APPENDIX 2 (Revised)

STUDY GUIDE FOR THE PRIMARY EXAM

HOW TO USE THIS DOCUMENT

Trainees can use this document to

- understand the new Appendix 2 structure
- track and understand the rationale for changes to LOs
- identify deleted LOs

Appendix 2 has been re-structured under body systems and topics. This format will be more conducive as a guide to teaching and study programs for the primary examination. This revised Appendix 2 will be incorporated into the 2024 edition of the ANZCA Curriculum, due for publication in early 2024.

The wording of some LOs has been amended to improve clarity. Some LOs have been added to clarify existing content.

The operational verb associated with each LO has been critically reviewed, and amended where necessary to better indicate the expected depth of understanding. A definition for each of these verbs is given in this document.

Importantly, all LOs retain their numbering format which links to the main body of the Curriculum.

The IT LOs have been deleted from Appendix 2 because these are duplicates of other LOs.

LOs that are redundant, or not applicable to PEx, have been deleted from Appendix 2. These are indicated by yellow highlighter.

There are two completely new LOs, pertaining to the physiology and pharmacology of iron replacement. These are indicated by green highlighter. These are examinable from the 2024.2 exam onwards.

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DEFINITIONS

The following definitions relate to the operational verb associated with Learning Outcomes.

COMPARE	note the similarities
CONTRAST	note the differences
DEFINE	give the precise meaning of
DESCRIBE	give a detailed account of
DISCUSS	write about a topic in detail, considering different issues or ideas
EVALUATE	make an appraisal of the worth of something
EXPLAIN	make plain, interpret, account for in detail
ILLUSTRATE	make clear by concrete examples and/or diagrams
INTERPRET	analyse and explain what something means
JUSTIFY	show adequate grounds for decisions
LIST	catalogue by groups or classes with minimal explanation
OUTLINE	give the main features or general principles
RELATE	show how things are connected to and affect each other

1. APPLIED PROCEDURAL ANATOMY

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
airway / respiratory			
IT_AM 1.1	Describe the basic structural anatomy of the upper airway including the larynx	Delete from PEx	Retain in IT and IAACQ Duplicated by BT_AM 1.1 below
BT_AM 1.1	Describe the anatomy of the upper airway, larynx and trachea, including its innervation and endoscopic appearance	Describe the anatomy of the upper airway, larynx and trachea, including its innervation and endoscopic appearance see also SS_PA 1.1 and SS_OB 1.6	add links to related LOs on neonatal & maternal airway (but keep those grouped within specialty sections as more specialised and best studied later)
BT_RT 1.22	Outline the anatomy relevant to drainage of the pleural space		
vascular access			
BT_RT 1.20	Outline the anatomy relevant to vascular access in resuscitation: specifically for safe cannulation of antecubital, saphenous jugular and subclavian veins and placement of intraosseous infusion devices	Describe the anatomy (including ultrasound anatomy) relevant to vascular access in resuscitation: specifically for safe cannulation of antecubital, saphenous, jugular and subclavian veins and placement of intraosseous infusion devices	Describe Add ultrasound (to match BT_GS 1.72)
BT_GS 1.70	Describe the anatomy including ultrasonic anatomy of the	Describe the anatomy (including ultrasound anatomy) of the	Change ultrasonic to ultrasound

	peripheral venous system relevant to performing intravenous cannulation	peripheral venous system relevant to performing intravenous cannulation and PICC line insertion	Add PICC lines
BT_GS 1.72	Describe the anatomy and anatomical relations of the great veins relevant to performing central venous cannulation, including the ultrasound anatomy		
BT_GS 1.74	Describe the anatomy of the radial, brachial, femoral and dorsalis pedis arteries and their anatomical relations relevant to arterial cannulation including the ultrasound anatomy	Outline the anatomy of the radial, brachial, femoral and dorsalis pedis arteries and their anatomical relations relevant to arterial cannulation including the ultrasound anatomy	Outline (less detail expected c/w venous anatomy)
BT_RT 1.21	Outline the anatomy relevant to the drainage of pericardial fluid	Delete from curriculum	Doing a needle pericardiocentesis is no longer taught in the EMST course Management of pericardial tamponade is well covered in FEx LOs SS_CS 1.23, AT_RT 2.1, AT_RT 1.8, AT_RT 1.9
neuraxial			
BT_RA 1.4	Describe the anatomy of the vertebral column spinal cord and meninges relevant to the performance of central neuraxial block with appropriate surface markings.	Describe the anatomy of the vertebral column spinal cord and meninges relevant to the performance of central neuraxial block with appropriate surface markings.	add link to LO in obstetric section (but keep it located within maternal section as more specialised and best studied later)

		see also SS_OB 1.7	
BT_RA 1.17	Describe the midline and paramedian approaches to the sub-arachnoid space and epidural space		

2. FUNDAMENTAL PHARMACOLOGY

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
pharmacodynamics			
BT_GS 1.1	Explain the concept of drug action with respect to: · Receptor theory · Enzyme interactions · Physico-chemical interactions		
BT_GS 1.2	Explain receptor activity with regard to: · Ionic fluxes · Second messengers and G proteins · Nucleic acid synthesis · Evidence for the presence of receptors · Regulation of receptor number and activity		
BT_GS 1.3	Define and explain dose-effect relationships of drugs with reference to: · Graded and quantal response · Therapeutic index · Potency and efficacy		

	· Competitive and non-competitive antagonists · Partial agonists, mixed agonist-antagonists and inverse agonists · Additive and synergistic effects of drug combinations		
BT_GS 1.4	Describe efficacy and potency with reference to dose-response curves		
BT_GS 1.5	Explain the law of mass action and describe affinity and dissociation constants	Explain the law of mass action and dynamic equilibrium. Describe receptor affinity and dissociation constants.	Reworded to make clearer.
BT_GS 1.6	Describe the mechanisms of adverse drug effects		
pharmacokinetics			
BT_GS 1.7	Explain the concept of pharmacokinetic modelling of single and multiple compartment models and define: · Half life · Clearance · Zero and first order kinetics · Volume of distribution		

	· Bio-availability · Area under the plasma concentration time curve · Extraction ratio		
BT_GS 1.8	Describe absorption and factors that will influence it with reference to clinically utilised sites of administration	Describe drug absorption with reference to clinically utilised routes of administration	Simplify and make clearer
BT_GS 1.9	Describe factors influencing the distribution of drugs (for example, protein binding, lipid solubility, pH, pKa) and their alteration in physiological and pathological disturbance		
BT_GS 1.10	Describe the mechanisms of drug clearance and how physiological and pathological disturbance may affect these		
BT_GS 1.11	Describe the mechanisms of non-hepatic and hepatic metabolism of drugs including: • Phase 1 and phase 2 reactions • Hepatic extraction ratio and its significance • First pass effect, enzyme induction and inhibition	Describe the mechanisms of non-hepatic and hepatic metabolism of drugs including: • Phase 1 and phase 2 reactions • Hepatic extraction ratio and its significance • First pass effect • Enzyme induction and inhibition	Last bullet point had 2 unrelated parts – makes more sense to have enzyme induction/inhibition as its own bullet point

BT_GS 1.12	Explain and describe the clinical application of concepts related to intravenous and infusion kinetics including: · Effect-site and effect-site equilibration time · Concept of context sensitive half time · Calculation of loading and maintenance dosage regimens	Explain and describe the clinical application of concepts related to intravenous and infusion kinetics including: · Effect-site and effect-site equilibration time · Concept of context sensitive half time · Calculation of loading and maintenance dosage regimens See also BT_GS 1.59	Add important link to a closely related LO on TCI
BT_GS 1.13	Explain clinical drug monitoring with regard to peak and trough concentrations, minimum therapeutic concentration and toxicity	Outline clinical drug monitoring with regard to peak and trough concentrations, minimum therapeutic concentration and toxicity	Outline
variability in drug response			
BT_GS 1.14	Develop an understanding of variations in individual drug responses together with clinical application of this knowledge	Discuss the variations in individual drug responses, and apply this concept to clinical situations.	More appropriate wording
BT_GS 1.15	Define tachyphylaxis, tolerance, addiction, dependence and idiosyncrasy and describe mechanisms of tolerance	Define tachyphylaxis, tolerance, addiction, dependence and idiosyncrasy. Describe mechanisms of tolerance.	Clearer meaning if worded as 2 sentences

