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EXAMINATIONS & CREDENTIALS

11 February 2026

Invitation to Review and Comment: Draft FCA(SA) Curriculum

Members are hereby invited to review the attached **draft FCA(SA) curriculum**, which is currently under development.

We kindly request that all comments, queries, and recommendations be submitted for consideration **no later than 31 March 2026**.

All correspondence relating to this draft curriculum must be directed to **busisiwe.mrara@gmail.com** by the above-mentioned closing date. Submissions received after this date may not be accommodated.

Your time and valuable input in this review process are greatly appreciated and will contribute meaningfully to the finalisation of the curriculum.

Kind Regards

Prof Busisiwe Mrara
College of Anaesthetists of South Africa - President

DRAFT FOR COMMENT

South African Curriculum for Anaesthesiology Training

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Background

I Preamble

The anaesthesiology curriculum aims to guide medical practitioners training in anaesthesia on the competencies required to practice safe Anaesthesia in South Africa (SA). The curriculum has been developed with joint contributions of the College of Anaesthetists of South Africa (CASA), University departments and experienced specialists practising anaesthesia in all sectors of the health system in South Africa.

The document has been compiled from various sources: The first edition of the FCA(SA) curriculum, and curricula from various international colleges of anaesthetists: Canadian Royal College, Australia and New Zealand College and the UK Royal College.

The curriculum is intended for use by all levels of trainees in South Africa: Diploma in Anaesthesia (DA(SA)) and Fellowship in Anaesthesia (FCA(SA)) trainees. It will also guide the requirements for training anaesthetists in SA for tutors, examiners, university programme directors, hospitals, and policymakers. The document will also assist practising anaesthetists to keep abreast of developments in the profession.

The first edition of the SA curriculum was published in 2014. This edition has been developed considering suggestions to improve the previous curriculum and in response to modern developments in the workplace, necessitating the updating of learning outcomes. Importantly, there is a clear imperative to train anaesthetists to be dynamic in the workplace, taking up roles not limited to technical work but encompassing multiple non-technical skills necessary to navigate the complex health system.

Accordingly, the attributes of a medical expert as described by the CanMeds Framework from the Canadian Royal College of Physicians and Surgeons were described in the first edition. These have been more explicitly described and adapted to the local context in all curriculum domains in the second edition. Additionally, a spiral curriculum is presented, which emphasises the integration and continuity of learning; the same topics with increasing levels of complexity from the diploma to the fellowship are presented, reinforcing previous knowledge. Lastly, the curriculum domains have been re-organised and abbreviated to facilitate pragmatic, user-friendly delivery.

As training in anaesthesiology is both theoretical and experiential, trainees will be required to use this document as a guide while keeping an electronic record of all their professional activities in an e-portfolio. This document should be used in conjunction with other documents available on the websites of CMSA, South African Society of Anaesthesiologists (SASA) and Health Professions Council of South Africa (HPCSA) which cover the following important information for trainees:

1. Accredited training hospitals
2. Scope of practice of various categories of anaesthetists
3. South African Anaesthetics Practice Guidelines

It is envisaged that major curriculum revisions will be undertaken at five-year intervals and minor modifications at regular intervals as relevant new information and evidence-based practice is incorporated into the clinical space. Curriculum users are encouraged to continually critique the document and send inputs and updates to the chair of the curriculum review committee, ECCChair@cmsa.ac.za.

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We hope this document will be a valuable resource for guiding anaesthesiology training in South Africa.

The next few pages will outline the following:

I. An executive summary of the curriculum: table 1
   A brief explanation of what each curriculum domain entails.
II. The CanMEDS specialist competency framework adapted for South Africa
III. An overview of planned evaluation methods for the new curriculum:
   a. Formative Assessments: Workplace- based assessments (WBAs), entrustable professional activities (EPAs)
   b. Summative assessments
IV. Reading resources
V. How to use this document

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II Executive Summary

Table 1 Executive Summary of the Domains of the South African Anaesthesiology Curriculum

DOMAIN	THEME	SUB-DOMAINS
ONE	Basics of Anaesthesia	1.1 General, Regional & Sedation
		1.2 Anaesthesia environment
		1.3 Medications used in balanced anaesthesia
		1.4 Intravenous fluids
TWO	Airway Management	2.1 Anatomy & Physiology
		2.2 Airway devices: supra- and infra-glottic
		2.3 Airway assessment
		2.4 Management of the difficult airway
THREE	Pain Management	3.1 Acute and basic chronic pain
		3.2 Assessment & Management
		3.3 Pharmacology of analgesics and nonpharmacological approaches
FOUR	Regional and Local Anaesthesia	4.1 Anatomy, physiology, pharmacology & physics related to regional anaesthesia (
		4.2 Local anaesthesia agents
		4.3 Techniques
FIVE	Perioperative Care	5.1 Preoperative assessment of patient and context
		5.2 Physical examination

		5.3 Pathophysiology & anaesthesia Implications of concurrent diseases
		5.4 Investigations
		5.5 Preoperative preparation
		5.6 Maintenance and restoration of homeostasis before, during, after anaesthesia
		5.7 post-anaesthesia care
		5.8 Complications of anaesthesia
SIX	Quality of Practice	6.1 Risk awareness, avoidance & management
		6.2 2 Anaesthesia in resource-poor environments
		6.3 Social determinants of health and outcomes
		6.4 Outreach
		6.5 Human performance
		6.6 Ethics of practice
		6.7 Medico-legal issues
		6.8 Practice and theatre management
		6.9 Health economics
		6.10 Audits, quality improvement and patient safety incident monitoring and reporting
		6.11 Research
SEVEN	Specific Areas of Practice	7.1 Intensive Care
		7.2 Anaesthesia for General Surgery (HPB, Endocrine)
		7.3 Anaesthesia for Trauma Surgery
		7.4 Anaesthesia for Orthopaedic Surgery (including rheumatology)
		7.5 Anaesthesia for Obstetrics & Gynaecology
		7.6 Paediatric Anaesthesia
		7.7 Anaesthesia for Neurosurgery
		7.8 Anaesthesia for Cardiac Surgery

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		7.9 Anaesthesia for Thoracic Surgery
		7.10 Anaesthesia for Vascular Surgery
		7.11 Anaesthesia for Head & Neck Surgery
		7.12 Anaesthesia for Ophthalmic Surgery
		7.13 Anaesthesia for Aesthetic and Reconstructive Surgery (including Burns)
		7.14 Anaesthesia for Urological & Renal Surgery
		7.15 Anaesthesia for Transplant Surgery
		7.16 Pain medicine

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III The Specialist Competency Framework: a South African modification of the CanMEDS

The original CanMEDS specialist framework from Canada, rolled out in 2004/5, was based on seven specialist roles: Medical Expert, Professional, Scholar, Collaborator, Communicator, Health Advocate and Leader (Frank and Danoff, 2007).

Each role comprises several key competences. Each of the key competences is divided into several enabling competences which are the basic building blocks in the framework. The CanMEDS doctrine promotes training with a milestone approach: each specialist role is broken up into the enabling competences, which are referred to as milestones. Once milestones are reached, it is assumed that the trainee can perform the specialist role, because they can perform the sub-components of the role. However, this assumption may not always be true and led to the exploration of alternative methods to assess and improve competency of graduate specialists.

The relevance of the CanMEDS competencies in South Africa and to anaesthesiology has been assessed and modified. A Delphi process ascertained key national opinions and found that some of the CanMEDS enabling competences were not locally relevant (Kalafatis, Sommerville, Gopalan (2019)) Consequently, seven were removed; and 19 new enabling competences were added, along with two new specialist 'roles': Humaneness and Context Awareness which are not really regarded as roles but are deemed attributes that a specialist must have. Hence the nine are considered as meta-competences rather than roles.

Figure 1 below shows a graphic representation of the modified South African CanMEDS flower. Each of the nine roles/meta-competences have several key competences and enabling competences as indicated in the modified CanMEDS framework for SA and are described in table 2 below. In addition, sound attitudes and behaviours that encourage good work ethic and teamwork, as expected of an Anaesthesiologist, are listed in table 3(Mitchell, 2012).

Figure 1: An Illustration of the South African Modified CanMeds Framework, adding humaneness and context-awareness. Adapted from Kalafatis, Sommerville & Gopalan (2019)

Table 2: Description of South African Modified CanMeds Roles and Competencies

ROLE	KEY COMPETENCY	ENABLING COMPETENCIES
Medical Expert (ME)	1.Practice medicine within their defined scope of practice and expertise	1.1 Demonstrate a commitment to high-quality care of their patients
		1.2 Integrate the CanMEDS Intrinsic Roles into their practice of medicine
		1.3 Apply knowledge of the clinical and biomedical sciences relevant to their discipline
		1.4 Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner
		1.5 Carry out professional duties in the face of multiple, competing demands
		1.6 Recognize and respond to the complexity, uncertainty, and ambiguity inherent in medical practice
	2. Perform a patient-centred clinical assessment and establish a management plan.	2.1 Prioritize issues to be addressed in a patient encounter
		2.2 Elicit a history, perform a physical exam, select appropriate investigations, and interpret their results for the purpose of diagnosis and management, disease prevention, and health promotion
		2.3 Establish goals of care in collaboration with patients and their families, which may include slowing disease progression, treating symptoms, achieving cure, improving function, and palliation
		2.4 Establish a patient-centred management plan

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	3. Plan and perform procedures and therapies for the purpose of assessment and/or management.	3.1 Determine the most appropriate procedures or therapies
		3.2 Obtain and document informed consent, explaining the risks and benefits of, and the rationale for, a proposed procedure or therapy
		3.3 Prioritize a procedure or therapy, considering clinical urgency and available resources
		3.4 Perform a procedure in a skilful and safe manner, adapting to unanticipated findings or changing clinical circumstances
	4. Establish plans for ongoing care and, when appropriate, timely consultation.	4.1. Implement a patient-centred care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation.
	5. Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of health care quality and patient safety.	5.1 Recognize and respond to harm from health care delivery, including patient safety incidents
		5.2 Adopt strategies that promote patient safety and address human and system factors
		5.3 Demonstrate the ability to multi-task
Communicator (Cm)	1.Establish professional therapeutic relationships with patients and their families.	1.1 Communicate using a patient-centred approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion
		1.2 Optimize the physical environment for patient comfort, dignity, privacy, engagement, and safety
		1.3 Recognize when the values, biases, or perspectives of patients, physicians, or other health care professionals may have an impact on the quality of care, and modify the approach to the patient accordingly
		1.4 Respond to a patient's non-verbal behaviours to enhance communication

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		1.5 Manage disagreements and emotionally charged conversations
		1.6 Adapt to the unique needs and preferences of each patient and to his or her clinical condition and circumstances
	2. Elicit and synthesise accurate and relevant information, incorporating the perspectives of patients and their families.	2.1 Use patient-centred interviewing skills to effectively gather relevant biomedical and psychosocial information
		2.2 Provide a clear structure for and manage the flow of an entire patient encounter
		2.3 Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent
	3. Share health care information and plans with patients and their families.	3.1 Share information and explanations that are clear, accurate, and timely, while checking for patient and family understanding
		3.2 Disclose harmful patient safety incidents to patients and their families accurately and appropriately
	4. Engage patients and their families in developing plans that reflect the patient's health care needs and goals.	4.1 Facilitate discussions with patients and their families in a way that is respectful, non-judgmental, and culturally safe
		4.2 Use communication skills and strategies that help patients and their families make informed decisions regarding their health
	5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy.	5.1 Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements
		5.2 Communicate effectively using a written health record, electronic medical record, or other digital technology
		5.3 Share information with patients and others in a manner that respects patient privacy and confidentiality and enhances understanding

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		5.4 Able to communicate effectively with patients, caregivers and families despite language differences
Collaborator (Cl)	1.Work effectively with physicians and other colleagues in the health care professions.	1.1 Establish and maintain positive relationships with physicians and other colleagues in the health care professions to support relationship-centred collaborative care
		1.2 Negotiate overlapping and shared responsibilities with physicians and other colleagues in the health care professions in episodic and ongoing care
		1.3 Engage in respectful shared decision-making with physicians and other colleagues in the health care professions
		1.4 Ability to respond to need for emergency involvement outside perioperative domain
	2. Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts.	2.1 Show respect toward collaborators
		2.2 Implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports a collaborative culture
	3. Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care.	3.1 Determine when care should be transferred to another physician or health care professional
		3.2 Demonstrate safe handover of care, using both verbal and written communication, during a patient transition to a different health care professional, setting, or stage of care
		3.3 Awareness of the competency required of the receiving practitioner at hand over of patients
Leader (Le)	1.Contribute to the improvement of health care delivery in teams, organisations, and systems	1.1 Apply the science of quality improvement to contribute to improving systems of patient care
		1.2 Contribute to a culture that promotes patient safety

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		1.3 Analyse patient safety incidents to enhance systems of care
		1.4 Use health informatics to improve the quality of patient care and optimize patient safety
	2. Engage in the stewardship of health care resources.	2.1 Allocate health care resources for optimal patient care
		2.2 Apply evidence and management processes to achieve cost-appropriate care
	3. Demonstrate leadership in professional practice.	Demonstrate leadership skills to enhance health care
		Facilitate change in health care to enhance services and outcomes
	4. Manage career	4.1 Set priorities and manage time to integrate practice and personal life
		4.2 Manage a career and a practice
		4.3 Implement processes to ensure personal practice improvement
Health Advocate (HA)	1.Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment	1.1 Incorporate disease prevention, health promotion, and health surveillance into interactions with individual patients
	2. Respond to the needs of the communities or populations they serve by advocating with them for system-level change in a socially accountable manner	2.1 Possess an In-depth knowledge of global health issues
		2.2 Improve clinical practice by applying a process of continuous quality improvement to disease prevention, health promotion, and health surveillance activities
		2.3 Contribute to a process to improve health in the community or population they serve
		2.4 Ensure that all staff (including oneself) in the clinical environment are safe and not at risk with respect to physical or psychological injuries.
Scholar (Sc)	1.Engage in the continuous enhancement of their	1.1 Develop, implement, monitor, and revise a personal learning

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	professional activities through ongoing learning	plan to enhance professional practice
		1.2 Identify opportunities for learning and improvement by regularly reflecting on and assessing their performance using various internal and external data sources
		1.3 Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice.
	2. Teach students, residents (trainees), the public, and other health care professionals	2.1 Recognize the influence of role-modelling and the impact of the formal, informal, and hidden curriculum on learners
		2.2 Promote a safe learning environment
		2.3 Ensure patient safety is maintained when learners are involved
		2.4 Plan and deliver a learning activity
		2.5 Provide feedback to enhance learning and performance
		2.6 Assess and evaluate learners, teachers, and programs in an educationally appropriate manner
	3. Integrate best available evidence into practice.	3.1 Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that address them
		3.2 Identify, select, and navigate pre-appraised resources
		3.3 Critically evaluate the integrity, reliability, and applicability of health-related research and literature
		3.4 Integrate evidence into decision-making in their practice
	4. Contribute to the creation and dissemination of	4.1 Demonstrate an understanding of the scientific principles of research and scholarly inquiry and

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	knowledge and practices applicable to health.	the role of research evidence in health care
		4.2 Identify ethical principles for research and incorporate them into obtaining informed consent, considering potential harms and benefits, and considering vulnerable populations
		4.3 Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry
Professional (Pr)	1.Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards	1.1 Exhibit appropriate professional behaviours and relationships in all aspects of practice, demonstrating honesty, integrity, humility, commitment, compassion, respect, altruism, respect for diversity, and maintenance of confidentiality
		1.2 Demonstrate a commitment to excellence in all aspects of practice
		1.3 Recognize and respond to ethical issues encountered in practice
		1.4 Recognize and manage conflicts of interest
		1.5 Exhibit professional behaviours in the use of technology-enabled communication
	2. Demonstrate a commitment to society by recognizing and responding to societal expectations in health care.	2.1 Demonstrate accountability to patients, society, and the profession by responding to societal expectations of physicians
		2.2 Demonstrate a commitment to patient safety and quality improvement
	3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation.	3.1 Fulfil and adhere to the professional and ethical codes, standards of practice, and laws governing practice
		3.2 Recognize and respond to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions

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	4. Demonstrate a commitment to physician health and well-being to foster optimal patient care.	4.1 Exhibit self-awareness and manage influences on personal well-being and professional performance
		4.2 Manage personal and professional demands for a sustainable practice throughout the physician life cycle
		4.3 Promote a culture that recognizes, supports, and responds effectively to colleagues in need
		4.4 Able to always practice efficiently
		4.5 Ability to advocate on behalf of the profession to the public to assist in public awareness.
		4.6 Able to always function punctually
Context Awareness (CA)	1.Ability to adapt clinical and non-clinical practice to specific scenarios and environments to ensure good outcomes.	1.1 Ability to perceive, to comprehend the meaning of, and to predict the impact of variables in the work environment (situational awareness)
		1.2 Capacity to be adaptable and creative in solving problems
		1.3 Ability to assess capacity and obtain appropriate consent in any given circumstance
		1.4 Ability to remain humane in difficult circumstances
Humaneness (Hu)	1.Ability to engage with patients, colleagues, societies and communities with good naturedness.	1.1 Awareness of and respect for the impact and sensitivities of race, culture and ethnicity on decision-making and patient management
		1.2 Tolerance and the ability to respect diversities in patients, families and colleagues and function in a non-judgmental manner
		1.3 Ability to practice with sound moral standards (Honesty, altruism, integrity, humility, commitment, kindness)

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		1.4 Ability to remain calm under pressure
		1.5 Ability to manage patients and their families with a caring and empathetic nature.
		1.6 Ability to promote human welfare and humanitarianism in society and at work.

