockade Management of dural tap Techniques and complications of intravenous regional anaesthesia (IVRA), Toxicity of local anaesthetic agents and its management Management of failed/ deteriorating regional block Methods of sedation Absolute and relative contraindications to regional blockade</p> <p>Experience to be gained Technique of spinal and epidural (including caudal) analgesia in any suitable patients Recognition of contraindicated or unsuitable patients or those in whom a block would be difficult to perform Management of hypotension, nausea, anxiety and shivering induced by spinal or epidural blockade Post-operative care following spinal or epidural block (including urinary retention) Prescription of continuous epidural infusions Use of epidural techniques for post-operative pain management Checking epidural/spinal packs Technique of intravenous regional</p>
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						<p>anaesthesia (IVRA) Performance of some simple peripheral nerve blocks Use of drugs to provide sedation Combined general and regional anaesthesia</p> <p>COMMUNICATION Safety first Considering views of patient and surgeon Management of theatre environment with awake patient Planning list to allow block to take effect Communication and reassurance Consent for regional blockade</p>
<p>15 9 2 04 - 29 2 04 + 29 3 04 - 5 4 04</p>	<p>THE LIVER Functional anatomy and blood supply Metabolic functions Bile Formation Other functions</p> <p>THE DIGESTIVE SYSTEM Gastric function; secretion, nausea and vomiting Gut motility, sphincters and reflexes Digestive functions</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS Pharmacokinetic analysis contd; Pharmacokinetic variation, influence of body size, sex, age, disease, anaesthesia, trauma, surgery, smoking, alcohol and other drugs</p>	<p>Antacids Drugs influencing gastric secretion and motility Antiemetics</p>	<p>Interpretation of x-rays, CT scans and MRI scans of head and neck, both normal and showing gross abnormality eg fracture, haemorrhage</p>	<p>Airways, laryngeal masks, tracheal tubes, tracheostomy tubes, emergency airways Fixed and variable performance oxygen therapy equipment Self-inflating bags</p>	<p>TRAUMA MANAGEMENT, STABILISATION & TRANSFER Knowledge required Performance and interpretation of the primary and secondary survey Emergency airway management Anatomy and technique of cricothyrotomy/tracheostomy/mini-tracheotomy Establishing IV access: interosseous cannulation Immediate specific treatment of life-threatening illness or injury, with special reference to thoracic and abdominal trauma Recognition and management of hypovolaemic shock Effects of trauma on gastric emptying Central venous access: anatomy and techniques Central venous pressure monitoring Arterial pressure monitoring Pleural drain insertion Peritoneal lavage</p>

						<p>Principles of the management of head injury</p> <p>Mechanisms and effects of raised intracranial pressure: coup and contra-coup injuries</p> <p>Methods of preventing the 'second insult' to the brain</p> <p>Principles of anaesthesia in the presence of a recent head injury</p> <p>Management of cervical spine injuries</p> <p>Principles of the safe transfer of patients</p> <p>Understanding portable monitoring systems</p> <p>Recognition and management of dilutional coagulopathy</p> <p>Factors affecting intraocular pressure</p> <p>Experience to be gained</p> <p>Assessment and immediate management of trauma patient: primary and secondary survey</p> <p>Glasgow coma scale</p> <p>Recognition of need for appropriate investigations (Hb, cross-match, chest X-ray etc)</p> <p>Assessment and management of circulatory shock</p> <p>Emergency airway management, oxygen therapy and ventilation</p> <p>Chest drain insertion and management: emergency relief of tension pneumothorax</p> <p>Cannulation of major vessels for resuscitation and monitoring</p> <p>Care and immobilisation of cervical spine</p> <p>Transfers within and between hospitals of adults who <u>do not</u> have life threatening conditions or a severe head injury</p> <p>Analgesia for trauma victim</p>