BT_GS 1.16	Describe alterations to drug response due to physiological change with particular reference to the elderly	Describe alterations to pharmacokinetics and pharmacodynamics due to physiological changes with particular reference to the elderly and obesity. See also SS_OB 1.1, SS_PA 1.52 and SS_PA 1.53	Make words plural. Change “drug response” to “pharmacokinetics and pharmacodynamics”. Add obesity. Add links to pregnancy and paeds LO on the same concept.
BT_GS 1.17	Describe alterations to drug response due to pathological disturbance with particular reference to cardiac, respiratory, renal and hepatic disease	Describe alterations to pharmacokinetics and pharmacodynamics due to pathological disturbance with particular reference to cardiac, respiratory, renal and hepatic disease	Change “drug response” to “pharmacokinetics and pharmacodynamics”.
BT_GS 1.19	Describe the mechanisms of drug interaction	Describe the mechanisms of drug interactions	plural
BT_GS 1.20	Describe and give examples of the clinical importance of pharmacogenetic variation, for example, atypical cholinesterase, codeine metabolism	Outline and give examples of the clinical importance of pharmacogenetic variation, for example, atypical plasma cholinesterase, and CYP450 variations	Outline change codeine metabolism to CYP450 variations to broaden this beyond 1 example
BT_GS 1.21	Describe and give examples of the clinical importance of isomerism	Outline and give examples of the clinical importance of isomerism	Outline
pharmaceutics			

BT_GS 1.22	Describe the mechanisms of action and potential adverse effects of buffers, anti-oxidants, anti-microbial and solubilising agents added to drug	Outline the mechanisms of action and potential adverse effects of buffers, anti-oxidants, anti-microbial and solubilising agents added to drug	Outline

3. CELLULAR PHYSIOLOGY

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_PO 1.82	Outline basic cellular physiology in particular • The structure of the cell membrane and trans-membrane transport mechanisms • The composition and regulation of intracellular fluid • The generation of the trans-membrane potential • Energy production by metabolic processes in cells	Outline basic cellular physiology in particular • The structure of the cell membrane and trans-membrane transport mechanisms • The composition and regulation of intracellular fluid • The generation of the trans-membrane potential • Protein synthesis	Add protein synthesis Re-locate “energy production” to the nutrition/metabolism section, as a new LO (BT_PO 1.82a) (because it needs a higher level of understanding)

4. GENERAL ANAESTHETIC AGENTS & SEDATIVES

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
inhalational			
BT_GS 1.23	Describe the physical properties of inhalational agents, including the: · Principles of vaporisation of inhalational agents · Properties of an ideal inhalational anaesthetic agent · Structure-activity relationships of inhalational agents		
BT_GS 1.24	Describe the uptake, distribution and elimination of inhalational anaesthetic agents and the factors which influence induction and recovery from inhalational anaesthesia including the: · Concepts of partition coefficients, concentration effect and second gas effect · Relationships between inhaled and alveolar concentration · Significance of the distribution of cardiac		

	output and tissue partition coefficients on uptake and distribution of volatile agents		
BT_GS 1.25	Describe the effects of inhalational agents on the cardiovascular, respiratory and central nervous systems		
BT_GS 1.26	Describe the toxicity of inhalational agents		
BT_GS 1.27	Describe the pharmacology of nitrous oxide		
BT_GS 1.28	Describe the comparative pharmacology of nitrous oxide, halothane, enflurane, isoflurane, desflurane, sevoflurane, xenon and ether	Describe the comparative pharmacology of - nitrous oxide, sevoflurane, desflurane Outline the comparative pharmacology of - isoflurane, methoxyflurane, ether, halothane, xenon	Split into 2 sections Expect detailed knowledge for N2O, sevo, des only Basic knowledge for others Delete enflurane / add methoxy
BT_GS 1.50	Describe the concept and clinical application of MAC in relation to inhaled anaesthetic agents		
intravenous			

BT_GS 1.29	Describe the physical properties of sedative/hypnotic agents, including: · Formulation · Properties of an ideal agent · Structure-activity relationships	Outline the physical properties of sedative/hypnotic agents, including: · Formulation · Properties of an ideal agent · Structure-activity relationships	Outline
BT_GS 1.30	Describe and compare the pharmacokinetics of intravenous induction and sedative agents, the factors which affect recovery from intravenous anaesthesia and the clinical implications of these differences	Discuss the pharmacokinetics of IV anaesthetic and sedative agents, including - onset and offset - clinical implications of differences between drugs See also BT_GS 1.59 and 1.59a	Reworded to make meaning clearer Add link to related LOs on TIVA
BT_GS 1.31	Describe and compare the pharmacodynamics of intravenous induction and sedative agents and in particular the effects on the cardiovascular, respiratory and central nervous systems	Discuss the comparative pharmacology of IV anaesthetic and sedative agents, in particular the effects on the central nervous, respiratory, and cardiovascular systems	Clearer wording (similar to wording to similar LO on inhalational agents BT_GS 1.28)
BT_GS 1.32	Describe the adverse effects of individual induction, sedative and premedicant agents		
BT_GS 1.34	Outline the pharmacology and clinical use of flumazenil		

BT_GS 1.59	Describe the pharmacological principles of and sources of error with target controlled infusion	Discuss the pharmacokinetics and pharmacodynamics of target controlled infusions, including the concepts of - multi-compartment model and rate constants - effect site (biophase) and ke0 - the relationship between plasma and effect site concentration - altered response due to factors including age, obesity, and cardiac output - sources of error	Improved, more specific, wording
BT_GS 1.59a		Outline the similarities and differences between commonly used TCI models	New LO needed on TCI models (implied in above LO but not made explicit)
integrated			
BT_GS 1.49	Discuss proposed mechanisms of anaesthesia and the sites of action of anaesthetic agents including the physiology and pharmacology of neurotransmitters and their receptors (that is GABA, excitatory amino acids, acetylcholine, noradrenaline, dopamine and serotonin)	Outline the proposed mechanisms of anaesthesia, and the sites of action of anaesthetic agents.	Outline Simplify wording (no need to list every neurotransmitter)

BT_GS 1.51	Describe the concept of depth of anaesthesia and how this may be monitored	Describe the concept of depth of anaesthesia and how this may be assessed	Change “monitored” to “assessed” – to bring in clinical assessment methods. The EEG is considered in more detail under separate LOs
BT_GS 1.51a	Outline the aetiology of and measures to prevent intra-operative awareness under general anaesthesia		
BT_GS 1.53	Describe the synergism between anaesthetic agents, opioids and regional blockade and how this is used clinically		
BT_GS 1.54	Describe techniques to balance anaesthetic depth with changing surgical stimulus	Delete from PEx	Clinical LO Map to FEx and WBAs
BT_GS 1.57	Explain the techniques of intravenous and inhalational induction and describe clinical indications and advantages and disadvantages of both techniques	Delete from PEx	Clinical LO Map to FEx and WBAs
BT_GS 1.48	Describe the effects of anaesthetic agents on regional circulation	Describe the effects of anaesthetic agents on regional circulations	make circulations plural
BT_GS 1.60	Describe the physiological effects of anaesthesia on the respiratory system and its clinical management (also refer to the	Describe the physiological effects of anaesthesia on the respiratory system and its clinical management	No need for “also refer to…”

	Airway management clinical fundamental)		
BT_GS 1.61	Discuss the effects of anaesthesia on the immune, haematological and endocrine systems	Outline the effects of anaesthesia on the immune, haematological and endocrine systems	Outline
BT_GS 1.33	Describe how physiological and pathological disturbance can alter the pharmacology of intravenous anaesthetic agents	Describe alterations to the pharmacokinetics and pharmacodynamics of inhalational and intravenous anaesthetic agents for example - elderly - obesity - cardiac, respiratory, renal, and hepatic disease See also SS_OB 1.1, SS_PA 1.52 and SS_PA 1.53	Reworded to cover both inhalational and IV agents. The wording mirrors BT_GS 1.16 and 1.17. Add links to similar LO on pregnancy and paeds
BT_GS 1.46	Discuss factors influencing choice of agents for: · Sedation · Induction and maintenance of anaesthesia · Muscle relaxation	Delete from PEx	Better assessed in IAACQ, WBAs and FEx

5. RESPIRATORY SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
BT_PO 1.7	Outline the anatomy of the lower airways	Outline the anatomy of the lungs, tracheobronchial tree, and alveoli. See also BT_AM 1.1	Clearer meaning and intent as anatomy relevant to undertsnading physiology (as distinct from bronchoscopic anatomy for DLTs etc, covered by SS_TS 1.1)
physiology			
control			
BT_PO 1.9	Describe the neural and chemical control of ventilation via central and peripheral chemoreceptors and indicate how this is altered by anaesthesia and abnormal clinical states		
mechanics			
BT_PO 1.6	Discuss the structure of the chest wall and diaphragm and the implications for respiratory mechanics	Outline the structure of the chest wall and diaphragm and the implications for respiratory mechanics	Outline

BT_PO 1.11	Define compliance (static, dynamic and specific) and relate this to the elastic properties of the lung		
BT_PO 1.12	Discuss ‘fast’ and ‘slow’ alveoli, including the concept of ‘time constants’	Describe ‘fast’ and ‘slow’ alveoli, including the concept of ‘time constants’	Describe
BT_PO 1.13	Describe the elastic properties of the chest wall and plot pressure-volume relationships of the lung, chest wall and the total respiratory system		
BT_PO 1.14	Explain the vertical gradient of pleural pressure and its significance		
BT_PO 1.10	Describe the properties of surfactant and relate these to its role in influencing respiratory mechanics		out of numerical sequence but appropriate for constructive alignment
BT_PO 1.15	Explain the physics of gas flow and the significance of the relationship between resistance and flow in the respiratory tract		
BT_PO 1.16	Describe the factors affecting airway resistance and how airway resistance may be measured		