Table 3 Additional Attributes, Attitudes and Behaviour expected of an Anaesthesiologist

Understand need for multidisciplinary teamwork, communication and collaboration with all role-players	Le/Cm/Cl
Commit to, and believe in, a culture of safe and ethical, high-quality care	Pr
Accept that medical knowledge and skills are not the only requirements of specialist practice	Pr
Be aware of medico-legal obligations relating to medical practice	Pr
Have insight into one's own limitations, abilities and areas of expertise	Pr
Commit to lifelong continuing professional development	Pr/Sc
Manage patients and their kin honestly, empathetically, with honour, respect and kindness	HA
Acknowledge, understand and be tolerant to patient diversities	Pr/HA
Maintain accountability to self, patients, society and the profession	Pr
Behave, commit to, and believe in a manner that embraces ethical and professional principles	Pr/HA

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IV An overview of planned evaluation methods for the new curriculum:

a. Formative Assessments: Workplace- based assessments (WBAs), entrustable professional activities (EPAs)

CMSA and the training universities have embarked on a project to implement formative assessments, in the form of WBAs and EPAs, planned for rollout in 2026/27.
Formative assessments will be performed during training, and are an effective, evidence-supported approach to professional training. Their primary goal is to monitor a learner's progress and provide ongoing, actionable feedback to guide further development. WBAs

serve as the practical tools within this framework, involving the direct observation and assessment of a trainee's performance in real-life clinical situations, thereby ensuring a high degree of validity and authenticity. The content and structure of these WBAs are increasingly presented within EPAs, although some WBAs may be separate from EPAs. EPAs are specific, observable units of professional practice that a trainee is expected to master to a certain level of supervision (e.g., from direct supervision to independent practice) (**ten Cate,** 2005). EPAs consist of key competences bundled together to realistically replicate the complex roles of a specialist. These are then used as milestones. An EPA example is described in figure 2 below.

The integration of formative WBAs within an EPA framework creates a robust system that provides clear learning objectives, facilitates targeted feedback, and supports the progressive development of competence toward independent professional practice.

EPA example:

EPA: Ability to perform a pre-operative assessment

This might consist of key/enabling competences from several of the nine meta-competences:

-Communicator: communicating effectively with patient and family (correct language etc.) with respect to consent and explanations

-Professional: writing clear notes/ documenting discussions and consent

-Medical Expert: applying knowledge of patient's medical/surgical issues to your anaesthetic plan

-Context awareness: considering how various contexts may alter anaesthetic practice and what modifications are essential to ensure good outcomes

-Humaneness: managing the patient (and family) with compassion, respect and alleviating anxiety

Relevant WBAs:

History and Examination, Interpreting investigations, Risk stratification, Counselling, perioperative planning, multidisciplinary discussion

Figure 1 EPA example

b. Summative assessments

Summative assessments will be conducted (by CMSA and the universities) to determine eligibility to progress in the various phases of training, as well as to qualify as a specialist.

References

Frank, J. R., & Danoff, D. (2007). The CanMEDS initiative: implementing an outcomes-based framework of physician competencies. *Medical teacher*, *29*(7), 642-647

Kalafatis, N., Sommerville, T., & Gopalan, P. (2019). Defining fitness for purpose in South African anaesthesiologists using a Delphi technique to assess the CanMEDS framework. *Southern African Journal of Anaesthesia and Analgesia*, *25*(2), 7-16.

Mitchell, P. (2012). *Core principles & values of effective team-based health care*.

ten Cate, O**.** (2005). Entrustability of professional activities and competency-based training. *Medical Education, 39*(12), 1177-1178.

Resources Used for Compiling the Curriculum

College of Anaesthetists of South Africa. Curriculum for trainees in Anaesthesiology 2014.
ANZCA. Anaesthesia training program curriculum November 2020 v1.10.
Royal College of Physicians and Surgeons of Canada. National curriculum for Canadian Anesthesiology Residents. Third Edition, Feb 2020.
Royal College of Anaesthetists. https://rcoa.ac.uk/training-careers/training-hub/2021-anaesthetics-curriculum (Accessed 6th January 2022).

V Recommended reading resources

DA

Textbooks

- Morgan GE, Mikhail MS and Murray MJ *Clinical Anesthesiology*, 8th ed, McGraw-Hill, 2018
- Milner, Welch. Applied Pharmacology in Anaesthesia and Critical Care, 2nd edition

SASA guidelines

Candidates are advised to consult the latest revision of each guideline

SASA practice guidelines: latest revision https://sasaapi.sasaweb.com/Document/SAJAA(V24N1)2061SASAPracticeGuidelines_V12_636803016948256880.pdf	
SASA paediatric guidelines: latest revision	
SASA infection control guidelines: latest revision	

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SASA perioperative patient blood management guideline latest revision	
SASPOS sedation summary document: latest revision	
SASA adult sedation and analgesia guidelines latest revision	
SASRA guidelines for regional anaesthesia in South Africa latest revision	
SASA acute pain guidelines latest revision	
SASA Airway guidelines latest revision	
SASA high spinal anaesthesia guideline latest revision	

Laws pertaining to health care in SA

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Protection Of Personal Information Act (POPIA)	
National Health Act 61 of 2003 https://www.saflii.org/za/legis/consol_act/nha2003147.pdf	
Health Professions Act 56 of 1974	
Children's Act 38 of 2005	
Choice of termination of pregnancy act 92 of 1996	

Medical Protection Society (MPS) booklets

Medical records in SA	
Consent to medical treatment in SA	

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Managing the risks of general practice in SA	

ASA Standards of Basic Monitoring	
SANBS Clinical guidelines for the use of blood products in SA	

Health Professions Council Ethical rules of Conduct

https://www.hpcsa-blogs.co.za/new-and-updated-ethical-guidelines/

Useful Apps

- AnSo Anaesthesia Sonoanatomy (free)
- NYSORA (monthly/annual subscription)
- World Federation of Societies of Anaesthesiologists: Tutorial of the week https://resources.wfsahq.org

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FCA I

All FCA Part 1 Subjects:

1. Miller RD. Anesthesia. Churchill Livingstone, Latest Edition
2. Morgan GE, Mikhail MS, Murray MJ. Clinical anesthesiology. Stamford, Conn. Prentice-Hall. Latest Edition
3. Relevant journal articles

Biochemistry:

Murray RK, Harper's illustrated biochemistry. New York, London. McGraw-Hill. Latest Edition

Chemical Pathology:

Walmsley RN, White GH. A guide to diagnostic clinical chemistry. Oxford. Blackwell Scientific Publications. Latest Edition

Pharmacology:

1. Bovill JG, Howie MB. Clinical pharmacology for anaesthetists. London. WB Saunders, Latest Edition

2. Calvey TN, Williams NE. Principles and practice of pharmacology for anaesthetists, Oxford. Blackwell Science, Latest Edition
3. Kaufman L, Taberner PV. Pharmacology in the practice of anaesthesia. London. Arnold, Latest Edition
4. Milner A, Welch E. Applied pharmacology in anaesthesiology and critical care. Centurion. Medpharm 2012
5. Neal MJ. Medical pharmacology at a glance. Oxford. Blackwell Science, Latest Edition
6. Rang HP, Dale MM, Ritter JM. Pharmacology. Edinburgh. Churchill Livingstone, Latest Edition

7. SA medicines formulary.
8. Stoelting, RK. Pharmacology and physiology in anesthetic practice. Philadelphia. Lippincott Raven, Latest Edition

Physics:

1. Aitkenhead AR, Moppett I, Smith JT Aitkenhead's Textbook of Anaesthesia, Latest edition

2. Davis PD, Kenny GNC. Basic physics and measurement in anaesthesia. Oxford. Butterworth Heinemann, Latest Edition
3. Dorsch JA, Dorsch SE. Understanding anesthesia equipment. Baltimore. Williams & Wilkins, Latest Edition
4. Sykes MK, Vickers MD. Principles of measurement and monitoring in anaesthesia and intensive care. Blackwell, Latest Edition

Physiology:

5. Guyton AC, Hall JE. Textbook of medical physiology. London. WB Saunders, Latest Edition
6. Ganong WF. Review of medical physiology. Stamford, Conn. Appleton & Lange. London. Prentice Hall International, Latest Edition
7. Lumb AB. Nunn's applied respiratory physiology, Oxford. Butterworth-Heinemann, Latest Edition
8. Stoelting RK. Pharmacology and physiology in anesthetic practice. Philadelphia. LippincottRaven, Latest Edition
9. West JB. Respiratory physiology – the essentials. Philadelphia. Lippincott Williams & Wilkins, Latest Edition

FCA II

Textbooks

1. John F. Butterworth, David C. Mackey, John D. Warnick, Morgan & Mikhail's Clinical Anaesthesiology. 6th ed. MacGraw Hill Education.2018
2. Caplan RA, Benumof JL. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Anesthesiology. 2013 Feb;118(2):251-70. Updated by the Committee on Standards and Practice Parameters, Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG, Hagberg CA, previous update was developed by the American Society of Anesthesiologists Task Force on Difficult Airway Management Chestnut's Obstetric Anesthesia: Principles and Practice. 6th Edition, February 20, 2019. Authors: David Chestnut, Cynthia Wong, MD, Lawrence Tsen, MD, Warwick D Ngan Kee, Yaakov Beilin, Jill Mhyre, Brian T. Bateman, Naveen Nathan.

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3. Cook, Tim, and Michael Kristensen, eds. “Core Topics in Airway Management.” Cambridge University Press, 2020.
4. Shaw, Ian, Chandra Kumar, and Chris Dodds, eds. “Oxford textbook of anaesthesia for oral and maxillofacial surgery.” Oxford University Press, 2010.
5. Clinical Anaesthesiology, Barash et al
6. Miller’s Anaesthesia
7. Stoelting’s Anaesthesia and Co-existing Disease

Guidelines and Articles (latest updates must be checked)

1. Guidelines for Maternity Care in South Africa. 4th Edition. National Department of Health, Republic of South Africa.
2. Saving Mothers: Caesarean Section on Monograph 2013 – Anaesthetic section.
3. Saving Mothers: Triennial report on confidential enquiries into maternal deaths in South Africa – most recent. (2017-2019 currently)
4. International consensus statement on the management of hypotension with vasopressors during caesarean section under spinal anaesthesia. Kinsella SM, Carvalho B, Dyer RA, Fernando R, McDonnell N, Mercier FJ, et al. Anaesthesia 2018. 73 (1), 71-92
5. van Rensburg G, van Dyk D, Bishop D, Swanevelder JL, Farina Z, Reed AR, Dyer RA. The management of high spinal anaesthesia in obstetrics: suggested clinical guideline in the South African context. Southern African Journal of Anaesthesia and Analgesia 2016; 22(1) (Supplement 1): S1-S3
6. Lee SY, Shih SC, Leu YS, Chang WH, Lin HC, Ku HC. Implications of age-related changes in anatomy for geriatric-focused difficult airways. International Journal of Gerontology. 2017 Sep 1;11(3):130-3.
7. South African Society of Anaesthesiologists (SASA). SASA Airway Guidelines. SASA Working Group. South Afr J Anaesth Analg 2014;20(4)S1-S1.
8. Heesen M, Carvalho B, Carvalho JCA, Duvekot JJ, Dyer RA, Lucas DN, McDonnell N, Orbach-Zinger S, Kinsella SM. International consensus statement on the use of uterotonic agents during caesarean section. Anaesthesia. 2019 Oct;74(10):1305-1319.
9. Roelofse, J., et al. “SASA Guidelines for the safe use of procedural sedation and analgesia for diagnostic and therapeutic procedures in adults: 2020–2025.” Southern African Journal of Anaesthesia and Analgesia 26.2 (2020): S1-75
10. Roelofse, J., et al. "SASA paediatric guidelines for the safe use of procedural sedation and analgesia for diagnostic and therapeutic procedures in children: 2021–2026." Southern African Journal of Anaesthesia and Analgesia 27.4 (2021): S1-S84.
11. Leffert L, Butwick A, Carvalho B, Arendt K, Bates SM, Friedman A, Horlocker T, Houle T, Landau R, Dubois H, Fernando R, Houle T, Kopp S, Montgomery D, Pellegrini J, Smiley R, Toledo P; members of the SOAP VTE Taskforce. The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Anesthetic Management of Pregnant and Postpartum Women Receiving Thromboprophylaxis or Higher Dose Anticoagulants. Anesth Analg. 2018 Mar;126(3):928-944.
12. Mushambi MC, Kinsella SM, Popat M, Swales H, Ramaswamy KK, Winton AL, Quinn AC; Obstetric Anaesthetists' Association; Difficult Airway Society. Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics. Anaesthesia. 2015 Nov;70(11):1286-306
13. Bishop DG, Gibbs MW, Dyer RA. Post-caesarean delivery analgesia in resource-limited settings: a narrative review. International journal of obstetric anesthesia 2019. 40, 119-127
14. Hypertension in Pregnancy: National Guidelines, 2018/19. National Department of Health, Republic of South Africa.