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						<p>Urinary catheterisation in traumatised patient</p> <p>Establishing central venous pressure monitoring: interpretation of readings</p> <p>Establishing arterial pressure monitoring: interpretation of readings</p> <p>Anaesthesia in the presence of a recent head injury (which itself does not require surgery)</p> <p>Anaesthesia for a penetrating eye injury</p> <p>Ability to deal with emergencies before, during and after anaesthesia and the ability to stabilise a patient's condition until senior assistance arrives</p> <p>COMMUNICATION</p> <p>Importance of speed of response and proper resuscitation</p> <p>Try to offer the best chance of survival. Focus on the golden hour.</p> <p>Communication with appropriate specialists</p> <p>Ability to take control when either appropriate or necessary</p> <p>Insist on stabilisation before transfer</p> <p>Pretransfer checking of kit and personnel</p> <p>Communication with relatives</p>
1/3/04 - 28/3/04	EXAMINATION BREAK					
16 5 4 04 - 2 5 04	METABOLISM Nutrition; carbohydrates, proteins, fats, vitamins, minerals and trace elements Metabolic pathways and	PHARMACOKINETICS & PHARMACODYNAMICS Effects of acute organ failure on drug elimination	Anti-diabetic agents Corticosteroids	The eye and orbit STATISTICS Types of data and their handling Measures of central tendency and	Function and use of resuscitation equipment Transfusion devices Humidification devices	OBSTETRIC ANAESTHESIA & ANALGESIA Physiological changes associated with a normal pregnancy Functions of the placenta: placental transfer: foeto-maternal circulation The foetus: foetal circulation: changes

	<p>enzymes for energy production Metabolic rate Hormonal control of metabolism Regulation of plasma glucose Response to trauma The Stress Response Physiological alterations in starvation, obesity and exercise Thermoregulation</p>	<p>Pharmacodynamics; concentration-effect relationships, hysteresis</p>		<p>dispersion The Normal distribution Probability theory and confidence intervals</p>		<p>at birth Pain pathways relevant to labour Methods of analgesia during labour: indications and contraindications Effect of pregnancy on the technique of general and regional anaesthesia Principles of anaesthesia for incidental surgery during pregnancy Preoperative assessment of pregnant patient Anaesthesia for retained products of conception Analgesia for labour Management of APH and PPH Management of dilutional coagulopathy Intubation problems in the full-term mother Anaesthesia/analgesia for instrumental delivery Anaesthesia for retained placenta Anaesthesia for caesarean section</p> <p>COMMUNICATION Attempt by conscientious care to recognise problems early Seek senior help early Good communication with mother, partner and other family members Calmness under pressure Timely assistance and prompt response to requests for analgesia and help Reassurance to the mother Compassion and kindness when the outcome of labour has been poor</p>
<p>17 3 5 04 - 30 5 04</p>	<p>ENDOCRINE SYSTEM Mechanisms of hormonal action; effect on membrane and intracellular receptors, feedback mechanisms Hypothalamic and</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS Pharmacogenetics; familial variation in drug response</p>	<p>Other hormone preparations</p>	<p>STATISTICS Null hypothesis Simple parametric and non parametric tests Choice of appropriate test Type I and type II</p>	<p>Environmental control in the operating theatre; temperature, humidity, air changes, scavenging systems Measurement of pain</p>	<p>PAEDIATRIC ANAESTHESIA Anatomical differences in the airway, head, and spinal cord from the adult Deciduous and permanent dentition Physiological differences from the adult Haematological and biochemical changes with age</p>

	<p>pituitary functions Adrenocortical hormones Adrenal medullary hormones Insulin, glucagon and exocrine pancreatic function Thyroid and parathyroid hormones and calcium homeostasis</p>	<p>Adverse reactions to drugs; hypersensitivity, allergy, anaphylaxis, anaphylactoid reactions</p>		<p>errors</p> <p>Aspects of study design Definition of outcome: methods and uncertainty of measurement Basic concepts of evidence based medicine and meta-analysis</p>		<p>Estimation of blood volume, replacement of fluid loss Modification of drug dosages Analgesia for children Premedication, including local anaesthesia for venepuncture Calculation of tube sizes, selection of masks and airways Choice of breathing system Upper respiratory tract infections and when to cancel operations Psychological aspects of sick children Preoperative assessment of the previously fit child Anaesthesia in fit children for elective and urgent general, ENT, and ophthalmic surgery, minor trauma