BT_PO 1.17	Describe closing capacity and its relationship to airway closure and explain its clinical significance and measurement		
BT_PO 1.18	Describe the work of breathing		
BT_PO 1.19	Describe altered lung mechanics in common disease states		
pulmonary gas volumes			
BT_PO 1.20	Discuss lung volumes and capacities, their measurement and normal values	Describe lung volumes and capacities, their measurement and normal values	Describe
BT_PO 1.21	Discuss dead space, its measurement and apply the Bohr equation and alveolar gas equation	Describe dead space, its measurement and apply the Bohr equation and alveolar gas equation	Describe
BT_PO 1.22	Describe the composition of ideal alveolar and mixed expired gases		
pulmonary circulation			
BT_PO 1.8	Outline the anatomy of the pulmonary and bronchial circulations		

BT_PO 1.33	Discuss the difference between the pulmonary and systemic circulations	Describe the difference between the pulmonary and systemic circulations	Describe
BT_PO 1.34	Discuss pulmonary vascular resistance and the control of pulmonary vascular tone	Describe pulmonary vascular resistance and the control of pulmonary vascular tone	Describe
V/Q relationships			
BT_PO 1.26	Discuss normal ventilation-perfusion matching	Describe normal ventilation-perfusion matching	Describe
BT_PO 1.27	Discuss West's zones of the lung	Describe West's zones of the lung	Describe
BT_PO 1.28	Describe the shunt equation		
BT_PO 1.29	Discuss regional ventilation-perfusion inequalities, venous admixture and the effect on oxygenation and carbon dioxide elimination	Discuss regional ventilation-perfusion inequalities and abnormalities, venous admixture, and the effect on oxygenation and carbon dioxide elimination	add "and abnormalities"
BT_PO 1.30	Outline methods used to measure ventilation-perfusion inequalities	Delete from curriculum	Equations for calculating dead space and shunt are already included above under separate LOs. The science of imaging techniques such as VQ or SPECT scans are outside the scope of this curriculum.

			Clinically applied knowledge of VQ scans is incorporated in AT_PO 2.5
diffusive transfer of gases			
BT_PO 1.23	Describe the oxygen cascade		
BT_PO 1.24	Describe the alveolar exchange of oxygen and carbon dioxide		
BT_PO 1.25	Discuss diffusion capacity and its measurement	Describe diffusion capacity and its measurement	Describe
gas transport in blood			
BT_PO 1.31	Discuss the carriage of oxygen in blood, the oxyhaemoglobin dissociation curve, oxygen stores in the blood and their clinical significance and implications		
BT_PO 1.32	Discuss the carriage of carbon dioxide in blood, the carbon dioxide dissociation curve and their clinical significance and implications		
applied			
BT_AM 1.2	Describe the physiology of the airway including airway reflexes	Outline the physiology of the airway including airway reflexes	Outline

BT_PO 1.35	Discuss the physiological consequences of intermittent positive pressure ventilation and positive end-expiratory pressure		
IT_AM 1.9	Describe preoxygenation, including its physiological basis		This is one of only 2 IT LOs mapped to PEx that is not duplicated by other BT LOs. Suggest add a new LO (BT_PO 1.35a) but with the same wording in order to complete the separation of IT LOs from PEx
BT_PO 1.35a		Describe preoxygenation, including its physiological basis	
BT_PO 1.36	Discuss the physiological effects of hypoxaemia, hyper and hypocapnia, and carbon monoxide poisoning		
BT_RT 1.10	Outline the causes of hypoxaemia	Classify and describe the causes of hypoxia and hypoxaemia	Classify and describe – more detail is needed in this LO
BT_RT 1.11	Describe the physiological consequences of hypoxaemia	Describe the physiological consequences of hypoxia and hypoxaemia	Wording matches above
BT_RT 1.38	Define respiratory failure and differentiate between type 1 and type 2 respiratory failure		
BT_RT 1.39	Interpret blood gas analysis in respiratory failure		

BT_AM 1.4	Describe the physiological consequences of anaesthesia and patient positioning on the respiratory system and their management (also refer to the *General anaesthesia and sedation* clinical fundamental)	Describe the physiological consequences of anaesthesia and patient positioning on the respiratory system	Simplify wording No need for “(also refer to …)”
BT_AM 1.19	Describe different modes of ventilation available on modern ventilators and their physiological consequences	Describe different modes of mechanical ventilation and their physiological consequences	More appropriate wording
IT_GS 1.8	Outline the physiological changes that occur with and the implications for anaesthetic management of pneumoperitoneum	Delete from PEx	Duplicated by other LOs (BT_PO 1.37 and BT_PO 1.48) Retain in IT for IAACQ
pharmacology			
BT_PO 1.40	Describe the pharmacology of anti-asthma drugs, including beta 2 agonists, corticosteroids, anticholinergics, leukotriene antagonists and theophylline	Outline the pharmacology of anti-asthma drugs	Outline delete examples
BT_PO 1.41	Outline the pharmacology of drugs used to treat pulmonary hypertension including nitric oxide		

BT_PO 1.41a	Discuss oxygen therapy including methods of delivery, indications and contraindications, physiological and pathophysiological effects		

6. AUTONOMIC NERVOUS SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy and physiology			
BT_PM 1.2	Describe the anatomy of the autonomic nervous system		
BT_PO 1.51	Describe the autonomic nervous system and its physiological roles including: · Autonomic receptors and cellular effects of receptor activation · Autonomic transmitters, their synthesis, release and fate		
pharmacology			
see Cardiovalscular Pharmacology BT_PO 1.52 BT_PO 1.53 BT_PO 1.54 BT_RT 1.17 BT_RT 1.18			

7. CARDIOVASCULAR SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
BT_PO 1.42	Describe the anatomy of the heart including the coronary circulation and territories supplied		
physiology			
electrical			
BT_PO 1.43	Discuss the physiological basis of electrical activity and its relationship to mechanical events including the: · Ionic basis of automaticity the normal and abnormal processes of cardiac excitation · Physiological basis of the electrocardiograph in normal and common pathological states · Factors that may influence cardiac electrical activity	Describe the physiological basis of electrical activity and its relationship to mechanical events including the: · Ionic basis of automaticity the normal and abnormal processes of cardiac excitation · Physiological basis of the electrocardiograph in normal and common pathological states · Factors that may influence cardiac electrical activity	Describe

	· Correlation of the mechanical events of the cardiac cycle with the electrical and ionic events	· Correlation of the mechanical events of the cardiac cycle with the electrical and ionic events	
cardiac output, blood pressure, and regional circulations			
BT_PO 1.44	Describe the physiology of cardiac muscle and the mechanism of excitation contraction coupling		
BT_PO 1.44a		Describe the events of the cardiac cycle using a Wiggers diagram and pressure-volume loop	new LO needed to make clear that this is required knowledge (implied in other LOs)
BT_PO 1.45	Discuss the factors that determine and control cardiac output and the implications for clinical practice including: · Preload, afterload and contractility · The Frank-Starling mechanism · Cardiac output and vascular function curves		

	· Pressure volume relationships in the heart		
BT_PO 1.46	Describe the factors determining myocardial oxygen supply and demand and their clinical implications		
BT_PO 1.47	Discuss the control of blood pressure and the distribution of blood volume and flow throughout the cardiovascular system including: · The factors determining systemic blood pressure and its regulation and control · Total peripheral resistance and factors affecting it · The relationship between organ blood flow and demand and the role of autoregulation · Clinically significant features of the coronary, cerebral, skin, muscle, renal, hepatic and splanchnic circulations · The essential features of the microcirculation including fluid		

	exchange and its control		
applied			
BT_PO 1.48	Discuss the cardiovascular responses to: · Changes in posture · Exercise · Valsalva maneouvre · Positive pressure ventilation and PEEP · Pneumoperitoneum · Haemorrhage and hypovolaemia · Surgery and trauma	Discuss the cardiovascular responses to: · Changes in posture · Exercise · Valsalva manoeuvre · Positive pressure ventilation and PEEP · Pneumoperitoneum · Haemorrhage and hypovolaemia · Surgery and trauma	correct the spelling of manoeuvre
BT_PO 1.49	Describe the cardiovascular changes that occur with ageing		
BT_PO 1.50	Describe the cardiovascular changes that occur with morbid obesity	Outline the cardiovascular changes that occur with morbid obesity	Outline
IT_GS 1.8	Outline the physiological changes that occur with and the implications for anaesthetic	Delete from PEx	Duplicated by BT_PO 1.48 Retain in IT for IAACQ

	management of pneumoperitoneum		
shock			
BT_RT 1.1	Define shock	Define shock. Classify and describe causes of shock based on the underlying pathophysiological mechanisms.	Clearer meaning and depth
BT_RT 1.2	Integrate knowledge of factors determining cardiac output to classify causes of shock	Discuss different types of shock with reference to the determinants of cardiac output	Clearer meaning
BT_RT 1.3	Describe the physiological consequences of shock		
BT_RT 1.4	Describe oxygen delivery and outline the use of indicators of tissue oxygenation (base deficit, lactate, mixed venous oxygen saturation) in resuscitation		
BT_RT 1.30	Outline how the clinical signs of shock may be altered by age		
pharmacology			
BT_PO 1.52	Describe the mechanism of action and effects of sympathomimetic and anticholinergic drugs used clinically	Describe the mechanism of action and effects of sympathomimetic and anticholinergic drugs	Delete “used clinically”