DRAFT FOR COMMENT

15. van Dyk D, Dyer RA, Fernandes NL. Preeclampsia in 2021-a Perioperative Medical Challenge for the Anesthesiologist. Anesthesiol Clin. 2021 Dec;39(4):711-725
16. Vasco M, Pandya S, Van Dyk D, Bishop DG, Wise R, Dyer RA. Maternal critical care in resource-limited settings. Narrative Review. International Journal of Obstetric Anesthesia 2018
17. McCombe K, Bogod DG. Learning from the Law. A review of 21 years of litigation for pain during caesarean section. Anaesthesia. 2018 Feb;73(2):223-230.
18. Wise R, Bishop DG, Gibbs MW, Govender K, James M, Kabambi K, Louw V, et al. South African Society of Anaesthesiologists Perioperative Patient Blood Management Guidelines 2020. Southern African Journal of Anaesthesia & Analgesia.

VI Abbreviations List

ACLS	Advanced Cardiac Life Support
ALI	acute lung injury
ARDS	acute respiratory distress syndrome
ASA	American Society Of Anesthesiologists
ASOS	African Surgical Outcomes Study
ATLS	Advanced Trauma Life Support
AV	atrioventricular
BURP	backward upward rightward position
COCI	cannot oxygenate, cannot intubate
COPD	chronic obstructive pulmonary disease
CP	cricoid pressure
CPAP	continuous positive airway pressure
CRE	carbapenem-resistant Enterobacteriaceae
CSII	controlled sequence induction and intubation
CT	computed tomography
CVP	central venous pressure
CXR	chest X-ray
DAS	Difficult Airway Society
DCD	donation after circulatory death
DIC	disseminated intravascular coagulation
ECG	electrocardiogram
ECMO	extracorporeal membrane oxygenation
EMLA	eutectic mixture of local anaesthetics

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ESBL	extended-spectrum beta-lactamase
FAVI	fibreoptic assisted video intubation
FONA	front of neck access
GCS	Glasgow Coma Scale
GI	gastrointestinal
HELLP	haemolysis, elevated liver enzymes and low platelets
HFNO	high-flow nasal oxygen
HFNO	High-Frequency Nasal Oxygenation
HME	heat and moisture exchanger
ICU	intensive care unit
IPC	infection, prevention and control
JEDI	Justice, Equity, Diversity and Inclusion
LAST	local anaesthetic systemic toxicity
MMP-TP	modified Mallampati with tongue protrusion
MP	Mallampati
MRSA	methicillin-resistant Staphylococcus aureus
mRSII	modified rapid sequence induction and intubation
NIV	non-invasive ventilation
NSTEMI	non-ST-elevation myocardial infarction
OELM	optimal external laryngeal manipulation
PACU	postoperative anaesthesia care unit
PACU	post-anaesthesia care unit
PCWP	pulmonary capillary wedge pressure
Pecs	pectoral
PEEP	positive end expiratory pressure
RSII	rapid sequence induction and intubation
SGAD	supraglottic airway devices
STEMI	ST-elevation myocardial infarction
TEG	thromboelastogram
THRIVE	Transnasal Humidified Rapid-Insufflation Ventilatory Exchange

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VAFI	video-assisted flexible intubation
VAP	ventilator-associated pneumonia

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Domain 1: Basic Anaesthesia

Summary

COMPETENCES	DA	FCA I	FCA II	MetComp
To provide a variety of modes of anaesthesia, sedation, and pain relief, in and out of the theatre environment, using appropriate medication and fluids.				ALL
To practice within the scope of recommended legal and professional frameworks				ALL
KNOWLEDGE				
General anaesthesia, sedation, and loco-regional anaesthesia				ME/Sc/Pr
The environmental impact on the provision of a safe anaesthesia				ME/Sc/HA/ Pr/CA
Anatomy, physiology, pathophysiology, medical biochemistry and clinical pathology* relevant to the provision of anaesthesia				ME/Sc
Pharmacology of medications and fluids used in the provision of general anaesthesia, sedation, and loco-regional anaesthesia.				ME/Sc
Physics and clinical measurement and the anaesthesia/theatre environment on the provision relevant to the provision of anaesthesia				ME/Sc/HA/ Pr/CA
Principles of practice in terms of standard operating procedures, occupational safety, and patient safety				ME/Sc/HA/ Pr/CA

*Clinical pathology encompasses biochemistry microbiology haematology and histopathology

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DA

1.1 Principles of Practice: Definitions and modalities of anaesthesia

Understand the different modalities and mechanisms of anaesthesia including general anaesthesia, regional anaesthesia, perioperative pain relief and procedural sedation and practice independently for American Society of Anaesthesiologist Physical Status (ASA) 1 to 2 patients for minor and intermediate surgery and ≥ ASA 3 under supervision for major surgery or for life saving procedures.

1.1.1 General anaesthesia

- The process where the patient is rendered unconscious and unaware of the surgical or surrounding process.

1.1.2 Regional anaesthesia

- The area to be operated on is made senseless by either local infiltration, neuraxial or regional nerve block while the patient is awake or sedated.

1.1.3 Sedation

- When the patient is provided with medication for sedation and/or provided with analgesia and is not fully aware of surroundings but can be woken up for coherent communication.

1.2 Anatomy relevant to the provision of anaesthesia

1.2.1 Airway

- Anatomy of the airway for airway assessment, management of airway, and anatomy for front of neck access

1.2.2 Cardiovascular system

- Major vessels of the neck for central venous cannulation; landmark- and ultrasound-based
- Chest wall and cavity
- Radial artery for radial arterial cannulation
- Heart and great vessels

1.2.3 Central and peripheral nervous system

- Basic anatomy of the autonomic nervous system
- Brachial plexus and nerves of the upper limb
- Digital blocks
- Femoral and sciatic nerves
- Nerves at the wrist
- Sensory, motor and osteotomes innervation
- Ultrasound anatomy and landmarks for common nerve block (see Domain 4 – check list)

1.2.4 Musculoskeletal

- Anatomy of the spinal column as it relates to neuraxial techniques

1.2.5 Respiratory system

- Large airways
- Hilar structures
- Lungs
    - Lung volumes, zones, lobes and fissures, costo-phrenic angles
    - Pathologies e.g.: consolidations, fibrosis, cavities, volume loss, vascular markings, infarction, hyperinflation, pleural effusions, fluid, masses
- Rib cage
- Pneumothorax, rib fractures/flail chest, clavicle fractures, sternal fractures, pleura, and pleural spaces

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1.2.6 Radiological anatomy / assessment

- Anatomy of the spinal column as it relates to neuraxial techniques
- Cardiac: Size and shape of cardiac silhouette, calcifications, big vessels
- C-spine to suspect/recognise C-spine injuries/abnormalities
- Contents of anterior, middle, and posterior mediastinum
- Limbs, pelvis, spinal column to evaluate for fractures
- Lungs: markings, infiltration, cavities, masses
- Soft tissues

1.2.7 Specific populations / presentations

- Changes related to the
  - pregnant patient
  - obese patient
  - paediatric patient
- Difficult airway
- Difficult regional anaesthesia/block
- Difficult IV access
- Difficult positioning

1.2.8 Technical skills

1.2.8.1 Clinical skills

- Assess
  - Airway and identify markers for difficult airway
  - Respiratory and cardiovascular anatomy
  - Spine with regards to suitability for neuraxial anaesthesia
  - Central nervous system and peripheral nervous systems
- Perform basic regional blocks: axillary, wrist, digital, femoral, sciatic using landmarks, nerve stimulators and ultrasound to reduce complications
- Interpret X-rays
  - Abdomen e.g., free air, air-fluid levels
  - Chest
  - Pelvis / limb
  - Spine
- Ultrasound-guided or landmark technique central venous and arterial cannulation
- Allen's test before cannulation of radial artery

1.2.8.2 Administrative

- Document results of examination and radiological and sonographic studies

1.2.8.3 Organisational (refer to Background)

1.3 Physiology, medical Biochemistry, pathophysiology, clinical pathology

1.3.1 The central and peripheral nervous system

- Physiology
  - Cerebral blood flow
  - Monroe-Kelly doctrine
  - Transmission of nerve impulses, innervation of major organs
  - Physiology of muscle contraction, neuromuscular blockade, reversal of neuromuscular block
- Pathophysiology
  - Acute spinal shock
  - Autonomic dysreflexia
  - Chronic spinal injury
  - Haemodynamic changes

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- Intra-cranial bleeds
- Raised intra-cranial pressure

- Clinical tests
  - CT brain (read report)
  - Spine X-rays (cervical, thoracic, lumbar)

1.3.2 Respiratory

- Physiology
  - Lung capacities
  - Mechanics of breathing
  - Oxygen delivery equation
  - Physiology of gas exchange: normal oxygen/carbon dioxide exchange; gas transfer of inhalational anaesthetics
- Pathophysiology
  - Abnormal gas exchange
  - Abnormal lung mechanics
  - Obstructive or restrictive lung disease, peak flow, flow-volume loops, respiratory tests
  - Pneumothorax
  - Pulmonary oedema/atelectasis/pneumonia
- Clinical tests
  - Blood gases
  - CXR
  - Respiratory function tests.

1.3.3 Cardiovascular

- Physiology
  - Cardiac cycle
  - Cardiac Electrophysiology and the ECG
  - Innervation of the heart and blood vessels
  - Blood volume
  - Regulation of blood pressure
- Pathophysiology
  - Definition and different types of shock
  - Hypertension
  - Coronary artery disease/myocardial ischaemia
  - Peripheral vascular disease
  - Dysrhythmias
  - Cardiac arrest: ventricular fibrillation, pulseless ventricular tachycardia, pulseless electrical activity, asystole
- Clinical tests
  - Correct measurement of blood pressure; cuff sizes, sites, method
  - Definitions of hypertension
  - Tests for target organ damage; fundoscopy, ECG, renal function, ECHO
  - Cardiac enzymes
  - Cardiac ischaemia

1.3.4 Hepatobiliary / Abdominal

- Physiology
  - Gastric emptying
  - Liver: Synthetic and metabolic functions
- Pathophysiology
  - Abdominal compartment syndrome
  - Bowel obstruction – need for RSI, necrotic bowel – reperfusion injury

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- Influence on blood clotting
- Influence on drug metabolism
- Infection control implications of hepatitis
- Jaundice/Cirrhosis/hepatitis/HELLP syndrome

- Clinical tests
  - Abdominal X-ray
  - Abdominal ultrasound
  - Liver function tests
  - Clotting tests

1.3.5 Renal

- Physiology
  - Blood flow
  - Blood pressure control
  - Electrolyte handling
  - Fluid handling
- Pathophysiology
  - Accumulation of drugs/toxins that need renal excretion
  - Contrast media
  - Complications of acute and chronic renal impairment e.g.,
    - Chronic anaemia
    - Dysregulation of blood pressure
    - Electrolyte abnormalities
    - Fluid overload
    - Implications for drug clearance
- Dialysis
  - Indications for emergency dialysis
  - Basic knowledge of types of dialysis
  - Types of venous access for haemodialysis and special precautions related to each type of venous access
- Clinical tests
  - Clinical signs of hypocalcaemia / hypercalcaemia
  - ECG signs of hypo-/hyperkalaemia
  - Assessment of GFR
    - Estimated glomerular filtration rate
    - 24-hour specimen for creatinine clearance
  - Evaluation of fluid status, regulation of fluid volume
  - Electrolyte abnormalities
  - Haemoglobin (in chronic renal dysfunction)
  - Urea and creatinine

1.3.6 Endocrine

- Physiology
  - Glucose physiology
  - Thyroid and parathyroid
  - Pituitary-adrenal axis
- Pathophysiology
  - Thyroid
    - Implications of hypothyroidism/hyperthyroidism for anaesthesia
    - Thyroid function tests and medication
  - Glucose physiology
  - Diabetes Mellitus (DM)
    - Types of DM and implications for anaesthesia

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        - Perioperative management and preparation for theatre
        - Tests e.g. Glucose, HbA1C, target organ damage identification
        - Complications related to diabetes e.g.: Diabetic keto-acidosis (DKA), Hyperosmolar, non-ketotic acidosis (HONK), target organ damage, autonomic dysfunction determination
    - Tests for pituitary-adrenal axis

1.3.7 Blood

- Physiology
    - Red blood cell as oxygen carrier
    - White blood cells; immunological function
    - Platelets: Clotting function
    - Clotting factors-clotting cascade
- Pathophysiology of the following conditions, causes, management and anaesthetic risks and implications:
    - Anaemia
    - Neutropoenia
    - Thrombocytopaenia
    - Increased haemoglobin
    - Leucocytosis
    - Thrombocytosis
    - Hyper-coagulable states
    - Thromboembolism
        - Including deep vein thrombosis, pulmonary emboli, coronary emboli
- Clinical tests
    - Full blood count and peripheral smear
    - Duplex doppler for diagnosis of deep vein thrombosis
    - Viscoelastic testing
    - Raised D-dimer in peri-operative period; other causes of raised d-dimer
    - CTPA (computer tomography of pulmonary artery) for pulmonary embolism

1.3.8 Acid-base physiology

- Acidosis and Alkalosis: Metabolic, respiratory, and mixed presentations
    - Definition
    - Causes
    - Acute vs chronic
    - Buffering
    - Management
    - Anaesthesia implications

1.3.9 Specific patient populations and associated physiological changes

- Paediatric patients
    - Anatomical and physiological differences
- Pregnancy and puerperium
    - Effects of changes in organ system function on the administration of anaesthesia
    - Changes during labour and delivery
    - Placental function and autotransfusion
    - Fatal effects during labour and delivery
- Elderly and Ageing and associated and physiological changes
    - Effects of changes in organ system function on the administration of anaesthesia
    - Pharmacokinetic and dynamic changes
    - Perioperative cognitive function and frailty

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- Obesity and associated and physiological changes
    - Effects of changes in organ system function on the administration of anaesthesia
    - Effects on cardio-respiratory system, airway, and impact on intubation and ventilation
    - Pharmacokinetic and dynamic changes

1.3.10 Technical Skills (physiology, pathophysiology, clinical pathology)

1.3.10.1 Clinical skills

- Central nervous system.
    - Manage the patient with
        - Raised intra-cranial pressure for emergency non-neurosurgical procedure
        - Neurological compromise for emergency non-neurosurgical procedure
        - Autonomic dysreflexia
    - Apply neuroprotective strategies
    - Apply manual inline stabilisation during airway management
    - Log-roll during transfer/positioning
- Peripheral nervous system and spinal injuries
    - Spinal cord lesion for emergency non-neurosurgical procedure
    - Manage haemodynamics of acute spinal shock in patients presenting for emergency non-neurosurgical procedures
    - Chronic spinal cord injury for non-neurosurgical procedure
    - Autonomic dysreflexia: administer anaesthesia (local, regional, general) for procedures even in paralysed areas
    - Recognise, prevent further injury, and refer peripheral nerve injuries
- Respiratory
    - Pre-oxygenate
    - Manage common respiratory problems e.g.:
        - pulmonary oedema
        - bronchospasm
        - laryngospasm
        - pneumothorax
    - Apply lung-protective ventilation
    - Ventilator settings for different disease states
    - Interpret and manage abnormalities related to blood gases, respiratory function tests, CXR
- Cardiovascular:
    - Measure, interpret and manage blood pressure (invasive and non-invasive)
    - Determine target organ damage secondary to hypertension
    - Assess effort tolerance
    - Interpret ECG
    - Manage hypotension
    - Use vasopressors and inotropes by bolus or infusion
    - Manage hypertension – hypertensive crisis: urgency vs emergency
    - Manage Dysrhythmias with medications or manoeuvres
    - Electrical cardioversion
        - Apply transcutaneous pacing
        - Defibrillate – Indications, types of defibrillator devices, energy settings, difference between defibrillation, synchronized cardioversion and pacing
    - Apply advanced cardiac life support and determine reversible causes