and other non-specialist procedures. Venous access (including local anaesthesia premedication) Airway management, selection of correct sized tubes and masks etc IV and gaseous induction of general anaesthesia Spontaneous and ventilated maintenance of anaesthesia Caudal and other simple blocks Management and stabilisation of the injured child (excluding neonates and infants) until senior help arrives Principles of paediatric resuscitation</p> <p>COMMUNICATION Communication with the child and parents Reassurance for the child and parents Issues of consent Management of the environment during induction of anaesthesia</p> <p>ANAESTHESIA FOR THE ELDERLY Physiological changes with age</p>
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						<p>Altered pharmacological response Erosion of physiological reserve Frequent co-morbidities Positioning difficulties Communication difficulties (eyesight, hearing, CVAs) Mental clarity, memory loss Causes of post-operative confusion Importance of social circumstances Modifications necessary when anaesthetising the elderly Management of post-operative confusion</p> <p>COMMUNICATION Special efforts to communicate clearly (N.B. deafness and blindness) Old people have feelings too Respect for the social norms of older people Problems of consent in mental infirmity Recognising the limitations of therapy Ethics of 'do not resuscitate' orders</p>
<p>18 31 5 04 - 27 6 04</p>	<p>PREGNANCY Physiologic changes in normal pregnancy Materno-foetal, foetal and neonatal circulations Changes in the foetus at birth</p>	<p>PHARMACOKINETICS & PHARMACODYNAMICS Effect of pregnancy on maternal pharmacokinetics and materno-foetal distribution</p>	<p>New drugs and drugs in development, of relevance to Anaesthesia, Intensive Care and Pain Medicine.</p>	<p>Foetal and materno-foetal circulation Maternal anatomic changes during pregnancy</p>	<p>Characteristics of IV cannulae, central lines, pulmonary artery catheters, arterial cannulae and setting up associated monitoring connections Characteristics of spinal and epidural needles</p> <p>The content of the anaesthetic record</p>	<p>PAIN MANAGEMENT Afferent nociceptive pathways, dorsal horn, peripheral and central mechanisms, neuromodulatory systems, supraspinal mechanisms Nociceptive pain, visceral pain, neuropathic pain Influence of therapy on nociceptive mechanisms The analgesic ladder Measurement of pain Assessment and management of postoperative pain and nausea Monitoring acute pain and pain relieving methods Non-steroidal anti-inflammatory agents: drugs and mechanisms Use of simple analgesics: paracetamol: NSAIDs</p>

						<p>Opioids: drugs and mechanisms Opioids: intramuscular, intravenous infusion, intravenous PCA, subcutaneous PCA, epidural, intrathecal Regional local anaesthetic techniques: lumbar epidural, caudal epidural, simple peripheral nerve blocks Local anaesthetic agents: drugs and mechanisms Inhalational analgesia Specific clinical groups: children, elderly, impaired consciousness, intensive care Organisation and objectives of an acute pain service Contributing to an acute pain service</p> <p>COMMUNICATION Communication with patients, relatives, staff Rapid response to unrelieved pain Management tempered by awareness of potential complications and side effects Awareness of limitations in pain management Making efforts to follow patients up on the wards Recognition of need for team approach and partnerships in a pain team</p> <p>INFECTION CONTROL Universal precautions and good working practices (hand washing, gloves etc) Cross infection: modes and common agents Emergence of resistant strains: antibiotic policies in a hospital Common surgical infections: antibiotic choice and prophylaxis</p>
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						<p>Infections from contaminated blood Hepatitis and HIV infections: modes of infection: natural history: at risk groups Immunisation policy Sterilisation of equipment Strategy if contaminated Preoperative assessment: awareness of at risk groups Recognition of the immunocompromised patient Administration of IV antibiotics: risk of allergy and anaphylaxis Aseptic techniques Use of disposable filters and breathing systems Use of protective clothing/gloves/masks etc</p> <p>COMMUNICATION Every patient entitled to the best care available Prevention of self-infection Prevention of cross infection</p>
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