BT_PO 1.53	Describe the pharmacology and clinical application of adrenergic agonists		
BT_PO 1.54	Describe the pharmacology of commonly used alpha and beta receptor blocking agents, their clinical use, adverse effects and use in the perioperative period	Outline the pharmacology of commonly used alpha and beta receptor blocking agents	Outline remove unnecessary wording
BT_PO 1.55	Outline clinically important drug interactions with the autonomic nervous system	Outline clinically important drug interactions with the autonomic nervous system (e.g. tricyclic antidepressants, monoamine oxidase inhibitors)	give examples to make meaning clearer (examples are justified here otherwise it could be an obscure LO)
BT_PO 1.56	Describe the physiological and pharmacological basis of antiarrhythmic therapy including classification based on electro-physiological activity and mechanism of action	Outline the physiological and pharmacological basis of classifying antiarrhythmic agents	Outline simplify wording
BT_PO 1.57	Describe the pharmacology of antiarrhythmic agents and their clinical applications including the following agents: lignocaine, flecainide, beta blockers, amiodarone, sotalol, ibutilide, calcium antagonists, digoxin, adenosine and magnesium	Describe the pharmacology of amiodarone. Outline the pharmacology of other antiarrhythmic agents	Describe for amiodarone (higher level knowledge expected). Outline for others Simplify wording and remove examples

BT_PO 1.58	Describe the pharmacology of anti-hypertensive agents and their clinical application, including the following agents: clonidine, alpha-methyl dopa, alpha and beta blockers, nitric oxide, sodium nitroprusside and glyceryl trinitrate, calcium antagonists, ACE inhibitors and angiotensin receptor antagonists, hydralazine and the potassium channel activators	Describe the pharmacology of • Glyceryl trinitrate • Sodium nitroprusside Outline the pharmacology of other antihypertensive agents	Describe for GTN and SNP (higher level knowledge expected) Outline for others Remove examples except GTN and SNP
BT_PO 1.59	Describe the pharmacology of drugs used to manage myocardial ischaemia/infarction, including: nitrates, beta blockers, calcium antagonists, anti-platelet agents, anti-coagulants and fibrinolytic agents	Outline the pharmacology of drugs used to manage myocardial ischaemia/infarction	Outline Simplify and remove examples
BT_PO 1.60	Describe the pharmacology of drugs used to manage acute or chronic cardiac failure, including: sympathomimetics, phosphodiesterase inhibitors, digoxin, diuretics, ACE inhibitors, nitrates and beta blockers	Outline the pharmacology of drugs used to manage acute or chronic cardiac failure	Outline Simplify and remove examples (note more detail on sympathomimetics covered in other LO's)
BT_RT 1.17	With reference to the management of shock, describe the pharmacology of vasopressors and inotropes, including:	With reference to the management of shock, describe the pharmacology of vasopressors and inotropes	Simplify and remove examples

	adrenaline, noradrenaline, phenylephrine, metaraminol, dopamine, dobutamine, phosphodiesterase inhibitors, vasopressin		
BT_RT 1.18	With reference to cardiopulmonary resuscitation, describe the pharmacology of adrenaline, vasopressin, amiodarone and lignocaine	With reference to cardiopulmonary resuscitation, describe the pharmacology of drugs listed in the current ACLS guidelines	Delete examples - replace with “current ACLS guidelines”

8. RENAL SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_PO 1.61	Describe the functional anatomy of the kidneys and urinary tract	Outline the functional anatomy of the nephron	Outline Change “kidneys and urinary tract” to “nephron” – this relates to the subsequent physiology No need for gross renal anatomy in PEx
BT_PO 1.62	Explain the physiology of renal blood flow		
BT_PO 1.63	Describe glomerular filtration and tubular function		
BT_PO 1.64	Explain the counter-current mechanisms in the kidney		
BT_PO 1.65	Explain the mechanisms involved in the regulation of renal function		
BT_PO 1.66	Outline the endocrine functions of the kidney		

BT_PO 1.67	Describe the role of the kidney in the handling of glucose, nitrogenous products and drugs		
BT_PO 1.68	Describe the principles of measurement of glomerular filtration rate and renal blood flow		
BT_PO 1.69	Describe the physiological effects and clinical assessment of renal dysfunction		
BT_PO 1.70	Explain the renal responses to hypovolaemia		
BT_PO 1.71	Explain the effects of anaesthesia on renal function	Outline the effects of anaesthesia on renal function	Outline
pharmacology			
BT_PO 1.80	Describe alterations to drug response due to renal disease		
BT_PO 1.81	Outline a physiological basis of classifying diuretics related to their site of action	Classify diuretics based on their site of action	Simpler wording
BT_PO 1.82	Describe the pharmacology of diuretics including mannitol, frusemide, thiazides, aldosterone antagonists and carbonic anhydrase inhibitors	Outline the pharmacology of diuretics	Outline Simplify and remove examples

9. FLUIDS AND ELECTROLYTES

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
IT_GS 1.5	Describe the chemical composition of crystalloids and colloids used in clinical practice and their effects when used in volume replacement	Remove from PEx Retain in IT for IAACQ	Need 2 new LO's for fluids to cover appropriate level for PEx (see 1.77a and 1.78b, below)
BT_PO 1.72	Describe the function, distribution and physiological importance of sodium, potassium, magnesium, calcium and phosphate ions	Describe the function, distribution and physiological importance of sodium, chloride, potassium, magnesium, calcium and phosphate ions	Add chloride
BT_PO 1.73	Describe the mechanisms involved in the maintenance of fluid and electrolyte balance		
BT_PO 1.74	Outline the constituents and functions of plasma		
BT_PO 1.75	Define osmotic pressure and explain the factors that determine it	Define osmotic pressure and outline the factors that determine it	Outline
BT_PO 1.76	Describe the regulation of osmolality		
BT_PO 1.77	Outline the significance of oncotic pressure, colloid osmotic pressure and reflection coefficients		

BT_PO 1.77a		Describe the body fluid ‘compartments’ and the movement of fluid between compartments	New LO -- Needed to make sense of the distribution of IV fluids
BT_PO 1.77b		Describe the chemical composition of crystalloids and colloids, and their use as volume replacement and maintenance fluid, including potential adverse effects	New LO – appropriate level for PEx -- addition of ‘maintenance fluids’ and adverse effects (compared with IT_GS 1.5)

10. ACID BASE

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_PO 1.78	Describe the regulation of acid/base balance		
BT_PO 1.79	Describe acid-base chemistry using the Henderson-Hasselbach equation and strong ion difference		
BT_PO 1.79a	Explain the principles of blood gas and acid-base analysis, and interpret blood gas analysis in clinical situations.	Interpret blood gases in clinical situations.	Simplify and make wording the same as BT_RT 1.39 Removing “explain the principles of…” makes clear that the physics of Clark, Severinghaus and pH electrodes is NOT examinable (was included in old Syllabus)

11. NERVOUS SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
BT_RT 1.23	Outline the anatomy of the cerebral and spinal cord circulation		
physiology			
BT_RA 1.1	Describe the physiology of nerve conduction		
BT_PO 1.92	Outline the basic electrophysiology of nerve conduction	Describe the physiology of nerve conduction	Make the same wording as BT_RA 1.1 (above)
BT_PO 1.93	Describe the physiology of sleep	Outline the difference between normal sleep and anaesthesia, including the EEG	makes the point of this LO clearer the whole “physiology of sleep” is an enormous area – outside the scope of anaesthesia
BT_PO 1.95	Discuss the determinants and control of: · Intracranial and intraspinal pressure		

	· Cerebral blood flow and autoregulation · Cerebral perfusion pressure · Spinal cord perfusion		
BT_PO 1.96	Discuss the significance of the blood brain barrier	Outline the structure and function of the blood brain barrier	Outline Clearer wording
BT_PO 1.97	Describe the dynamics and metabolism of cerebrospinal fluid	Outline the production, reabsorption, and role of cerebrospinal fluid	Outline Clearer wording
BT_PO 1.98	Describe cerebral and spinal cord metabolism including energy production, effects of temperature and factors leading to cell damage and cell death	Outline cerebral and spinal cord metabolism including energy production, effects of temperature and factors leading to cell damage and cell death	Outline
BT_RT 1.12	Outline the factors determining intracranial pressure and discuss its regulation	Discuss the factors determining intracranial pressure and its regulation	Discuss (for whole LO)
BT_RT 1.13	Describe the cerebral circulation, the regulation of cerebral blood flow and factors leading to the loss of autoregulation	Describe the regulation of cerebral blood flow, and factors leading to loss of autoregulation	Remove ‘the cerebral circulation’ – anatomy covered in BT_RT 1.23
BT_RT 1.14	Discuss cerebral perfusion pressure	Describe cerebral perfusion pressure	Describe