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    - Perform high quality CPR
- Abdominal/ Gastrointestinal/ Hepatobiliary
    - Perform rapid sequence induction with raised intra-abdominal pressure
    - Interpret abdominal X-ray
    - Limit intra-abdominal pressure during laparoscopy
    - Interpret liver function tests and chose appropriate medications
- Renal
    - Choose medications in patient with renal impairment
    - Manage fluids in patient with renal impairment
    - Take precautions in the patient with an arteriovenous fistula
- Fluid and electrolytes
    - Calculate osmolality
    - Manage fluid overload / hypovolemia
    - Manage specific electrolyte abnormalities
- Endocrine:
    - Thyroid
        - Interpret thyroid function tests
        - Examine goitre to exclude intrathoracic extension
        - Determine for presence of pressure symptoms
        - Check for signs of hyperthyroidism/ hypothyroidism
    - Diabetes
        - Manage diabetic emergencies (DKA/HONK)
        - Determine when patient with diabetic emergency can come to theatre
        - Determine extent of autonomic dysfunction
        - Change anaesthetic management depending on the presence or absence of autonomic dysfunction
    - Other endocrinopathies – manage in consultation with specialists
- Blood and products
    - Transfuse appropriately
    - Take infection control precautions especially in neutropoenia
    - Manage anti-coagulation
        - Prophylactic vs therapeutic
    - Prevent deep vein thrombosis
        - Anticoagulation and mechanical manoeuvres
- Blood gas interpretation
    - Interpret and manage
        - Acid-base disturbances including determine degree of compensation, calculate anion gap, calculate osmolar gap
        - Respiratory function and abnormalities
- Pregnancy:
    - Assess, prepare and manage for possible difficult airway (physiological and anatomical)
    - Be aware of increased risk of aspiration and need for rapid sequence induction
- Elderly patient:
    - Modify anaesthesia technique appropriate for concerns related to the elderly
    - Prevent and manage post-operative delirium
- Obese patient
    - Manage medications and drug dosing
    - Accommodate associated comorbidities
    - Modify anaesthesia technique appropriate for concerns related to the obese

1.3.10.2 Administrative

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- Document any abnormalities in physiology and preoperative examination
- Document results of special investigation
- Document vitals and ventilator settings
- Make meticulous contemporaneous notes by a designated scribe in case of cardio-pulmonary resuscitation

1.3.10.3 Organisational

- Ensure working equipment to monitor and manage patient physiology peri-operatively
- Team use of Surgical safety checklist

1.4 Pharmacology: Medication used in balanced anaesthesia

1.4.1 Pharmacology description for all drugs

- The following are knowledge required for all medications used:
    - Class of drug
    - Basic pharmacokinetics
    - Basic pharmacodynamics
    - Mechanisms of action
    - Routes of administration
    - Dosing
    - Duration of action, onset and offset
    - Drug interactions and potentiation
    - Indications and contra-indications
    - Complications and side effects
    - Antidotes
    - Storage (temperature and light considerations)
- Specific consideration can be found in each category below

1.4.2 Technical skills for all medication

The following technical skills are common to all drugs. Specific considerations are listed in relevant sections

1.4.2.1 Clinical:

- Verify and expiry dates
- Apply infection control and prevention principles to storage, drawing up, injection and disposal
- Appropriate dilution when needed
- Safe administration and by the correct route
- Safe use of medication for general and regional anaesthesia, procedural sedation, and pain management
- Correct indication for use of other medication
- Application of SASA guidelines/policy regarding ampoule sharing

1.4.2.2 Administrative

- Document medications given, doses, route and time given, on the anaesthetic record
- Correctly prescribe additional medications on patient treatment chart
- Document adverse drug reactions
- Signing for scheduled medication

1.4.2.3 Organisational

- Safely store and account for scheduled medication and their disposal
- Availability of medication and delivery systems

1.4.3 Intravenous anaesthetic agents

1.4.3.1 Medication

- Etomidate, Propofol, Thiopentone, Ketamine

1.4.3.2 Pharmacology in addition to 1.15.1

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- Principles of total intravenous anaesthesia (TIVA)
- Propofol-related infusion syndrome

1.4.3.3 Technical skills

- Clinical in addition to 1.15.2.1
    - Technique for TIVA
- Administrative: As per 1.15.2.2
- Organisational: As per 1.15.2.3

1.4.4 Inhalational agents

1.4.4.1 Medications

- Volatiles
- Desflurane, Halothane, Isoflurane, Sevoflurane
- Methoxyflurane – current use and indications
- Gasses
- Nitrous oxide, oxygen, medical air

1.4.4.2 Pharmacology in addition to 1.15.1

- Factors affecting the inspiratory concentration, alveolar concentration, rate of uptake, arterial concentration, elimination
- Complications
    - Manage complications including malignant hyperthermia, anaesthetic-induced rhabdomyolysis, liver dysfunction, emergence delirium

1.4.4.3 Vaporisers

- Physics of vaporiser
- Safety features of vaporiser
    - Safe filling
    - Prevention of utilizing more than one at the same time

1.4.4.4 Technical skills

- Clinical in addition to 1.15.2.1
    - Safely use vaporiser to administer inhalational anaesthetic medication
    - Monitor anaesthetic gasses
    - Manage complications
- Administrative in addition to 1.15.2.2
    - Document inhalation agents given, dose given and composition of fresh gas mixture
- Organisational in addition to 1.15.2.3
    - Check regular servicing of anaesthetic delivery system including vaporisers

1.4.5 Sedative drugs

1.4.5.1 Sedative and anxiolytic medication

- Propofol
- Ketamine
- Benzodiazepines – Diazepam, Lorazepam, Midazolam
- Alpha agonists – Dexmedetomidine, clonidine

1.4.5.2 Principles of sedation (see section 1.9)

1.4.5.3 Pharmacology as per 1.15.1

1.4.5.4 Technical skills

- Clinical in addition to 1.15.2.1
    - Prescribe preoperative anxiolytics
    - Monitor sedation level
    - Rescue a patient from an unacceptable deep level of sedation
- Administrative in addition to 1.15.2.2
    - Use protocol for procedural sedation

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    - Ensure that antidotes are available when sedation is administered
- Organisational in addition to 1.15.2.3
    - Check environment is safe for sedation
    - Use protocols for sedative premedication given in the ward

1.4.6 Analgesic medication

1.4.6.1 Medication

- Classification of analgesic agents (refer to domain 3)
- Paracetamol
- NSAIDs (COX-1 and COX-2)
- Tramadol, Tapentadol Opioids
- Ketamine
- Local anaesthetics

1.4.6.2 Principles of pain management and prescribing (refer to Domain 3)

1.4.6.3 Loco-regional techniques (refer to Domain 4)

1.4.6.4 Pharmacology in addition to 1.15.1

- Multimodal analgesia
- Complications (refer to domain 4)
    - E.g., local anaesthetic systemic toxicity (LAST)

1.4.6.5 Technical skills

- Clinical in addition to 1.15.2.1
    - Measure acute pain and develop analgesia plan
    - Administer local anaesthetics subcutaneously
    - Manage local anaesthetic systemic toxicity
    - Perform nerve blocks such as axillary block, wrist block, ring block/tendon sheath block, femoral, sciatic with nerve stimulation and /or ultrasound guidance
- Administrative in addition to 1.15.2.2
    - Prescribe post-operative analgesia
    - Document recovery from loco-regional anaesthesia
- Organisational In addition to 1.15.2.3
    - Protocols for postoperative monitoring after loco-regional anaesthesia

1.4.7 Neuromuscular blocking and reversal agents

1.4.7.1 Neuromuscular Blocking (NMB) Drugs

- Depolarising agents: Suxamethonium
- Non-depolarising agents (Aminosteroids and Benzylisoquinolones)

1.4.7.2 Reversal drugs

- Anticholinesterases, Anticholinergics, Sugammadex

1.4.7.3 Pharmacology in addition to 1.15.1

- Timing of reversal
- Manage residual muscle relaxation
- Complications
    - Scoline apnoea
    - Malignant hyperthermia

1.4.7.4 Clinical application

- Use medications in rapid sequence induction (RSI), modified rapid sequence (mRSI) induction and controlled /elective sequence induction or delayed sequence
- Timing of intubation and extubation
- Redosing of NMB, manage reversal of muscle blockade
- Methods of monitoring neuromuscular block
- Neuromuscular blocking medications and risk of intraoperative awareness

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1.4.7.5 Technical skills

- Clinical in addition to 1.15.2.1
    - RSI, mRSI, elective intubation
    - Manage the airway
    - Adjust ventilator to ventilate the patient with neuromuscular blockade
    - Quantitative monitoring of neuromuscular blockade
    - Reverse neuromuscular blockade
    - Manage residual neuromuscular block
- Administrative in addition to 1.15.2.2
    - Document monitoring of neuromuscular blockade and reversal
    - Document performance of block and recovery
- Organisational in addition to 1.15.2.3
    - Check cold chain management of temperature sensitive drugs
    - Management of light sensitive drugs
    - Availability of medications and reversal agents

1.5 Other medication used or encountered in perioperative patients

1.5.1 Pharmacology:

- All medication below to be described as per 1.15.1

1.5.2 Vaso-active drugs, inter ala

- Adrenaline
- Noradrenalin
- Clividipine
- Dobutamine
- Dopamine
- Ephedrine
- Esmolol
- Hydralazine
- Labetalol
- Nitroglycerin
- Phenylephrine
- Verapamil
- Etilifrine

1.5.3 Anticholinergics

- Atropine, Glycopyrrolate
- Hyoscine

1.5.4 Anti-arrhythmic drugs:

- Adenosine
- Amiodarone
- Digoxin
- Lignocaine

1.5.5 H_2-receptor antagonists, Proton pump inhibitors

- Cimetidine, Ranitidine
- PPI e.g., lansoprazole, omeprazole
- Non-particulate antacids (e.g. Na citrate)

1.5.6 Post-operative nausea and vomiting (PONV) medication

- Dexamethasone
- 5HT3 antagonists e
- Metoclopramide
- Droperidol

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1.5.7 Local anaesthetic medications
- Bupivacaine
- Hyperbaric Bupivacaine
- Lignocaine
- Ropivacaine
- Cocaine

1.5.8 Antidotes of various medications, inter alia
- Naloxone
- Flumazenil
- Calcium chloride/gluconate

1.5.9 Intravenous electrolytes and alkalinizing agents
- Potassium chloride
- Magnesium sulphate
- Sodium bicarbonate
- Calcium chloride /gluconate

1.5.10 Medications affecting glucose metabolism
- Insulin
- Glucagon
- Other

1.5.11 Dextrose

1.5.12 Diuretics
- Furosemide
- Hydrochlorothiazide
- Mannitol

1.5.13 Dantrolene

1,5.14 Lipid emulsion (Intra-lipid®)

1.5.15 Steroids, inter alia
- Dexamethasone
- Hydrocortisone
- Prednisone

1.5.16 Bronchodilators
- Aminophylline
- Ipratropium bromide
- B2 agonists e.g., salbutamol – nebulized and intravenous

1.5.17 Antiepileptics
- Carbamazepine
- Diazepam
- Phenytoin
- Sodium valproate

1.5.18 Procoagulants/Anticoagulants
- Low molecular weight heparin (e.g., enoxaparin)
- Unfractionated heparin
- Vitamin K antagonists
- Tranexamic acid
- DOACS/NOACS
- Antiplatelet agents
- Fibrinolytics

1.5.19 Uterotonics
- Carbetocin
- Ergometrine and formulations (e.g., syntometrine)

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- Misoprostol
- Oxytocin

1.5.20 Antimicrobials/ antivirals

- Agents used in Surgical prophylaxis
- Empiric therapy
    - Cephalosporins
    - Macrolides
    - Aminoglycosides
    - Metronidazole
    - Penicillins
    - Antiretrovirals

1.5.21 Technical skills

- Clinical in addition to 1.15.2.1
    - Manage infusions of medicines
    - Dilute medication to specific concentration
    - Calculate dose
    - Titrate infusion
    - Set up a drug infusion; set infusion pumps
    - Administer nebulised medication
    - Administer medication via different routes including oral and rectal with relevant permissions and information
- Administrative in addition to 1.15.2.2
    - Prescribe medication
    - Document all medication given on anaesthetic record
    - Practice antibiotic stewardship and report adverse drug events
- Organisational in addition to 1.15.2.3
    - Check cold chain supply
    - Check availability of infusion equipment

1.6 Peri-operative fluid management

1.6.1 Physiology

1.6.1.1 Composition of different body fluids
1.6.1.2 Total blood volume
1.6.1.3 Intravascular volume status

- Symptoms and signs of dehydration
- Surrogate markers of intravascular volume
- Fluid and electrolyte requirements

1.6.2 Fluid management concepts

1.6.2.1 Intravenous fluid as a drug
1.6.2.2 Normal maintenance requirements
1.6.2.3 Fluids used for resuscitation
1.6.2.4 Intraoperative fluid replacement
1.6.2.5 Estimate volume status and blood loss

1.6.3 Crystalloids

1.6.3.1 Basic pharmacology and effects of crystalloids

- Composition of different crystalloids
- Indications for crystalloids
- Complications associated with the administration of crystalloids

1.6.4 Colloids

1.6.4.1 Basic pharmacology of colloids

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- The difference between colloids and crystalloids
- Composition of different colloids
- Indications and contraindications
- Complications
- Dose of commonly used colloids
- Controversy surrounding hydroxyethyl starches

1.6.5 Technical skills

1.6.5.1 Clinical skills

- Calculate perioperative fluid requirements
- Calculate fluid and electrolyte requirements
- Cannulate major vessels for volume resuscitation
- Correct fluid and electrolyte abnormalities
- Determine volume/hydration status
- Determine fluid responsiveness
- Determine fluid balance
- Establish central venous access
- Estimate total blood volume
- Estimate blood loss
- Recognise and manage fluid overload
- Interpret blood gases related to metabolic and volume status

1.6.5.2 Administrative skills

- Prescribe intravascular fluid
- Document intravenous fluids on anaesthetic record

1.6.5.3 Organisational

- Train staff regarding the correct use of intravenous fluid
- Emphasise to staff the importance of administering fluid as prescribed

1.7 Blood and blood products

1.7.1 SASA Patient blood management guidelines

1.7.2 Components

- Whole blood
- Packed red blood cells
- Fresh Frozen Plasma (FFP)/Freeze dried Plasma (FDP)
- Cryoprecipitate
- Platelets
- Albumin

1.7.3 Benefits and risks of transfusion

1.7.4 Legal aspects of transfusion

1.7.5 Storage and administration of blood and blood components

1.7.6 Patient blood management and blood conservation strategies

- Preoperative optimization
- Blood conservation strategies
- Basic knowledge of principles, indications, and contraindications of cell salvage

1.7.7 Transfusion triggers in different patient populations

1.7.8 Order and administer blood and blood products

- Special precautions during transfusion
- Warming blood and components for transfusion
- Leuko-depleted filters

1.7.9 Red Blood Cells

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- Indications for red cell transfusion
- Storage and changes that occur during storage
- Blood groups (HBO)
- Significance of Rhesus-negative blood group

1.7.10 Platelet transfusion
- Indications for platelet transfusion
- Contraindications to platelet transfusion
- Administration and dose

1.7.11 Plasma components and derivatives
- General precautions for the use of plasma products
- Clinical indications and dosing of FFPs/FDPs