BT_RT 1.15	Describe the blood supply to the spinal cord and the regulation of spinal cord blood flow	Outline the blood supply to the spinal cord and the regulation of spinal cord blood flow	Outline
BT_RT 1.16	Discuss spinal cord perfusion pressure	Describe spinal cord perfusion pressure	Describe
BT_RA 1.2	Describe the physiological consequences of a central neuraxial block		
pharmacology			
BT_PO 1.98a		Outline the pharmacology of hyperosmolar solutions used to decrease brain volume	New LO needed – not covered elsewhere (previously the IV fluids or diuretics LOs were used to cover this)
BT_PO 1.99	Outline the pharmacology of anti-depressant, anti-psychotic, anti-convulsant, anti-parkinsonian and anti-migraine medication		
BT_PO 1.101	Outline the pharmacology of drugs acting via effects on serotonin or serotonin receptors		
BT_PO 1.102	Discuss the clinical features and management of serotonin syndrome	Outline the clinical features and management of serotonin syndrome	Outline

12. PAIN

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
BT_RA 1.7	Describe the pain and sensory pathways	Describe the anatomy of the sensory pathways with particular reference to pain sensation	Make same wording as BT_PM 1.1 (below)
BT_PM 1.1	Describe the anatomy of the sensory pathways with particular reference to pain sensation		
BT_RA 1.5	Describe the dermatomal innervations	Outline the dermatomal innervations	Outline
BT_RA 1.6	Describe the myotomal innervation	Outline the myotomal innervations	Outline
physiology			
BT_PM 1.3	Describe the basic physiological mechanisms of pain including: · Peripheral nociception · Conduction · Spinal cord modulation · Central processing of pain		

	· Mediators, pathways and reflexes · Peripheral and central sensitisation · Pre-emptive and preventive analgesia		
BT_PM 1.4	Describe the physiological mechanism of progression from acute to chronic pain	Outline the physiological mechanism of progression from acute to chronic pain	Outline
BT_PM 1.5	Describe the injury response to acute pain	Delete from curriculum	Unclear meaning
BT_PM 1.6	Describe the applied physiology and psychology of neuropathic pain	Outline the physiology of neuropathic pain	Psychology outside PEx scope. This aspect is already covered by AT_PM 1.10, SS_OR 1.25, AT_PM 1.2
BT_PM 1.7	Outline the effects of pain and analgesia on injury-induced organ dysfunction	Delete from curriculum	Unclear meaning
BT_PM 1.8	Describe the alterations to physiology and perception of pain in the older patient		
pharmacology			
general			

IT_PM 1.3	Outline the basic concepts of multimodal analgesia and pre-emptive analgesia	Delete from PEx Retain in IT	Already covered within BT_PM 1.3 Retain in IT – assess via IAACQ
IT_PM 1.4	Outline the basic pharmacology and clinical use of available analgesic agents	Delete from PEx Retain in IT	Covered by multiple other, more specific, LOs Retain in IT – assess via IAACQ
BT_PM 1.9	Describe the pharmacology of the following agents applicable to pain management, including: · Opioids · Tramadol · Tapentadol · Local anaesthetic agents (also refer to the *Regional and local anaesthesia* clinical fundamental) · NSAIDs · Paracetamol · NMDA antagonists · Anticonvulsants · Antidepressants	Describe the pharmacology of the following agents applicable to pain management: · Opioids · Tramadol · Tapentadol · Local anaesthetic agents · NSAIDs · Paracetamol · NMDA antagonists · Inhalational analgesics – nitrous oxide, methoxyflurane	Change the level of some to "outline" to be consistent with other LOs Simplify some wording

	· Corticosteroids · Inhalational analgesics – nitrous oxide, methoxyflurane	Outline the pharmacology of the following agents applicable to pain management: • Anticonvulsants • Antidepressants • Corticosteroids	
BT_PM 1.10	Describe the effect of physiological change and pathological disturbance on the pharmacology of the agents listed in learning outcome BT_PM 1.9, with special reference to the elderly		
BT_PM 1.11	Describe the different modes of administration of analgesic agents and evaluate their clinical application	Remove from curriculum	Duplicated by BT_PM 1.15 below
opioids			
BT_PM 1.12	Describe opioid receptors		
BT_PM 1.13	Describe the mechanisms of action of opioids, including tramadol and tapentadol		
BT_PM 1.14	Describe the actions of agonists, partial agonists, mixed agonists-antagonists and antagonists		

BT_PM 1.15	Discuss the pharmacokinetic and clinical implications of different routes of administration for commonly used opioids, including the oral, transdermal, subcutaneous, intramuscular and intravenous routes	Discuss the pharmacokinetic and clinical implications of different routes of administration for commonly used opioids, including the oral, transdermal, subcutaneous, intramuscular and intravenous routes (including Patient Controlled Analgesia – PCA)	adding PCA to this LO makes BT_PM 1.11 redundant
BT_PM 1.16	Outline the dose conversion between commonly used opioids	Calculate dose conversions between commonly used opioids	Clearer wording
BT_PM 1.17	Describe the pharmacokinetics of intravenous opioids and their clinical applications	Describe the pharmacokinetics and pharmacodynamics of intravenous opioids and evaluate their clinical applications	Combines BT_PM 1.17 and 1.22
BT_GS 1.41	Describe the clinical application of opioids to anaesthesia and sedation (also refer to the *Pain medicine* clinical fundamental)	Describe the clinical application of opioids to anaesthesia and sedation	Simplify wording
BT_GS 1.42	Describe the pharmacokinetics of intravenous opioids (also refer to the *Pain medicine* clinical fundamental)	Describe the pharmacokinetics of intravenous opioids	Simplify wording
BT_PM 1.18	Describe the pharmacology of opioids deposited in the epidural space or cerebrospinal fluid	Describe the pharmacology of epidural or intrathecal opioids	Simpler wording

BT_PM 1.19	Describe the adverse effects of opioids administered by systemic and neuraxial routes and their prevention and management		
BT_PM 1.20	Describe the potential adverse drug interactions between opioids and other agents		
BT_PM 1.21	Describe the pharmacology of opioid antagonists	Outline the pharmacology of opioid antagonists	Outline
BT_PM 1.22	Describe the pharmacodynamics of individual opioids and evaluate their clinical applications	Delete from curriculum	Combine with BT_PM 1.17
local anaesthetics			
BT_RA 1.3	Discuss the pharmacology of local anaesthetic agents including: · Mechanisms of action · Comparative pharmacology of different agents · Toxicity · Use of adjuvant agents to enhance the quality or extend duration of block	Discuss the pharmacology of local anaesthetic agents including: · Mechanisms of action · Comparative pharmacology of different agents · Speed of onset · Duration of action · Toxicity including management	Add • Speed of onset • Duration of action • Include management with toxicity Delete adjuvants (covered by BT_RA 1.16)

	· Pharmacokinetics of drugs administered in the epidural and subarachnoid space	· Pharmacokinetics of drugs administered in the epidural and subarachnoid space	
BT_RA 1.14	Describe factors influencing dose and choice of anaesthetic agents for spinal anaesthesia and epidural anaesthesia/analgesia		
BT_RA 1.15	Describe how the baricity of the agents used and positioning of patients may affect the extent of block in spinal anaesthesia	Outline how the baricity of the agents used and positioning of patients may affect the extent of block in spinal anaesthesia	Outline
BT_RA 1.16	Describe the drugs that may be injected into the intrathecal or epidural space as adjuvant agents to a central neuraxial block and discuss their risks and benefits	Outline the adjuvant agents that may be used with neuraxial and peripheral nerve blocks, including risks and benefits	Outline Simplify wording Combine neuraxial and peripheral (therefore delete adjuvants from BT_RA 1.3)
NSAIDS and paracetamol			
BT_PM 1.23	Describe the prostaglandin pathways and their physiological role in the production of pain	Outline the prostaglandin pathways and their physiological role in nociception	Outline
BT_PM 1.24	Classify non-steroidal anti-inflammatory drugs and outline their pharmacology in relation to enzyme inhibition, mode of	Classify non-steroidal anti-inflammatory drugs and describe their pharmacology	Describe (for second half) Simplify wording

	administration and adverse effects		
BT_PM 1.25	Describe in detail pharmacology of paracetamol including mode of action, clinical utility, metabolism and toxicity, advantages and disadvantages of different routes of administration	Describe the pharmacology of paracetamol, including toxicity	Simplify wording
other			
BT_PM 1.26	Describe the location and role of NMDA receptors	Describe the location, structure, and function of N-methyl-D-aspartate (NMDA) receptors	Clearer wording
BT_PM 1.27	Describe in detail the pharmacology of ketamine including mode of action, clinical utility, metabolism and toxicity, advantages and disadvantages of different routes of administration	Describe the pharmacology of ketamine	Clearer / simpler wording
BT_PM 1.28	Describe the pharmacology of anticonvulsants relevant to pain medicine, including gabapentin and carbamazepine	Outline the pharmacology of gabapentinoids and other anticonvulsants relevant to pain medicine	Outline Reduce examples

13. MUSCULAR SYSTEM

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_GS 1.35	Describe the physiology of the neuromuscular junction and the mechanism of action of neuromuscular blocking agents	Describe the physiology of the neuromuscular junction	Remove pharmacology from this LO (and relocate to BT_GS 1.36 below)
BT_PO 1.98a	Describe the physiology of skeletal muscle including mechanism of excitation contraction coupling and compare and contrast the physiology of skeletal, cardiac and smooth muscle	Outline the physiology of skeletal muscle including mechanism of excitation contraction coupling	Outline Separate this LO into 2, and add 1 new LO (see below)
BT_PO 1.98b		Outline the physiology of smooth muscle	New LO needed -- Needs to be added in order to understand pharmacology of drugs acting on smooth muscle
BT_PO 1.98c		Outline the similarities and differences between skeletal, cardiac, and smooth muscle	New LO – separates this learning point out from BT_PO 1.98a
pharmacology			

BT_GS 1.36	Describe the pharmacokinetics of neuromuscular blocking agents	Describe the mechanism of action and pharmacokinetics of neuromuscular blocking agents	Integrates the pharmacology aspect of BT_PO 1.35, enabling the wording change recommended above
BT_GS 1.37	Describe the pharmacological differences between neuromuscular blocking agents and the clinical importance of these differences.		
BT_GS 1.37a		Describe the onset and offset of neuromuscular blockade at different muscle groups	New LO needed - Not explicitly covered elsewhere - essential to understand timing at add.poll / diaphragm / larynx
BT_GS 1.38	Describe the adverse effects of neuromuscular blocking agents and factors that may modify responses to muscle relaxants		
BT_GS 1.39	Describe the reversal of neuromuscular blockade using anti-cholinesterase agents, anticholinergics and sugammadex and the physiological effects of reversal	Describe the pharmacology of drugs used to reverse neuromuscular blockade	Simplify wording No list
BT_GS 1.40	Describe the adverse effects of anticholinesterase agents		
BT_GS 1.47	Discuss the indications for muscle relaxation in anaesthesia		

BT_GS 1.56	Describe the clinical features and management of inadequate reversal of neuromuscular blockade		
BT_RT 1.19	With reference to the treatment of malignant hyperthermia, describe the pharmacology of dantrolene	Outline the pharmacology of dantrolene in the treatment of malignant hyperthermia	Outline Clearer wording

14. LIVER

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_PO 1.103	Describe the storage, synthetic, metabolic, immunological and excretory functions of the liver and identify the physiological consequences of hepatic disease	Outline the functions of the liver	Outline Simplify
BT_PO 1.104	Describe the anatomical and physiological considerations in hepatic blood flow, and the changes that occur with anaesthesia	Outline the determinants of liver blood flow	Outline simplify
BT_PO 1.105	Describe the portal circulation and its significance	Outline the portal circulation and its significance	outline
BT_PO 1.106	Describe the laboratory assessment of liver function and hepatic failure	Outline the laboratory assessment of liver function and hepatic failure	outline
pharmacology			
BT_PO 1.108	Describe alterations to drug response due to hepatic disease		

15. GASTROINTESTINAL

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_GS 1.43	Outline the physiological basis of vomiting	Describe the physiological basis of vomiting	Describe
BT_PO 1.107	Explain the: · Physiology of swallowing · Factors preventing reflux of gastric contents into the oesophagus · Control of gastric motility and emptying · Composition of gastric fluid · Physiology of nausea and vomiting	Describe the · Physiology of nausea and vomiting Outline the: · Physiology of swallowing · Factors preventing reflux of gastric contents into the oesophagus · Control of gastric motility and emptying · Composition of gastric fluid	Make n&v describe (same as BT_GS 1.43 above) Make other points outline
pharmacology			

BT_GS 1.44	Describe the clinical pharmacology of dopamine antagonists, anti-cholinergic agents, serotonin antagonists, anti-histamines pro-kinetics and steroids relevant to premedication and the management of nausea and vomiting	Describe the pharmacology of anti-emetic and pro-kinetic agents	Simplify wording No list
BT_GS 1.62	Discuss the prevention and management of postoperative nausea and vomiting		
BT_PO 1.109	Outline the pharmacological treatment of peptic ulcer disease and reflux		

16. ENDOCRINE, METABOLISM & NUTRITION

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_PO 1.82b		Describe energy production by metabolic processes in cells	A new LO is needed to separate this topic out from basic overview information in 1.89a. More detail is needed here (e.g. gluconeogenesis, ketone production, lactate), and is then a logical precursor to proceed with the next series of LOs on starvation etc.
BT_PO 1.83	Describe the physiological consequences of starvation	Describe the physiological consequences of fasting and starvation.	Starvation is extreme - adding “fasting” presents this as a continuum and includes what we subject every patient to!
BT_PO 1.84	Discuss the factors that influence metabolic rate	Outline the factors that influence metabolic rate	Outline
BT_PO 1.85	Explain the control of blood glucose		
BT_PO 1.86	Describe the role of the hypothalamus in the integration of neuro-humoral responses	Outline the role of the hypothalamus in the integration of neuro-humoral responses	Outline
BT_PO 1.87	Describe control of secretion and the functions of:	Outline control of secretion and the functions of:	Outline

	· Pituitary hormones · Thyroid hormones · Adrenocortical hormones · Adrenomedullary hormones · Renin and angiotensin · Atrial natriuretic peptide	· Pituitary hormones · Thyroid hormones · Adrenocortical hormones · Adrenomedullary hormones · Renin and angiotensin · Atrial natriuretic peptide	
BT_PO 1.88	Describe the regulation of plasma calcium including the actions and control of vitamin D, parathormone and calcitonin	Outline the regulation of plasma calcium including the actions and control of vitamin D, parathormone and calcitonin	Outline
BT_PO 1.89	Outline the role of prostaglandins and other autocoids		
pharmacology			
BT_PO 1.90	Describe the pharmacology of: · Insulin preparations · Oral hypoglycaemics · Corticosteroid drugs	Outline the pharmacology of: Insulin preparations Oral hypoglycaemics	Outline remove corticosteroids from this LO to make it just about the treatment of diabetes

BT_PO 1.91	Outline the pharmacology of: · Thyroid hormone replacement and anti-thyroid drugs · Glucagon · Vasopressin and analogues	Outline the pharmacology of: · Thyroid hormone replacement and anti-thyroid drugs · Corticosteroids · Glucagon · Vasopressin and analogues	Move Corticosteroids here instead of BT_PO 1.90 (to this miscellaneous group)

17. HAEMATOLOGY AND TRANSFUSION

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_PO 1.110	Describe the physiological consequences of acute and chronic anaemia	Describe the physiological consequences of acute and chronic anaemia, including iron deficiency.	Add iron deficiency. Managing this preoperatively is now an established role for anaesthetists.
BT_PO 1.111	Outline the major haemoglobinopathies and their clinical significance	Delete from PEx	Examine this in FEx Can be added to BT_PO 1.5 and AT_PO 2.6
BT_PO 1.112	Describe the physiology of haemostasis, including: · Coagulation · The role of platelets · Fibrinolysis		
BT_PO 1.113	Describe the physiological mechanisms of limiting and preventing thrombosis		
BT_PO 1.114	Outline the methods for assessing coagulation, platelet function and fibrinolysis	Describe the methods for assessing coagulation, platelet function and fibrinolysis	Describe

BT_PO 1.115	Describe blood groups and methods of cross matching blood		
BT_RT 1.7	Describe blood groups and the physiological basis of transfusion reactions		
BT_PO 1.116	Outline the composition, indications and risks of use of the following blood components and products: • Packed red cells • Fresh frozen plasma • Cryoprecipitate • Platelets • Factor VIIa	Describe the composition, indications and risks of use of the following blood components and products: • Packed red cells • Fresh frozen plasma • Cryoprecipitate • Platelets • Factor VIIa	Describe
BT_PO 1.117	Describe the changes that occur during blood storage and their clinical implications.	Outline the changes that occur during blood storage and their clinical implications	Outline
BT_RT 1.8	Outline the changes that occur in stored blood		
BT_RT 1.9	Describe physiological consequences of massive transfusion		
pharmacology			
BT_PO 1.118	Describe the pharmacology of heparin and low molecular weight		

	heparins including their side-effects		
BT_PO 1.119	Describe the mode of action of protamine and potential adverse reactions	Outline the pharmacology of protamine	Outline Simplify wording
BT_PO 1.120	Describe the pharmacology of warfarin and other anticoagulant drugs		
BT_PO 1.121	Describe methods to reverse the effect of warfarin	Describe methods to reverse the effect of warfarin and other anticoagulant drugs	Make wording the same as above (this covers NOACs)
BT_PO 1.122	Classify and describe the pharmacology of anti-platelet drugs		
BT_PO 1.123	Outline the pharmacology of thrombolytic agents		
BT_PO 1.124	Outline the pharmacology of antifibrinolytic agents in particular tranexamic acid and aprotinin	Outline the pharmacology of tranexamic acid	Delete aprotinin Simplify to just TXA
BT_PO 1.124a		Outline the pharmacology of iron replacement	New LO An important new area for perioperative medicine