1.7.12 Massive blood transfusion
- Definitions of major blood loss
- Components of massive transfusion protocol

1.7.13 Technical skills

1.7.13.1 Clinical skills
- Interpret laboratory results and coagulation studies
- Estimate blood loss and calculate volume of blood or components required
- Safely infuse blood and blood products
- Manage complications of transfusion and related to blood storage
- Use emergency blood products appropriately

1.7.13.2 Administrative skills
- Prescribe, order and record blood and blood products
- Report adverse blood events
- Have a massive blood transfusion protocol

1.7.13.3 Organisational
- Check availability of emergency blood

1.8 Physics, Clinical measurement, and the Anaesthetic Environment

1.8.1 SI Units
1.8.2 Capnography
1.8.3 Humidification
1.8.4 Measurement of volumes, flows, and pressures
1.8.5 Oximetry
1.8.6 Temperature
- Measurement of temperature
- Ambient temperature

1.8.7 Theatre ventilation

1.9 Operating suite environment and safety

1.9.1 Noise
1.9.2 Ionising radiation
1.9.3 Electrical safety
1.9.4 Fire and explosion safety
1.9.5 Surgical diathermy
1.9.6 Laser safety
1.9.7 Sustainability and environmental impact
1.9.8 Ventilation

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1.10 Anaesthetic environment

1.10.1 Equipment:

- Understand function of equipment used in anaesthesia practice including basic physics and measurements
- List of equipment needed per level of care (see SASA guidelines)
- Conduct pre-use checks and anaesthesia apparatus safety checks to ensure safe functioning for patients and staff

1.10.2 Airway devices (refer to Domain 2)

1.10.3 Anaesthesia delivery systems, gas supplies and monitors

- Anaesthesia delivery system, including pressure valves and regulators
- Breathing circuits: classification, testing, fresh gas flow requirements
- Carbon dioxide absorber: physics/chemistry and function
- Essential safety features of modern anaesthetic devices and gas supplies
- Gas supply in bulk and cylinders
- Pressure and volume monitoring
- Resuscitation breathing systems
- Monitors for vital signs, including pulse oximetry and ventilatory parameters including capnography
- Vacuum and waste gas scavenging
- Vaporisers: physics, design, safety features
- Ventilators: classification, design, ventilation modes

1.10.4 Additional equipment

- Defibrillators
- Temperature monitoring and control devices
- Neuromuscular monitors
- Nerve stimulators
- Operating table and positioning equipment
- Ultrasound for basic applications
- Depth of anaesthesia monitors

1.10.5 Technical Skills

1.10.5.1 Clinical skills:

- Correct use of anaesthesia delivery system, equipment and monitors
- Select correct ventilation mode and ventilator settings
- Use ultrasound for diagnostic and therapeutic indications

1.10.5.2 Administrative skills:

- Maintain records of safety checks
- Check regular servicing of equipment

1.10.5.3 Organisational skills:

- Check anaesthetic equipment routinely using a safety checklist and the manufacturer's instructions
- Decontaminate equipment to comply with infection control principles

1.10.6 Environmental sustainability

1.10.6.1 Knowledge (in addition to DA and Part 1)

- Environmental impact of anaesthesia and anaesthesia agents and waste management
- "Green Hospital" initiatives and sustainable practices

1.11 Monitoring

1.11.1 Principles of measurement of physiological variables

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1.11.2 Anaesthesia monitoring requirements
1.11.3 Basic monitoring standards
- Frequency and purpose of monitoring
- Indications, contra-indications, and complications

1.11.4 Classify BP monitors and non-invasive measurement of BP
1.11.5 Use additional monitoring when appropriate such as
- Blood loss
- Blood sugar
- Central venous pressure
- Coagulation screening and point of care
- Intra-arterial catheters and invasive pressure monitoring
- Neuromuscular monitoring
- Urine output

1.11.6 Technical skills
1.11.6.1 Clinical
- Interpret monitored variables
- Correctly place monitors including invasive monitors
    - Central venous cannulation, complications, and precautions
    - Arterial cannulation, complications, and precautions
    - Arterial blood gas collection and interpretation
- Estimation of blood loss
- Technique and interpretation of neuromuscular monitoring

1.11.6.2 Administrative
- Document all relevant variables on the anaesthetic record according to the standards of monitoring and documentation

1.11.6.3 Organisational
- Ensure appropriate monitors and consumables used
    -

1.12 Patient positioning

1.12.1 Understand the physical and physiological implications of patient positioning
- Different positions in which patients are placed for surgery
- Physical risks associated with each position
- Physiological changes that occur with each patient position

1.12.2 Technical skills
1.12.2.1 Clinical
- Manage different patient positions
- Protect the patient against physical and physiological risks related to each patient position

1.12.2.2 Administrative
- Positioning / Repositioning checklist
- Document patient position and what measures were taken to mitigate risk

1.12.2.3 Organisational
- Check proper functioning of the operating table and all attachments and equipment for positioning

1.13 Patient transport/transfer

1.13.1 Principles
- Safe transport of the critically ill, anaesthetised or recently anaesthetised patient
- Safe handover of care to another responsible healthcare worker

1.13.2 Requirements

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- Equipment, staff and monitoring needed for transport
- Safety precautions for transfer of patients from patient trolley to operating table and from theatre to recovery room

1.13.3 Adverse events related to transport of critically ill or anaesthetised patients

1.13.4 Technical skills

1.13.4.1 Clinical

- Assess patient prior to transport to ensure suitability for transport
- Prepare equipment, medicines, and monitors for transport
- Preparation of patient for intra and interhospital transport
- Ensure physiological stability during transport
- Deal with any untoward complication during transport

1.13.4.2 Administrative

- Accompany patient during transport and hand over to nursing staff/clinician
- Provide appropriate written and verbal instructions and information to recovery room staff
- Supervise the recovery period and authorise the patient's discharge from recovery

1.13.4.3 Organisational

- Check proper function of equipment and monitors for transport
- Establish whether oxygen supply is adequate for the transfer process
  -

1.14 Occupational safety

To be aware of potential occupational hazards and to take action to ensure the safety of self and colleagues

1.14.1 Knowledge

- Biological hazards
  - Risk of blood-borne, airborne and direct and indirect contact infections
- Special infections including
  - HIV
  - Hepatitis B and C
  - Tuberculosis
  - SARS-CoV-2
  - M-Pox
- Post-exposure prophylaxis
- Chemical hazards including
  - Disinfectants
  - Anaesthetic agents
  - Cytotoxic agents
  - Latex allergies/glove power sensitivities
  - Other chemicals e.g.: heavy metals such as mercury
- Radiation risk factors
  - Organs at highest risk
  - Protective gear
- Stress and burnout
  - Work or other situations with greatest exposure to stress
  - Effects on health and safety
  - Preventive and protective measures and support
  - Possible reasons for the increased suicide risk for anaesthetists and risk alleviation
  - Working hours
- Impaired colleagues
  - Nature of the risk

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    - Criteria for a specific risk assessment
    - Work situations with the greatest exposure
    - Effects on health and safety
    - Preventive and protective measures
    - Consultation with colleagues and HPCSA reporting requirements
- Interpersonal interactions and situational awareness especially in critical situations
- Ergonomic risk factors
    - Musculoskeletal injuries and biomechanical stress related to physical handling, positioning, and transferring of patients and equipment
- Electrical safety
- Diathermy safety
- Other hazards including
    - Wet floors: slips, trips and falls
    - Burns and scalds from hot sterilized equipment
    - Increased hazards for miscarriage
    - Carcinogenic hazards

1.14.2 Technical Skills

- Clinical skill
    - Correct ergonomic movement
    - Wearing of protective gear
- Administrative skills
    - Notification of injury on duty including needle stick
    - HPCSA reporting of impaired colleagues in conjunction with senior colleagues
- Organisational skills
    - Comply with occupational health and safety regulations, including use of PPE and safe disposal of infections material and sharps
    - Vaccinations against common or dangerous pathogens
    - Ensure a safe operating theatre environment
    - Temperature, humidity, lighting, noise, air conditioning, air pollutants, ionising radiation, ergonomic work conditions
    - Adequate ventilation and air-conditioning system
    - Proper scavenging of inhalational gases

1.15 Principles of standards of practice – Standard operating procedures (SOP) and professional guidelines

To understand the need for SOPs in the peri-operative period and to know the important protocols/guidelines guiding the practice of anaesthesia

1.15.1 Knowledge

- Health Professions Council of South Africa (HPCSA) rules and regulations regarding good professional and ethical practice
- Scope of practice relevant to category registered by the HPCSA and per SASA guidelines
- Requirements for anaesthetic case records
- Requirements for anaesthetic prescriptions
- The process of incident and death reporting
- Protection of Personal Information Act (POPIA)
- Infection control including hand washing, use of gloves and PPE, and safe disposal of sharps and waste

1.15.2 Technical Skills

- Clinical

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    - Perform invasive procedures using aseptic technique
    - Use antimicrobial agents in surgical prophylaxis as indicated
    - Adhere to local infection control policies
- Administrative:
    - Issue prescriptions
    - Complete GW7/24 forms for deaths of patients who had a procedure-related death.
- Organisational
    - Establish and follow protocols for incident reporting
    - Arrange morbidity and mortality meetings
    - Manage patient details according to POPIA
    - Develop SOPs for relevant perioperative procedures

1.16 Peri-operative management and general anaesthesia

1.16.1 Pre-operative assessment
- Refer to Domain 5

1.16.2 Special investigations

1.16.3 Patient preparation

1.16.4 Informed consent

1.16.5 Fasting guidelines

1.16.6 Appropriate referral and consultation
- To specialist or higher level of care when necessary
- Consultation with senior colleagues for patients ≥ ASA 3 or for major procedures

1.16.7 Anaesthetic technique
- Selection and planning
- Indications/Contra-indications

1.16.8 Medication
- Used in provision of anaesthesia
- Implications of concomitant patient medication

1.16.9 Airway management
- Refer to Domain 2

1.16.10 Standards of monitoring
- Record keeping and SASA monitoring standards
- Additional monitoring when appropriate (e.g., central venous pressure)

1.16.11 Phases of anaesthesia
- Induction, maintenance, emergence, recovery

1.16.12 Postoperative care

1.16.13 Perioperative complications

1.16.14 Infection control in theatre

1.16.15 Services, equipment, apparatus
- Requirements and standards for operating rooms, procedure rooms and post-anaesthesia recovery room

1.16.16 Patient safety and incident management
- Principles of patient safety
- Managing an intra-operative death or mishap

1.17 Neuraxial and regional anaesthesia (refer to Domain 4**)**

1.17.1 Techniques

1.17.2 Indications/Contraindications

1.17.3 Medication used in neuraxial/regional anaesthesia

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1.17.4 Standards of monitoring
1.17.5 Complications

1.18 Procedural sedation

1.18.1 Objectives
1.18.2 Risks
1.18.3 Appropriate environment/clinical setting
- Equipment, staffing, location

1.18.4 Medication
- Indications, contra-indications, precautions
- Midazolam
- Ketamine
- Propofol
- Dexmedetomidine
- Opioids

1.18.5 Basic vs advanced sedation techniques
- Single agent for single operator only
- Personnel – three-person model

1.18.6 Appropriate selection
- Patient selection
- Suitable procedures

1.18.7 Patient preparation
- Consent
- Fasting guidelines

1.18.8 Monitoring
- Standards of monitoring
- Level of sedation
- Sedation endpoints

1.18.9 Management of complications
1.18.10 Discharge criteria
1.18.12 Documentation
- Consent
- Pre-sedation assessment
- Anaesthetic record/sedation monitoring flowchart:
    - Intraoperative events, vitals/physiological parameters
    - Recovery room monitoring
- Post-sedation instructions
- Use of SASA Sedation guidelines and checklists for sedation safety
    -

1.19 Non-operating room anaesthesia (NORA)

1.19.1 Definition/scope
- Minor procedures requiring anaesthetic involvement outside the operating room or remote locations e.g., radiology, endoscopy, dentistry / office based

1.19.2 Appropriate level of care
- Patient evaluation and selection for NORA
- Referral to higher levels of care if required
- Anaesthetic techniques for patients managed outside the operating room

1.19.3 Pharmacology
- Anaesthetic agents/ medication suitable for short procedures: rapidly acting agents, including opioids, sedative-hypnotics, volatiles, and neuromuscular agents

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1.19.4 Safety standards

- Practice of anaesthesia in remote locations
- Transport of patients to and from remote locations
- Basic principles of safety and self-protection during ionizing radiation and MRI procedures

1.19.5 Clinical and organisational

- Problems associated with anaesthesia outside the operating room such as:
    - Distant airway and vascular access
    - Precarious monitoring
    - Distant or inexperienced help

1.20 Ambulatory / Day case surgery

1.20.1 Facility requirements

- Staffing, services, and equipment

1.20.2 Patient management

- Selection and suitability for day surgery
- Discharge criteria
- Complications and unexpected requirement for admission

1.20.3 Anaesthesia techniques and medication

- Suitability for ambulatory anaesthesia
    -

1.21 Perioperative complications and emergencies

1.21.1 Protocols and Drills

- Manage perioperative emergencies and complications using protocols and drills
- Advanced life support (SA Resuscitation Council guidelines link)
- Essential Steps in Management of Obstetric Emergencies (ESMOE) Guidelines or equivalent

1.21.2 Airway

- As examples
    - Failure to oxygenate
    - Inadequate airway, failed intubation, obstructed airway, oesophageal intubation, unplanned extubation
    - Laryngospasm, bronchospasm, stridor

1.21.3 Anaesthesia related

- As examples:
    - Delayed emergence
    - Emergence delirium
    - High spinal, spinal hypotension
    - Inadequate neuraxial blockade
    - Malignant hyperthermia
    - Residual neuromuscular blockade
    - Scoline apnoea

1.21.4 CVS

- As examples:
    - Arrhythmias
    - Hypertension, hypotension
    - Myocardial ischaemia

1.21.5 Metabolic/ Endocrine

- As examples:
    - Electrolyte abnormalities and emergencies

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- Hyperglycaemia, Diabetic Keto-Acidosis (DKA) and Hyperosmolar and non-ketotic coma (HONK)
- Hypoglycaemia
- Hyperthyroidism/Thyroid crisis /storm/ hypothyroid coma

1.21.6 Respiratory

- As examples:
  - Bronchospasm
  - Hypoxia
  - Hypocarbia/ Hypercarbia
  - Hypoventilation/ Hyperventilation
  - High ventilator peak inspiratory pressures
  - Pneumothorax
  - Pulmonary aspiration

1.21.7 Other

- As examples:
  - Anaphylaxis
  - Embolic events: venous thrombo-embolism, gas embolism, fat embolism, amniotic fluid embolism, bone cement embolism, arterial thrombus/acute stroke
  - Seizures

1.22 Technical skills (1.1**;** 1.16 to 1.21**)**

1.22.1 Clinical

- Conduct safe general anaesthesia, regional anaesthesia or sedation and perioperative care for patients where risk is low (ASA PS 1 and 2) including:
  - Preoperative:
    - Physically examine patient and determine organ dysfunction
    - Order special investigations rationally
    - Interpret blood investigations, blood gas investigation, common radiological and imaging scans, electrocardiogram, and lung function tests
  - Airway management skills (see domain 2)
  - Rapid sequence induction
  - Mechanical ventilation
  - Analgesia plan
  - Skills related to intra-vascular access
  - Aseptic techniques
- Conduct anaesthesia for ASA 3 and above with supervision or for life saving care
- Skills for the administration of spinal anaesthesia and basic peripheral nerve blocks (see domain 4)
- Manage perioperative emergencies and complications (using protocols and practice drills as needed) including advanced life support
- Post anaesthesia care
  - Safe recovery, transport and handover in post-anaesthesia recovery room, high care or ICU
  - Management of postoperative pain, fluids, and nausea and vomiting
  - Scoring systems to assess discharge readiness
  - Post-operative consultations