18. IMMUNOLOGY AND INFECTION

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
physiology			
BT_PO 1.126	Explain how the body defends against infection	Outline how the body defends against infection	Outline
BT_PO 1.127	Outline the effects of anaesthesia and surgery on immune function		
BT_PO 1.128	Describe the immunological basis and pathophysiological effects of hypersensitivity	Describe the immunology and pathophysiology of hypersensitivity reactions	Add the word “reactions” at the end Simplify wording - make same as below
BT_RT 1.6	Describe the physiological basis of anaphylaxis	Describe the immunology and pathophysiology of anaphylaxis.	Make wording same as above (also anaphylaxis is not normal “physiology”)
BT_PO 1.129	Outline the principles of tissue/organ transplantation and the mechanisms of rejection of allogeneic organs	Remove from curriculum	Clinical aspects are covered by FEx LO’s on care of transplant patients (e.g. SS_GG 1.9 or BT_PO 1.5). The cellular biology of transplant rejection etc is beyond the scope of PEx
pharmacology			
BT_PO 1.130	Outline the pharmacology of antimicrobial drugs and their	Describe the pharmacology of antimicrobial drugs used	Describe

	interactions with other drugs used during the perioperative period	perioperatively, including their spectrum of activity.	Remove “interactions with …” - this only relates to the potentiation of muscle relaxants by gentamicin - a very small point really, which is already covered within the muscle relaxant LO’s. Stressing it here detracts from learning the important points about antibiotics. Adding “spectrum of activity” highlights an important point often neglected by trainees.
BT_PO 1.131	Explain the principles of antibiotic prophylaxis		
BT_PO 1.3	Describe the adverse effects of antimicrobial agents		
BT_PO 1.132	Outline the pharmacology of antiseptics and disinfectants, their clinical use and associated risks		
IT_SQ 1.5	Outline the standards to which reusable anaesthetic equipment needs to be cleaned and/or treated. (Refer to College professional document *PS28 Guidelines on Infection Control in Anaesthesia*)	Remove from PEx	Not a basic sciences topic Assess in IAACQ and FEx

19. THERMOREGULATION

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_GS 1.65	Describe the mechanisms by which heat is produced by the body and transferred between the body and its environment		
BT_GS 1.66	Describe the physiological effects of hypo/hyperthermia	Describe the physiological effects of hypo- and hyperthermia	Separate out the words hypo and hyperthermia to make it clearer
BT_GS 1.67	Describe the energy requirements for maintenance of normal body temperature	Delete from curriculum	Unclear meaning
BT_GS 1.68	Describe the physiological responses to lowered and raised environmental temperature, and the effects of anaesthesia on these responses		
BT_GS 1.69	Discuss methods of maintaining body temperature during anaesthesia and sedation, including active warming of patients (also refer to the *Safety and quality in anaesthetic practice* clinical fundamental)	Discuss methods of maintaining body temperature during anaesthesia and sedation, including active warming of patients	Simplify wording
BT_SQ 1.17	Discuss the safety of methods for maintaining body temperature during anaesthesia and sedation,		

	including active warming of patients		

20. OBSTETRICS

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
SS_OB 1.6	Describe the changes in the anatomy of the maternal airway and their impact on airway management during anaesthesia		
SS_OB 1.7	Describe the changes in the anatomy of the maternal vertebral column, the spinal cord and meninges relevant to the performance of a central neuraxial block including epidural, spinal and combined spinal-epidural, with appropriate surface markings (refer to the *Regional and local anaesthesia* clinical fundamental)	Describe the changes in the anatomy of the maternal vertebral column, the spinal cord and meninges relevant to performing a central neuraxial block (including epidural, spinal and combined spinal-epidural), with appropriate surface markings	Simplify wording
SS_OB 1.8	Describe the anatomy and physiology of pain in labour and childbirth	Describe the anatomy of pain pathways in labour and childbirth	Just “anatomy”. Unclear why physiology was added here.
physiology			
SS_OB 1.5	Describe the mechanism and consequences of aorto-caval compression in pregnancy		

SS_OB 1.1	Describe the physiological changes and their implications for anaesthesia that occur during pregnancy, labour and delivery, in particular the respiratory, cardiovascular, haematological and gastrointestinal changes.		
SS_OB 1.2	Outline the reference ranges for physiological and biochemical variables in pregnancy		
SS_OB 1.4	Describe the utero-placental circulation and the principles of placental physiology as related to placental gas exchange and regulation of placental blood flow		
pharmacology			
SS_OB 1.9	Describe the influence of pregnancy on the pharmacokinetics and pharmacodynamics of drugs commonly used in anaesthesia and analgesia		
SS_OB 1.10	Describe the pharmacology of oxytocic agents with special reference to oxytocin derivatives, ergot derivatives and prostaglandins	Describe the pharmacology of drugs which increase uterine tone	Change oxytocic to “increase uterine tone” – oxytocic = oxytocin Remove list

SS_OB 1.11	Describe the pharmacology of tocolytic agents with particular reference to beta 2 agonists, calcium antagonists, magnesium, inhalational anaesthetics, nitrates and NSAIDS	Outline the pharmacology of tocolytic agents	Outline Remove list
SS_OB 1.12	Describe the pharmacology of agents used for the treatment of pre-eclampsia including magnesium, hydralazine and labetalol	Outline the pharmacology of agents used for the treatment of pre-eclampsia	Outline Remove list

21. FOETAL / NEONATAL AND PAEDIATRIC

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
anatomy			
SS_PA 1.1	Describe the anatomy of the neonatal airway, how this changes with growth and development and the implications for airway management		
physiology			
SS_PA 1.21	Describe the foetal circulation		
SS_OB 1.3	Describe the transition from foetal to neonatal circulation and the establishment of ventilation		
SS_PA 1.22	Describe the circulatory and respiratory changes that occur at birth		
SS_PA 1.23	Define the thermoneutral zone, describe temperature regulation in the neonate and the physiological responses to lowered and raised environmental temperature, the effects of anaesthesia on these	Define the thermoneutral zone. Outline temperature regulation in the neonate and the physiological responses to lowered and raised environmental temperature, the effects of anaesthesia on these	Outline (for the second bit).

	responses and how this changes with growth and development	responses and how this changes with growth and development	
SS_PA 1.24	Describe the physiology of the cardiovascular, respiratory, renal and neurological systems in the neonate and the changes that occur with growth and development and the implications of this for anaesthetic care	Outline the physiology of the cardiovascular, respiratory, renal and neurological systems in the neonate and the changes that occur with growth and development and the implications of this for anaesthetic care	Outline
SS_PA 1.25	Describe the composition of body fluids in the neonate and explain the changes that occur with growth and development	Outline the composition of body fluids in the neonate and explain the changes that occur with growth and development	Outline
SS_PA 1.26	Describe glucose homeostasis in the neonate and explain the changes that occur with growth and development	Outline glucose homeostasis in the neonate and explain the changes that occur with growth and development	Outline
SS_PA 1.27	Describe vital signs for children of different ages	Delete from PEx	Relocate to FEx or paed WBA A clinical LO best assessed within a scenario
pharmacology			
SS_OB 1.13	Explain the factors which influence the transfer of drugs across the placenta to the foetus		

SS_OB 1.14	Outline the potential effects on the foetus and neonate of drugs administered during pregnancy		
SS_OB 1.15	Outline the potential effects on the neonate of drug administration in association with lactation		
SS_PA 1.52	Describe how the pharmacokinetics of drugs commonly used in anaesthesia in neonates and children differ from adults and the implications for anaesthesia	Describe how the pharmacokinetics of drugs commonly used in anaesthesia in neonates and children differ from adults.	Simplify wording
SS_PA 1.53	Describe the changes in the pharmacodynamics of volatile agents, analgesics, opioids and neuromuscular blocking agents in the neonate and the changes that occur with growth and development and the implications for anaesthesia	Describe how the pharmacodynamics of drugs commonly used in anaesthesia in neonates and children differ from adults	Simplify wording - make the same as LO above
SS_PA 1.54	Describe the pharmacology of agents used for premedication in children, including midazolam, clonidine, and ketamine	Describe the pharmacology of agents used for premedication in children	Remove examples
SS_PA 1.79	Describe the difference in pharmacokinetics of local anaesthetic agents in neonates	Delete from curriculum	Already covered by SS_PA 1.52

	and children from adults and the implications for regional blockade		
SS_PA 1.80	Describe the maximum safe doses of local anaesthetic agents in different age groups	Calculate the maximum safe doses of local anaesthetic agents in different age groups	Change describe to calculate