1.22.2 Administrative

- Document special investigations
- Prescribe fasting guidelines

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- Prescribe premedication
- Document informed consent

1.22.3 Organisational

- Ensure availability and the use of anaesthetic-specific consent form
- Pre-anaesthetic preparation of equipment (anaesthesia machine, disposable materials and drugs)
- Ensure availability of anaesthesia-specific equipment, drugs, and consumables
- Ensure the location meets adequate standards, including adequate human resources
- Ensure adequate location for post-anaesthesia care and monitoring whether in operating room complex or remote locations

1.23 Patient safety

Understand and apply patient safety principles

1.23.1 Knowledge

- Anaesthesia machine, gas supplies and suction and theatre environment
- Electrical safety, micro- and macro-shock: prevention, ensuring the compatibility of medical procedure, treatment area, and medical equipment used
- Fires and explosions: causes, prevention, and management
- Safety of methods for maintaining body temperature during anaesthesia and sedation, including active warming of patients
- Principles of surgical diathermy, its safe use, and potential hazards
- Principles of surgical lasers, their safe use, and potential hazards
- Clinical reasoning principles
- Cognitive biases and how to avoid them

1.23.2 Technical Skills

- Clinical
    - Ensure appropriate standards are met in terms of equipment, monitoring, and staffing when providing anaesthesia or sedation
    - Maintain focus on patient care and avoid distractions
    - Situational awareness to anticipate and respond in a timely manner to changes in the clinical environment/patient's status and intervene appropriately as soon as possible
- Administrative
    - Documentation of safety incidents and hazards
- Organisational
    - Adopt strategies that promote patient safety and address human and system factors
    - Be involved in training of nursing staff

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FCA I

1.24 Physiology, pathophysiology, medical biochemistry, and clinical pathology

1.24.1 Cellular function

- The cell membrane.
  - Structure and function
  - Cell adhesions, junctions, and extracellular matrix
  - Intercellular and intracellular communication.
  - Membrane potentials

1.24.1.1 Cell organelles

- Nucleus
- DNA & RNA structure, replication, synthesis and protein synthesis
- Endoplasmic cytoskeleton
- Endoplasmic reticulum
- Endosomes
- Golgi apparatus
- Mitochondria
- Ribosomes

1.24.1.2 Cell replication

- Meiosis and mitosis
- Genes
- Genetic control of cellular activity
- Basic genetics and inheritance
- Genetic diseases.
- Tumours benign and malignant

1.24.1.3 Intermediary metabolism.

- Energy metabolism
  - Aerobic metabolism
  - Anaerobic metabolism
  - Carbohydrate metabolism
  - Fat metabolism
  - Protein metabolism
  - Nucleic acids
  - Free radicles

1.24.1.4 Cell adhesions, junctions, and extracellular matrix

- Intercellular and intracellular communication.

1.24.1.5 Cell death

1.24.2 Water and electrolytes

- Body water and compartments
- Osmolality, osmolarity, turgor
- Osmolar and anion gaps
- Regulation of body water and electrolytes
- Sodium, potassium, magnesium, calcium, phosphate, chloride
- Water and electrolyte disturbances

1.25 Pharmacology

General Principles

1.25.1 Definitions and descriptions of medications and drugs

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1.25.3 Structure and Functional Relationship of Medications

- Basics of inorganic and organic chemistry
- Organic chemistry: atomic structure and important atomic constituents
- Medications as organic molecules
- Chemical bonds, intermolecular bonds, and interactions.
- Ionisation of molecules. pH and pKa, dipoles.
- Enzyme kinetics.
- Oxidation and reduction.
- Isomerism.
- Tertiary and quaternary ammonium drugs

1.25.4 Applied Pharmacokinetics

- Routes of administration
- Absorption
- Distribution
- Clearance
- Metabolism
- Excretion
- Clinical pharmacokinetics.
- Bioavailability and bioequivalence
- First and zero order kinetics
- Time constants and half-life
- Context-sensitive half time
- Pharmacokinetic modelling
    - Non-compartmental
    - Compartmental
    - Physiological
- Target-controlled infusions (TCI)
- Total intravenous anaesthesia (TIVA)

1.25.5 Applied Pharmacodynamics

- Class of drug
- Mechanism of action
- The BioPhase.
- Drug-receptor interaction.
    - Classification of receptors.
    - Signal transduction, first and second messengers.
- Dose and dose-response relationship.
    - Affinity, efficacy, and potency.
    - Agonism and antagonism.
    - Hysteresis.
    - Dose-response curves.
- Desensitisation, tachyphylaxis and tolerance.
- Therapeutic index / ratio.
- Drug Dependance: Onset/offset, duration, receptor binding, drug interactions, tolerance
- Side effects
- Complications

1.25.6 Drug Interactions Relevant to Anaesthesia

- Pharmaceutical interactions.
- Pharmacokinetic interactions.
- Pharmacodynamic interactions.

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- Pharmacogenetic interactions

1.25.7 Toxicology

- Toxins, poisons
- Management of medication overdose
- Topical agents

1.25.8 Non-prescription medication

- Complementary medication
- Over the counter (OTC) medications
- Performance-enhancing agents
- Recreational medication

1.25.9 Topical agents and agents used for skin conditions

- Topical agents for all conditions
- Agent used for treatment for skin conditions e.g. Roaccutane

1.25.10 Storage and handling of medication

- Technicalities and legalities e.g., prescription practices, Section 21 processes.
- Scheduling of medication
- Medication storage
- Off-label use
- Generic drugs

1.26 Physics, Clinical Measurement, and the Anaesthetic Environment

General principles

1.26.1 Principles of measurement

- Sensing devices.
- Processors and display units.
- Recorders.
- Control systems.
- Alarms.
- Signal-to-noise ratio.
- Reproduction of input signal.
- Calibration of monitoring equipment.
- Artificial Intelligence.

1.26.2 Units of measurement and mathematical concepts

- SI units of measurement.
- Derived units.
- Symbols and functions.
- Mathematics relevant to anaesthesia.
- Trigonometry.
- Sine waves and waveform reproduction.
- Natural frequency, damping coefficient, over- and under-damping.
- Differentials and integrals.
- Power functions and logarithms, natural exponential functions.
- Basics of statistics.
- Area under the curve.

1.26.3 Mechanics and anaesthesia

- Mass, Work, Energy and Power.

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1.26.4 Electronics and anaesthesia

- Current, voltage, resistance, and OHM's Law
- Capacitance.
- Inductance.
- Transducers.
- Wheatstone bridge.
- Amplifiers and amplification of biological potentials.

1.26.5 Electromagnetic spectrum and its application

- The radiation spectrum.
- Beer-Lambert law.
- Colorimetry.
- Photometry.
- Spectroscopy.
- Spectrophotometry.
- Fluorescence.
- Magnetic resonance.

1.26.6 Ultrasound and the doppler principle

- Waves, motion, and sound.
- Generation and detection of sound.
- Properties of ultrasound.
- Scanning techniques.
- Doppler effect and its application in anaesthesia.

1.26.7 Pressure

- Units of measurement: bar, Pascal, mmHg.
- Gauge and absolute pressure.
- Gas laws.
- Universal gas constant.
- Critical temperature.
- Adiabatic effect.
- Solubility and vapour pressure.
- Diffusion and osmosis.
- Instruments used for measuring pressure.
    - Manometers.
    - Mechanical pressure gauges.
    - Diaphragm gauges.

1.26.8 Flows

- Laminar and turbulent flow.
- Factors effecting flow.
- Venturi effect.
- Bernoulli effect.
- Coanda effect.
- Principles of measurement of flow and volume.
    - Gas.
    - Liquids [including blood].

1.27 The Theatre Space

1.27.1 Medication used in the provision of Anaesthesia

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The following are required to describe all drugs used:

- Class of drug and schedule
- Storage (temperature and light considerations)
- Pharmacokinetics
- Pharmacodynamics
- Mechanisms of action
- Routes of administration
- Dosing
- Duration of action, onset and offset
- Drug interactions and potentiation
- Indications and contra-indications
- Complications and side effects
- Antidotes [if known]

- Premedication agents
  - Anxiolysis, sedation and amnesia,
  - Aspiration prophylaxis, gastric emptying
- Inhalational agents.
- Intravenous anaesthetic agents.
- Medications affecting the neuromuscular junction.
- Local anaesthesia agents [medications blocking nerve conduction].
- Analgesia for acute and chronic pain
- Intravenous fluids.
- Anti-emetics.
- Emergency drugs.

1.27.2 Environment

- Laminar flow units.
- High-pressure and low-pressure units.
- Ionising radiation [X-rays and CT scanner].
- Magnetic resonance imaging.
- Fires, explosions and pollutants.
- Electricity: electricity generation, supply, backup supply, electrical safety.
- Temperature and humidity, heating, ventilation and air conditioning (HVAC) systems.
- Theatre lighting and colour

1.27.3 Sustainability and environmental impact

- Global warming
- Climate change
- Greenhouse effect
- Greenhouse gases
- Carbon footprint
- Management of waste and pollutants
- Environmental toxicity
- Green washing

1.27.4 Equipment and consumables

- All equipment required for delivery of anaesthesia and patient recovery
- Emergency and resuscitation equipment
- Equipment required for patient positioning and transport
- Consumable items for delivery of anaesthesia e.g. needles, syringes, airway devices

1.27.5 Theatre and Equipment Ergonomics

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- The interaction between anaesthetists and their workspace environment to promote safety, performance, and well-being.

1.27.6 Personal Safety

- Ionising radiation and magnetic resonance imaging.
- Lasers.
- Basics of microbiology and infection control.
- Principles of hygiene, disinfection, and sterilisation.
- Personal protective equipment [PPE].

1.28 Integrated Systems: Integrated anatomy, physiology, pathophysiology, pharmacology, physics, clinical measurements, and anaesthetic environment

1.28.1 Cardiovascular system (CVS) and circulation

1.28.1.1 Functional anatomy

- Heart and blood vessels
- Lymphatics
- Sympathetic and parasympathetic nervous system innervation and control of CVS

1.28.1.2 Physiology

- Myocardium, coronary blood flow, metabolism, function
- Generation and conduction of the cardiac impulse and abnormal rhythms
- Cardiac cycle and cardiac sounds
- Cardiac output and determinants
- Endothelium, glycocalyx and transcapillary exchange
- Elastance and compliance of the heart and blood vessels
- Cardiac innervation: Generation and conduction of the cardiac impulse and abnormal rhythms
- Myocardium, flow, metabolism function
- Pressures
- Regulation of the macro- and microcirculation and relative organ blood flow

1.28.1.3 Pathophysiology

- Common disorders of the CVS system illustrative of abnormal CVS physiology. E.g., myocardial ischaemia, shock, hypertension, cardiac failure, Dysrhythmias.

1.28.1.4 Pharmacology

- Antidysrhythmic agents
- Antihypertensive agents.
- Medications used in the treatment of ischaemic heart disease.
- Medications used in the treatment of cardiac failure.
- Inotropes and vasopressors.

1.28.1.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
    - Laminar and turbulent flow and factors effecting flow.
    - Principles of measurement of flow and volume of liquids.
    - Non-invasive and invasive measurement of pressure,
    - Transducers – principles, use and factors affecting accuracy
- Clinical measurement
    - Principles of measurement of flow and volume in Liquids [including blood].
    - Cardiac output monitoring
    - Contractility
    - Systemic vascular resistance and elastance
    - Fluid status of vascular compartment
    - Electrocardiogram

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- Echocardiography
- Equipment and environment
  - CVS and hemodynamic monitoring equipment
  - Defibrillators
  - Pacemakers and implantable defibrillator devices
  - Diathermy
  - Infusion devices and pumps – e.g. syringe drivers, patient-controlled analgesia (PCA), volumetric and elastomeric.
  - Drips, needles, venous catheters, arterial and central line catheters
  - Basic principles of bypass and extracorporeal membrane oxygenation [ECMO].
  - cardiac bypass machine
  - Intra-aortic balloon pumps and cardiac assist devices
  - Comparisons of efficacy, cost effectiveness, and clinical utility

1.28.2 Respiratory system

1.28.2.1 Functional anatomy

- Upper airway
- Tracheo-bronchial tree and alveoli, hilar structures
- Pulmonary vasculature
- Nervous system innervation and control of respiratory system

1.28.2.2 Physiology

- Mechanics
  - Effects of barometric pressure
  - Flow, resistance, elasticity, and compliance
  - Lung volumes and capacities
  - Pressures in the respiratory system
  - Work of breathing
- Gas exchange/ventilation and circulation
  - Alveolar gas exchange
  - Oxygen and carbon dioxide homeostasis
  - Pulmonary circulation
  - Respiratory minute volume, alveolar ventilation, dead space
  - Ventilation-perfusion relationships
  - Ventilation – spontaneous and mechanical
- Regulation of breathing and respiratory function
- Non-respiratory pulmonary functions
- Altitude and its impact on homeostasis

1.28.2.3 Pathophysiology

- Common disorders of the respiratory system illustrative of abnormal respiratory physiology e.g., pulmonary infections/oedema, obstructive and restrictive lung pathology, pneumothorax pulmonary embolism
- Effect of ventilation on the lungs e.g. volutrauma, barotrauma, sheer trauma
- Effect of medication on the pulmonary system and vasculature.

1.28.2.4 Pharmacology

- Bronchodilators.
- Inhalational Anaesthetics
- Pulmonary vasodilators.
- Surfactant.

1.28.2.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
  - Laminar and turbulent flow and factors effecting flow.
  - Venturi effect.

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- Bernoulli effect.
- Coanda effect.
- Principles of measurement of flow and volume.
  - Gas (refer to general principles).
- Vapour pressure, latent heat, diffusion and osmosis
- Gas and vapour analysis.
- Effect of barometric pressure on apparatus function
- Effect of altitude on the delivery of anaesthesia
- Blood gas machine functioning

- Clinical measurement
  - Blood gas
  - Capnography
  - Imaging
  - Pulmonary function tests
  - Pulmonary vascular resistance
  - Pulse oximetry
  - Ventilator graphics
- Equipment and environment
  - Airway devices and tracheal intubation equipment [e.g. laryngoscopes and bronchoscopes].
  - Blood gas machine – interpretation of respiratory and metabolic function and other test
  - Delivery of anaesthetic gases and anaesthetic machine
    - Gas supply [manufacture, storage, supply of anaesthesia gases].
    - Cylinders and pipelines.
    - Vaporisers
    - Vapour pressure, latent heat, diffusion, and osmosis and vaporisers
    - Circuits, breathing systems.
    - Humidification and filtration
    - Equipment checks including machine, ventilator and gas supply
    - Low flow anaesthesia.
  - Ventilators and oxygen delivery devices
    - Ventilators, continuous positive airway pressure [CPAP], high frequency nasal oxygen [HFNO], transnasal humidified rapid insufflation ventilatory exchange [THRIVE], face masks, venturi masks, nasal prongs, self-inflating resuscitator bag
  - Modes of ventilation
  - Ventilation graphics
  - Suction.
  - Scavenging.

1.28.3 Cardiopulmonary Interaction

1.28.3.1 Physiology

- Ventricular interdependence and heart-lung interactions.