22. PHYSICS AND CLINICAL MEASUREMENT

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_SQ 1.5	Describe basic physics applicable to anaesthesia in particular: · Behaviour of fluids (gases and liquids) · Electrical concepts, current, potential difference, resistance, impedance, inductance and capacitance · Principles of humidification and use of humidifiers · Principles of ultrasound imaging and use of doppler	Outline basic physics applicable to anaesthesia in particular: · Behaviour of fluids (gases and liquids) · Electrical concepts, current, potential difference, resistance, impedance, inductance and capacitance · Principles of humidification and use of humidifiers Describe the physics of ultrasound imaging, including Doppler	Outline for the first 3 bullet points Separate out ultrasound and make “describe” as a higher level of knowledge is needed
BT_SQ 1.6	Describe the methods of measurement applicable to anaesthesia, including clinical utility, complications and sources of error in particular: · SI units	Describe the methods of measurement applicable to anaesthesia, including clinical utility, complications and sources of error in particular: · SI units	Add ECG (it is alluded to in BT_PO 1.43 but should be listed here as a clinical measurement technique) Simplify the item on respiratory function

	· Measurement of volumes, flows, and pressures, including transducers. · Measurement of blood pressure · Measurement of cardiac output · Measurement of temperature · Oximetry · Gas analysis, including capnography · Methods used to measure respiratory function, including: o Forced expiratory volume o Peak expiratory flow rate o Vital capacity o Flow-volume loops o Functional residual capacity and residual volume	· Measurement of volumes, flows, and pressures, including transducers. · Measurement of blood pressure · Measurement of cardiac output · Measurement of temperature · ECG · Oximetry · Infrared gas analysis, including capnography · Paramagnetic and fuel cell analysis of oxygen · Basic pulmonary function tests	Specify infrared and paramagnetic gas analysis

BT_PO 1.94	Outline the basis of the electroencephalogram		
BT_GS 1.52	Explain the principles involved in the electronic monitoring of depth of sedation and anaesthesia, including the use of EEG analysis		
BT_GS 1.55	Describe the concept of depth of neuromuscular blockade and explain the use of neuromuscular monitoring		
BT_GS 1.69a	Describe how a patient's temperature is monitored and discuss the indications for temperature monitoring with the advantages and disadvantages of particular sites and methods (also refer to monitors and monitoring standards, which is covered in the *Safety and quality in anaesthetic practice* clinical fundamental)	Delete from curriculum	An excessive LO on a small point of monitoring. Already covered in BT_SQ 1.6

23. EQUIPMENT AND SAFETY

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
IT_AM 1.6	Outline the equipment required to be immediately available for basic airway management and the 'can't intubate, can't oxygenate' situation (refer to College professional document: *PS56 Guidelines on Equipment to Manage a Difficult Airway During Anaesthesia*)	Delete from PEx	Not a basic sciences topic Assess in IAACQ and FEx
BT_SQ 1.3	Outline the mandatory safety requirements for anaesthetic machines. (Refer to College professional document *PS54 Statement on the Minimum Safety Requirements for Anaesthetic Machines and Workstations for Clinical Practice*)		
BT_SQ 1.7	Describe microshock and macroshock and the mechanisms for preventing these, with particular reference to ensuring the compatibility of medical procedure, treatment area, and medical equipment used	Outline microshock and macroshock and the mechanisms for preventing these, with particular reference to ensuring the compatibility of medical procedure, treatment area, and medical equipment used	Outline

BT_SQ 1.8	Outline the causes of fires and explosions in the operating suite and discuss methods for prevention and management (refer to the *Resuscitation, trauma and crisis management* clinical fundamental)	Delete from PEx	Relocate to FEx (already asked in various forms in final exam)
BT_SQ 1.9	Describe the hazards of anaesthetic gas pollution and the methods of scavenging anaesthetic gases	Outline the hazards of anaesthetic gas pollution and the methods of scavenging anaesthetic gases	Outline
BT_SQ 1.10	Describe the supply of medical gases (bulk supply and cylinder) and features to ensure supply safety including pressure valves and regulators and connection systems		
BT_SQ 1.11	Describe how medical suction is generated and how to set up and test suction systems, both fixed and portable	Outline how medical suction is generated and how to set up and test suction systems, both fixed and portable	Outline
BT_SQ 1.12	Describe the principles and safe operation of vaporisers		
BT_SQ 1.13	Describe and classify breathing systems used in anaesthesia. Evaluate their clinical utility and hazards associated with their use.	Describe and classify breathing systems used in anaesthesia and resuscitation. Evaluate their clinical utility and hazards associated with their use.	Change wording to “anaesthesia and resuscitation” – to make clearer that this LO covers self inflating resus bag

BT_SQ 1.14	Describe different systems to deliver supplemental oxygen and the advantages and disadvantages of these systems		
BT_SQ 1.15	Outline how CO2 is absorbed in a circle system and the hazards associated with the use of CO2 absorption		
BT_SQ 1.16	Describe when a level 1 anaesthesia machine check is required. (Refer to College professional document *PS31 Recommendations on Checking Anaesthesia Delivery Systems*)	Delete from PEx	Assess in WBA and FEx Needs re-wording to incorporate Level 1, 2 and 3 checks. (unsure why it is just Level 1)
BT_SQ 1.18	Discuss the principles of surgical diathermy, its safe use and the potential hazards	Outline the principles of surgical diathermy, its safe use and the potential hazards	Outline
BT_SQ 1.19	Describe the principles of surgical lasers, their safe use and the potential hazards	Delete from PEx	Examine in FEx (already commonly examined there) ? needs re-wording to make the focus on safety (rather than the physics of how a laser works)
BT_RA 1.8	Describe the principles of ultrasound imaging and the safe use of ultrasound equipment for regional anaesthesia	Describe the principles of ultrasound imaging	Simplify wording (hard to imagine unsafe use of US, and useful to not restrict the scope of this LO only to regional techniques)

BT_RA 1.9	Describe the principles of nerve stimulation to locate nerves and the safe use of nerve stimulators	Delete from PEx	Examine in FEx Specific techniques of finding nerves and doing blocks is outside the scope of PEx

24. MISCELLANEOUS PHARMACOLOGY

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_PO 1.100	Outline the pharmacology of histamine antagonists		
BT_PO 1.4a	Outline the pharmacology of herbal medicines	Outline potential perioperative adverse effects and drug interactions of herbal medicines	Combine 1.4a and 1.4b The specific PD and PK of each herbal medicine is outside the scope of anaesthesia
BT_PO 1.4b	Describe adverse effects and potential drug interactions of herbal medicines with particular reference to the perioperative period	Delete	Combine with 1.4a (no need for 2 LOs on herbal medicine)
BT_PO 1.3a	Outline the pharmacology of commonly encountered illicit drugs and their interactions with drugs used in anaesthetic care		
BT_PO 1.125	Outline the pharmacology of cancer chemotherapeutic agents and immunotherapy with particular reference to problems that these may cause during the perioperative period	Outline the major perioperative implications of cancer chemotherapy agents and immunotherapy	Restrict the focus of this LO to just perioperative implications (rather than the pharmacology of the drugs themselves)
BT_SQ 1.20	Outline the pharmacology of radiological contrast agents	Outline the potential perioperative effects of radiological contrast agents.	Make wording similar to the above, to focus on periop implications

25. STATISTICS

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
BT_PO 1.2	Describe the features of a diagnostic test, including the concepts of sensitivity, specificity, positive and negative predictive value and how these are affected by the prevalence of the disease in question	Delete from PEx	This sole LO on stats was retained in PEx after the other stats LOs were transferred to FEx. Learning this one in isolation has low educational value. It should be learned together with other stats, especially when applied within scholar role activities. Transfer to FEx and scholar role

replace section 25 with

25. OVERARCHING PRINCIPLES

LO number	Unedited Wording (as per current edition of Curriculum)	Recommended Change to Wording	Rationale for any Recommended Change
AR_ME 1.3	Apply knowledge of the clinical and biomedical sciences relevant to anaesthesia		
AR_ME 3.2	Demonstrate knowledge and understanding of the procedure		

	including indications, contraindications, anatomy, technique, side-effects and complications		

Unallocated LO's

These cross a number of topic areas, but could be deleted from PEx and left in IT for assessment at IAACQ, because they overlap with a multiple other BT LOs.

IT_GS 1.1	Outline the basic pharmacology of sedative/hypnotic agents (propofol, thiopentone, midazolam, ketamine), inhalational agents, opioids, muscle relaxants, reversal drugs and anti-emetic agents relevant to their clinical practice.	Delete from PEx	Retain in IT for IAACQ
IT_GS 1.9	Outline the physiological changes that occur with and the implications for anaesthetic management of the following patient positions: · Supine · Trendelenberg and reverse trendelenberg · Lateral · Lithotomy · Prone (Also refer to the *Safety and quality in anaesthetic practice* clinical fundamental)	Delete from PEx	Retain in IT for IAACQ