1.28.3.2 Pathophysiology

- Conditions causing abnormalities of cardiopulmonary interaction

1.28.3.3 Pharmacology

- Medications used in optimisation of cardiopulmonary interactions

1.28.3.4 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics and Clinical measurement
  - Dynamic wave form indices and arterial pressure variance methods e.g. SVV, PPV, SPV

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- Equipment and environment
    - Monitors and devices for measurement of SVV, PPV and SPV

1.28.4 Exercise physiology and testing

1.28.4.1 Functional anatomy

- skeletal muscle bone and cardiorespiratory system

1.28.4.2 Physiology

- Exercise physiology in particular the cardiopulmonary response
- Exercise tolerance
- Aerobic and anaerobic exercise
- Peak oxygen uptake VO2max
- Anaerobic threshold (AT)
- Ventilatory equivalents for CO2 e (V˙E/V˙CO2)
- Respiratory quotient

1.28.4.3 Pathophysiology

- Exercise intolerance

1.28.4.4 Pharmacology

1.28.4.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Metrics eg Metabolic equivalents
- Hand grip test
- Ramp testing
- Walk tests
- Duke activity Status Index [DASI]
- Cardiopulmonary exercise test (CPET)
    - Interpretation of CPET data
    - Common patterns of CPET limitation in CVS, RESP and Vascular disease

1.28.5 Nervous system

1.28.5.1 Functional anatomy and structure

- Central and peripheral nervous system
- Autonomic nervous system

1.28.5.2 Physiology

- Neurons and brain metabolism
- Cerebral blood flow, cerebral perfusion pressure
- Cerebrospinal fluid – formation and flow
- Intracranial pressure – determinants, raised intracranial pressure
- Excitable tissues – skeletal muscle, smooth muscle, and cardiac muscle
- Membrane potentials, action potential and graded responses
- Neuromuscular transmission, neuromuscular junction dysfunction
- Synaptic transmission
- Neurotransmitters
- Motor function – basic aspects
- Sensory mechanisms
- Reflexes
- Physiology of pain

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- Special senses – auditory, smell, touch, taste, vision
- Autonomic nervous system function
- Thermoregulation and homeostasis
- Vomiting [see GIT]
- Serotonergic pathways
- Consciousness, sleep, and anaesthesia

1.28.5.3 Pathophysiology

- Common disorders of the central, peripheral, and autonomic nervous systems illustrative of abnormal nervous system physiology e.g. raised intracranial pressure (RICP), stroke, spinal cord lesions, sleep disorders, peripheral nerve lesions [upper and lower motor nerve lesions], neuromuscular junction dysfunction, disorders of thermoregulation, muscle disorders
- Serotonergic pathway abnormalities

1.28.5.4 Pharmacology

- Central and peripheral nervous system
    - Medication used in the treatment of neurological conditions and implication for anaesthesia
    - Effect of anaesthesia medication on the nervous system
    - Neuroprotection and treatment of raised intracranial pressure (RICP)
- Autonomic nervous system.
    - Adrenoreceptor agonists/sympathomimetics
    - Adrenoreceptor antagonists.
    - Anticholinergics.
    - Cholinomimetics/cholinesterase antagonists
- Serotonergic pathway medication.

1.28.5.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Monitoring Neuromuscular junction and muscle monitoring
- Electroencephalography [EEG]. Including processed EEG
- Cerebral function and flow monitors
- Evoked responses
- Physics
    - Heat, cold, freezing point, temperature measurement
- Clinical measurement
    - Monitoring Neuromuscular junction and muscle monitoring
    - Electroencephalography [EEG]. Including processed EEG
    - Cerebral function and flow monitors
    - Evoked responses
    - Cerebral perfusion and oximetry
    - Intracranial pressure monitoring
    - Temperature measurement
    - Spinal cord monitoring
- Equipment and environment
    - Warming and cooling devices
    - Neuromodulatory devices
    - Thermometers and thermocouples

1.28.6 Haemopoietic system, including blood cells, coagulation

1.28.5.1 Functional anatomy

- Bone marrow
- Spleen

1.28.6.2 Physiology

- Blood cells

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    - Erythrocyte, leucocytes, platelets
    - Blood groups
    - Physiology of blood
- Iron Vitamin B12 and Folate metabolism
- Haemoglobin structure, synthesis, function and metabolism
- Haemostasis including coagulation, anticoagulation and fibrinolysis.
- Plasma

1.28.6.3 Pathophysiology

- Disorders of all blood components e.g., Anaemia, polycythaemia, haemoglobinopathies, porphyria, white cells
- Coagulation disorders, platelet disorders
- Blood transfusion complications

1.28.6.4 Pharmacology

- Anticoagulants.
- Procoagulants
- Antiplatelet agents.
- Thrombolytics.
- Antifibrinolytics.
- Products used in the treatment of coagulation disorders.
- Haematinics and medications that stimulate production of blood components.
- Pharmacology of blood and blood products.

1.28.6.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
    - Determinants of fluid flow
- Clinical measurement
    - Full blood count
    - Test of haemostasis and coagulation including viscoelastograms
- Anaesthesia environment / equipment
    - Infusion devices
    - Principles of cell salvage
    - Point of care devices

1.28.7 Immunology and allergy

1.28.7.1 Functional anatomy

- Body defence mechanisms including:
    - White cells, (leucocytes), neutrophile, macrophages
    - Reticuloendothelial system
    - Lymphocytes, antibodies, antigens, complement system

1.28.7.2 Physiology

- Innate vs acquired immunity
- Host defence mechanisms – response to infection and inflammation
- Surgical Stress Response
    - Neuroendocrine–metabolic response
    - Inflammatory–immune response
- Allergic and hypersensitivity reactions
- White cells and body defence mechanisms.
- Prostaglandins, leukotrienes, encephalins and endorphins.

1.28.7.3 Pathophysiology

- Disorders of the immune system and allergic reactions
    - Allergy and anaphylaxis.
    - Inflammatory response syndrome.

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- Immune deficiency syndromes.
- Transplant and rejection syndromes.
- Cancer
- Vaccines

1.28.7.4 Pharmacology

- Effect of anaesthesia agents on the immune system
- Medication to treat allergy/ allergic reactions
- Histaminergic pathways and medication
- Corticosteroids.
- Immunosuppressants.
- Chemotherapeutics agents
- Biologics agents
- Antimicrobial agents
  - Antibiotics.
  - Antifungals.
  - Antivirals including antiretrovirals.
  - Antiprotozoals.
  - Antituberculosis therapy.
  - Anthelminthics

1.28.7.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics and Clinical measurement
  - Allergy testing
  - Tests of the immune system
- Equipment and environment
  - Latex allergy (see immunology)

1.28.8 Gastro-Intestinal System (GIT)

1.28.8.1 Functional anatomy

- Anatomy of the gastrointestinal tract
- Exocrine pancreatic function and anatomy

1.28.8.2 Physiology

- Functions of the GIT
- Neural and hormonal control of GIT functions
- Gastric emptying
- Blood flow and regulation
- Exocrine pancreatic physiology

1.28.8.3 Pathophysiology

- Disorders of GIT function and the pancreas
- Nausea, vomiting and diarrhoea

1.28.8.4 Pharmacology

- Medication affecting GIT motility, gastric emptying, and prevention of aspiration
- Treatment of peptic ulcer disease
- Pancreatic enzymes
- Anti-nausea and anti-emetic medication
- Antidiarrheal medication

1.28.8.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics and Clinical measurement
  - Measurement of gastric pH and Oesophageal motility studies
- Equipment and environment
  - Devices for measurement of above

1.28.9 Nutrition and Metabolism

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1.28.9.1 Functional Anatomy

1.28.9.2 Physiology

- Nutrition and metabolism
    - Calorimetry.
    - Energetics, metabolic rate and energy requirements.
    - Enteral and parenteral nutrition
    - Intermediary metabolism
    - Vitamins, trace elements, essential fatty acids, and amino acids.
    - Neural regulation and neurotransmitters

1.28.9.3 Pathophysiology

- Disorders of nutrition and metabolism including
    - Deficiency and toxicity of vitamins and trace elements
    - Intermediary metabolism and the metabolic response to fasting, starving, trauma, surgery, sepsis, alcohol intoxication and refeeding
    - Inborn error of metabolism
    - Malnutrition: under- and overnutrition

1.28.9.4 Pharmacology

- Enteral and parenteral nutrition (see Domain 7.1)
- Trace elements, micronutrients, and vitamins

1.28.9.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics and Clinical measurement
    - Calorimetry
    - Methods of temperature measurement
    - Heat, thermometry, methods of warming and cooling patients
    - Temperature
- Equipment and environment
    - Devices for measuring temperature
    - Forced air and other warming devices

1.28.10 Hepatobiliary System

1.28.10.1 Functional anatomy

1.28.10.2 Physiology

- Hepatic, pancreatic and biliary functions and regulation
- Blood supply of the hepato-biliary system

1.28.10.3 Pathophysiology

- Disorders affecting the hepatobiliary system e.g. cirrhosis, hepatic failure
- Jaundice
- Ascites
- Hepato-renal / pulmonary/ cardiac syndromes
- Pancreatic

1.28.10.4 Pharmacology

- Effect of medications and anaesthesia on the hepato-biliary and pancreatic systems
- Medication used in treatment of hepatic failure, or disorder of biliary and pancreatic systems.
- Hepatic protection.

1.28.10.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Liver, biliary and pancreatic function tests
- Imaging of hepato-biliary tree and
- Measurement of hepatic volume

1.28.11 Endocrine System

1.28.11.1 Functional anatomy of the endocrine system

- Organs and organ-axes involved in the endocrine system

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1.28.11.2 Physiology

- Mode of action and chemical structure of hormones, receptors and second messengers and feedback mechanisms
- Hypothalamus
- Pituitary, H-P-Axis
- Thyroid
- Parathyroid gland and calcium and phosphate homeostasis
- Thymus
- Adrenal gland
- Pancreas including abnormalities of glucose metabolism
- Endocrine function of other organs (e.g., kidney, lung, GIT, adipose tissue)

1.28.10.3 Pathophysiology

- Pathophysiological consequences of endocrine disorders
- Impact on anaesthesia

1.28.10.4 Pharmacology

- Medications used in the treatment of endocrine conditions and anaesthetic implications

1.28.10.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Tests of endocrine hormones and dysfunction
- Glucose monitoring devices
- Insulin delivery devices

1.28.12 Female and Male Reproductive and Hormonal Systems,

1.28.12.1 Function anatomy of the reproductive system

1.28.12.2 Physiology

- Hormonal regulation of the female and male reproductive system

1.28.12.3 Pathophysiology

- Common disorders of the male and female reproductive systems and anaesthesia implications

1.28.12.4 Pharmacology

- Medication affecting male and female reproductive systems
- Hormone replacement therapy, oral contraceptive agents

1.28.12.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics and Clinical measurement
    - Reproductive hormonal tests
- Equipment and environment

1.28.13 Renal system, body fluids

1.28.13.1 Function anatomy of the urogenital system

1.28.13.2 Physiology

- Fluid compartments
- Renal physiology
    - Glomerulus Function.
- Glomerular filtration.
- Renal blood flow.
- Plasma clearance.
- Tubular function
- Counter current mechanisms.
- Handling of water, electrolytes, and other substances.
- Dilution and concentration of urine.
- Regulation of renal blood flow.
- Kidney as an endocrine organ.

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- Renal-angiotensin-aldosterone system (RAAS)

1.28.13.3 Pathophysiology

- Abnormalities of fluids including hypovolemia, fluid overload and oedema
- Common disorders of the kidney and RAAS
- Renal failure

1.28.13.4 Pharmacology

- Diuretics.
- Vasopressin.
- Medications in renal failure
- Renal protection and renal protective medication
- Effect of anaesthesia on renal function
- Fluids
- Contrast media
- Medication affecting acid-base status

1.28.13.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
    - Diffusion and osmosis
    - Hemofiltration, dialysis and dialysates
- Clinical measurement
    - Renal function tests
- Equipment and environment
    - Measurement of urine output

1.28.14 Acid-base

1.28.14.1 Physiology

- Chemical buffers.
- Henderson-Hasselbalch equation
- Strong ion difference.
- Kidney and acid base
- Lungs and acid base
- Bones and acid base

1.28.14.1 Pathophysiology

- Acid base disturbances

1.28.14.3 Pharmacology

- Treatment of Acid base disturbances

1.28.14.4 Physics, Clinical Measurement, and the Anaesthetic Environment

- Measurement of pH Bicarbonate Carbon dioxide Electrolytes and Acids
- Temperature and pH

1.29 Special patient groups and situations

1.29.1 Pregnancy, Parturition and Lactation

1.29.1.1 Functional anatomy

1.29.1.2 Physiology

- Physiology of pregnancy, parturition (birth) and lactation
- Placental function and transfer mechanisms

1.29.1.3 Pathophysiology

- Disorders of pregnancy, placenta and lactation e.g. molar pregnancy, HELPP syndrome
- Ovarian hyperstimulation

1.29.1.4 Pharmacology

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- Medication uterine smooth muscles e.g. tocolytic and uterotonics
- Safety and effect of medication used during pregnancy and lactation

1.29.1.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
- Clinical measurement
- Equipment and environment

1.29.2 Foetus and Neonate

1.29.2.1 Functional anatomy

- Development of organ systems and intrauterine life
- Anatomical differences between foetus, neonate and adults

1.29.2.2 Physiology

- Physiology of birth and adaptation to extrauterine life
- Foetal-to-Neonatal physiology
- Premature neonate
- Neonatal physiology

1.29.2.3 Pathophysiology

- Foetal-neonatal maladaptation

1.29.2.4 Pharmacology

- Differences in neonatal to adult pharmacology including dosing
- Effect anaesthetic agents on neonate

1.29.2.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
- Clinical measurement
- Equipment and environment

1.29.3 Aging

1.29.3.1 Functional anatomy

- Anatomical changes

1.29.3.2 Physiology

- Physiology of ageing on all organ systems

1.29.3.3 Pathophysiology

- Conditions associated with aging or altered physiology

1.29.3.4 Pharmacology

- Prescribing in the elderly
- Impact of anaesthesia on the elderly

1.29.3.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
- Clinical measurement
- Equipment and environment

1.29.4 The Obese patient

1.29.4.1 Functional anatomy

1.29.4.2 Physiology

- Physiological changes of obesity

1.29.4.3 Pathophysiology

- Conditions associated with obesity

1.29.4.4 Pharmacology

- Prescribing in the obese patient

1.29.4.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Physics
- Clinical measurement
- Equipment and environment

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1.29.5 Altitude, Aviation, and space

1.29.5.1 Functional anatomy

1.29.5.2 Physiology

- Cardiovascular
- Respiratory
- CNS
- Renal
- Blood
- GIT
- Immunology
- Musculoskeletal
- Receptor function
- Body fluids

1.29.5.3 Pathophysiology

- Short- and medium-term space flights and altitude anaesthesia

1.29.5.4 Pharmacology

- Drugs physicochemical stability
- Pharmacokinetics
- Pharmacodynamics
- Anaesthesia agents
  - Hypnotics
  - Neuromuscular blocking agents and reversal
  - Volatiles

1.29.5.5 Physics, Clinical Measurement, and the Anaesthetic Environment

- Space environment
- Types of space flight
- Phase of flight
- Monitoring
- Anaesthetic delivery systems
- Airway management
- Patient positioning

1.29.6 Diving

1.29.6.1 Functional anatomy

1.29.6.2 Physiology

- Cardiovascular
- Respiratory
- CNS
- Renal
- Blood Endocrine
- Age
- Sex
- Descent
  - Nitrogen
  - Oxygen
  - Carbon Dioxide

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    - Carbon Monoxide
    - Exotic mixtures
    - Liquid Oxygenation
- Ascent
    - Decompression
    - Barotrauma
    - The bends
    - Nitrogen narcosis

- Long term effects of working under high pressure

1.29.6.3 Pharmacology

- Pharmacokinetics
- Pharmacodynamics
- Anaesthesia agents
    - Hypnotics
    - Neuromuscular blocking agents and reversal
    - Volatiles

1.29.6.4 Physics, Clinical Measurement, and the Anaesthetic Environment

- Hyperbaric environment and gas laws
- Types of diving: Free, recreational and commercial diving
- Recompression chambers
- Impact of hyperbaric pressure on equipment function [covered earlier in respiratory]

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1.30 Technical skills

1.30.1 Clinical Skills

- Application of principles of physiology, pharmacology, physics, clinical measurement and anaesthetic environment to patient care
- Knowledge of disorders/abnormalities of above principles to ensure appropriate safe patient care

1.30.2 Administrative skills

- Documentation of physiological vitals, medication administered and monitoring during patient care
- Compliance with medica-legal, HPCSA and society guidelines for documentation, and use of medication and monitors

1.30.3 Organisational skills

- Ensure safe and appropriate medication, equipment and theatre environment available for patient care
- Training of staff on use of equipment

1.31 Meta-competencies

- Medical Expert
    - Use knowledge of physiology, pharmacology, physics, clinical testing and the anaesthetic environment to determine the most appropriate management plan for the patient
- Communicator
- Collaborator
- Leader
- Health advocate
- Scholar
- Professional
- Context awareness
- Humaneness

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FCA II

All the relevant headings and subheadings in Domain 1, Domain 1 DA, Domain 1 FCA I, technical and nontechnical skills for FCA Part II.

The section will equip the trainee or practitioner to manage an extended profile of complex patients and procedures with greater depth of knowledge, understanding and skills, whilst also defining areas that may require additional exposure, or competencies post FCA for safe practice.

1.32 Principles of Practice

1.32.1 Definitions and Modalities of anaesthesia
- As per Diploma in Anaesthesia 1.1.1 to 1.1.3

1.32.2 Provision of Perioperative care
- Management of all patients presenting for care at a specialist level, through the provision of general, regional anaesthesia, procedural sedation, pain management and ICU care

1.32.3 SASA practice guidelines
- Practice according to Society guidelines

1.33 Perioperative management and general anaesthesia

1.33.1 All DA competencies (refer to 1.4, 1.9, 1.10)

1.33.2 Additional Competencies
- Manage patients from ASA I to VI for specialist perioperative care and complex procedures
- Awareness of controversies and current literature
- Plan a perioperative anaesthesia service, including a preanesthetic clinic
- ICU care at specialist anaesthesiologist level

1.34 Neuraxial and regional anaesthesia (refer to Domain 4**)**

1.34.1 All DA Competencies (refer to 1.5)

1.34.2 Additional competencies: all of Domain 4 including
- Advanced regional techniques
- Evidenced based choices and alternatives
- Impact on perioperative outcomes
- Planning and management of a regional anaesthesia service

1.34.3 SASA / Societal guidelines
- E.g. Management of high spinal in obstetric anaesthesia
- SASRA Regional Anaesthesia guidelines; relevant international guidelines

1.35 Procedural sedation and analgesia

1.35.1 All DA competencies (refer to 1.6); see also Domain 7.15

1.35.2 Additional Competencies and knowledge
- Extended patient and procedure profile
- Advanced sedation techniques, medications and equipment
- Set up of a sedation service

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1.36 Non-operating room anaesthesia (NORA)

1.36.1 All DA competencies (refer to 1.7)

1.36.2 Additional Competencies

- Diagnostic and interventional procedures in the catheterisation laboratory or MRI suite
- Moderate and complex procedures
- Extended patient profile
- Setup of a NORA service

1.37 Ambulatory / Day case surgery

1.37.1 All DA competencies (refer to 1.8)

1.37.2 Additional Competencies

- Setup and manage an ambulatory / day case surgery facility
- Extended patient and procedure profile

1.38 Perioperative complications and emergencies

1.38.1 All DA competencies (refer to 1.9)

1.38.2 Additional competencies

- Conduct training and drills for management of perioperative emergencies
- Provide team leadership during emergencies
- Analyse causes of complications and institute plans to prevent future event

1.39 Technical skills (1.33 to 1.38)

1.39.1 All DA competencies (refer to 1.10)

1.39.2 Additional competencies

- Clinical
  - Provide independent perioperative care for all patients ASA-physical status I to VI and for all procedures unless otherwise defined per sub-specialised domain.
- Administrative
  - Devise departmental documents and SOPS
- Organisational
  - Set up a perioperative or day-case service
  - Ensure departmental governance activities are undertaken

1.40 Anaesthetic Environment

All DA sections 1.11 to 1.14, and Part 1 section 1.26 to 1.29 are a minimum requirement

The following additional knowledge and skills are required for part 2

1.40.1 Equipment

1.40.1.1 Knowledge (in addition to DA and Part 1)

- Clinical indication for and use of advanced equipment
- Critical appraisal of equipment

1.40.1.2 Technical skills (in addition to 1.11.1 to 1.11.3 and 1.30)

- Clinical skills
  - Advanced ventilation methods and modes
  - Use of advanced equipment in clinical care
- Administrative skills
  - Equipment procurement and SCM processes e.g., specifications and equipment evaluation
  - Evaluation of cost effectiveness and performance
- Organisational skills

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- Collaborate with a health technology service to set up and ensure appropriate equipment for a perioperative service
- Ensure checking and servicing of equipment

1.40.2 Monitoring

1.40.2.1 Knowledge (in addition DA and Part 1)

- Comparison, performance, and limitation of monitors as applied in the clinical setting

1.40.2.2 Technical Skills (in addition to 1.12.6.1 to 1.12.6.3 and 1.30)

- Clinical
  - Correct indication, placement and interpretation of monitors including advanced invasive cardiac, respiratory, neurological, and neuromuscular monitors
- Administrative
  - Audit monitoring standards in compliance with SASA guidelines
  - Motivate for and procure monitors to match clinical service requirement.
  - Development of specifications and equipment evaluation
  - Evaluation of cost effectiveness and performance
- Organisational
  - Train staff in use of advanced monitors and create SOPs for use
  - Ensure correct consumables available as required

1.40.3 Patient positioning

1.40.3.1 Knowledge (in addition to DA and Part 1)

- Positions for complex surgery e.g., neurosurgery, craniofacial or cardiac-thoracic, scoliosis surgery, robotic surgery

1.40.3.2 Technical Skills (in addition to 1.13.2.1 to 1.13.2.3)

- Clinical skills
  - Manage complex patient positions
- Administrative
  - Develop SOPs for patient positioning
- Organisational as per 1.13.2.3
  - Ensure appropriate equipment and training for patient positioning

1.40.4 Patient transport/transfer

1.40.4.1 Knowledge (in addition to DA and Part 1)

- Physiological impact of patient transport by different modes including air-transport

1.40.4.2 Technical Skills (in addition to 1.14.4.1 to 1.14.4.3)

- Clinical skills
  - Manage complex transfers
- Administrative
  - Devise transport SOPs and monitor adverse events related to transport
- Organisational
  - Ensure appropriate training for patient transfer

1.40.5 Environmental sustainability

1.40.5.1 Knowledge (in addition to DA and Part 1)

- Environmental impact of anaesthesia and anaesthesia agents and waste management
- “Green Hospital” initiatives and sustainable practices

1.40.5.2 Technical Skills

- Clinical
  - Apply sustainable practices in clinical care and choices
- Administrative
  - Develop SOPs for sustainable practice
- Organisational

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- Ensure organisation adopts sustainable practices

1.40.6 Applied Basic Sciences

Mastery of knowledge, technical and non-technical skills for FCA Part 1 is a minimum competency requirement for the anaesthetic specialist.

1.40.6.1 Additional Skills

- Application of basic sciences to ensure management of patients of extend complexity at a specialist level in the perioperative period.
- Implementation into clinical practice of new modalities of care, medication, equipment or monitoring as technology or knowledge advances
- In-depth understanding of organ system homeostasis and derangements to provide optimal patient care and improve perioperative outcomes

1.40.7 Integrated organ systems

1.40.7.1 Additional Knowledge (in addition to 1.28)

- Principles of ECMO
- Transplant anaesthesia
- Patient blood management and fluid management controversies
- ICU feed and nutrition
- Dialysis, renal replacement therapy

1.40.7.2 Additional Skills (in addition DA and part 1: 1.28.1 to 1.28.11)

- Clinical
  - Order and interpret clinical tests to inform or modify decision making for anaesthesia and perioperative care
  - Manage patients with complex comorbidities or homeostatic derangement across all organ systems
  - Provide perioperative care and anaesthesia for complex patients e.g.:
    - non-complex cardiac surgery and thoracic surgery
    - complex vascular procedures
    - neurosurgical and spinal procedures
    - renal transplant and vascular access
    - cell salvage
    - organ donation and post-transplant patients (all organs)
    - endocrine surgeries e.g., thyroid, pituitary, parathyroid, adrenal gland tumours, neuro-endocrine tumours
    - advanced oncological surgery
    - major gastro-intestinal or hepatobiliary surgery

1.41 Special patient groups and situations

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Domain 2: Airway Management

Summary

	DA	PART 1	PART 2	Metcomp
COMPETENCES				
To understand the basic sciences as applicable to the airway	DA			ME/Sc
To be able to assess, plan for and manage both normal and difficult airways for anaesthesia, perioperative practice and other emergencies				
KNOWLEDGE				
Anatomy and physiology, applied physics and pharmacology of the airway, including age-related developmental concerns and the implications of concurrent disease				ME /Sc/ CA
Airway devices and equipment used in airway management and airway rescue				ME/Sc
Assessment, risk stratification, interpretation of investigations related to the airway and planning for airway management during anaesthesia or perioperative care				ME/Sc/CA
Management of the airway during anaesthesia or perioperative care, including for general anaesthesia, sedation, airway management for out-of-theatre procedures or rescue, ICU ventilation or during CPR				ME/Sc/Cm/Cl/HA/Le/Pr
Planning and management of the anticipated and unexpected difficult airway, including knowledge of airway algorithms and planning for extubation and postoperative airway care				ME/Sc/Cm/Cl/HA/Le/Pr
Pharmacology and performance of blocks for the airway				ME/Sc
Anticipation and management of airway complications and airway-related morbidity that may occur				ME/Sc/HA/CA

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DA

2.1 Anatomy and physiology

2.1.1 Normal anatomy and physiology

Including innervation and vascular supply, physiology and functioning of the upper and lower airways, inter alia:

- Nose, mouth, teeth, tongue
- Nasopharynx, oropharynx, hypopharynx
- Laryngeal structures and cartilages, including epiglottis, supraglottis, glottis, and subglottic structures.
- Sensory and motor innervation and vascular supply
- Tracheobronchial tree and alveoli
- Airway reflexes, humidification and warming of inspired air.

2.1.2 Special populations

Understand the anatomical and physiological differences of the airway as it relates to age extremes or specific patient populations, inter alia:

- Paediatric airway:
    - Anatomical, physiological and functional differences between the paediatric and adult airway
- Geriatric airway:
    - Age-related changes in anatomical and physiological parameters impacting the airway (e.g. dentition, reduced temporomandibular joint mobility, sarcopenia and cervical spine changes and pharyngeal muscles)
- Obstetric airway:
    - Changes in the airway and physiology impacting the airway related to pregnancy and labour.

2.1.3 Clinical pathophysiology

- Nasal polyps, tumour influence on nasal instrumentation
- Acute infections, hyperaemic mucosa, irregular nasal mucosa
- Restricted mouth opening has an impact on airway management.
- Masses causing airway obstruction.
- Traumatic injuries
- Systemic diseases with airway effects
- Obesity syndromes and central or obstructive sleep apnoea
- Syndromes, craniofacial deformities/abnormalities
- Post-therapy airway, including radiotherapy and tracheostomy.

2.2 Airway devices: Supra- and infraglottic

2.2.1 Indications, contraindications and function of airway devices/instruments

- Laryngoscopes
- Video laryngoscope
- Magill forceps
- Introducer
- Gum-elastic bougie
- Face masks
- Nebuliser masks
- Heat and moisture exchanger (HME) filter
- Endotracheal tubes (straight, oral RAE, nasal RAE, cuffed, uncuffed, reinforced)
- Nasopharyngeal airway and oropharyngeal airway
- Supraglottic airway devices
- Cricothyroidotomy kit and front of neck access (FONA) equipment

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- High-flow nasal oxygen devices (e.g. Transnasal Humidified Rapid-Insufflation Ventilatory Exchange [THRIVE] device)
- Determination of the appropriate airway device depending on the circumstances

2.3 Airway assessment

2.3.1 Appropriate history-taking and assessment

- Assessment of patient for difficult ventilation, difficult intubation, difficult supraglottic device placement and difficult FONA
- Interpretation of common radiology imaging and special investigations that can assist in the safe airway management of the patient.
- Development of an airway plan

2.3.2 Referral to colleagues

- Integration of knowledge within the operating environment, equipment available, own expertise and the patient's condition when referring the patient for specialist or higher care

2.3.3 Recognise potential difficult airway in comorbid disease.

- Specific potential airway abnormalities to consider in cases, inter alia:
    - Obstetric patient
    - Paediatric patient
    - Geriatric patient
    - Obese patient
    - Patients with diabetes mellitus and other endocrine disorders
    - Patients with connective tissue disorders
    - Patients with rheumatological disorders
    - Patients with thyroid or other neck masses
    - Facial trauma
    - Craniofacial abnormalities

2.4 Management of the normal airway

2.4.1 Understand and perform basic principles of airway management.

- Airway manoeuvres
- Face mask ventilation technique
- Adjuncts to improve airway patency.
- Appropriate use of cricoid pressure
- Appropriate use of laryngoscope
- Appropriate patient positioning for airway management
- Manoeuvres to improve the line of vision for intubation.
- Confirmation of endotracheal tube position
- Insertion and confirmation of supraglottic airway device
- Differences between the management of adult versus paediatric airways
- Appropriate removal of airway devices

2.4.2 Complications of airway management

- Obstructed airway
- Oesophageal intubation
- Endobronchial intubation
- Unplanned extubation
- Regurgitation of stomach content with possible aspiration
- Laryngospasm
- Bronchospasm
- Airway trauma

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- Dental trauma
- Post-extubation stridor

2.5 Management of the difficult airway

2.5.1 Clinical protocols

- Drills and protocols for crisis management of the following:
  - Inadequate airway patency and ventilation
  - Failed intubation
  - Difficult Airway Society (DAS) intubation guidelines (Attachment 3)
  - Management of unanticipated difficult tracheal intubation
  - Failed intubation, failed oxygenation in paralysed, anaesthetised patient.
  - Conditions associated with the potential for difficult airway management.

2.5.2 Specific populations/environments

- Obstetric:
  - Differences in obstetric airway management, difficult and failed intubation
  - Difficult airway algorithms in the management of the unanticipated difficult airway (pregnant vs. non-pregnant patients)
- Trauma:
  - Management of the patient with possible or confirmed C-spine fractures and other C-spine abnormalities, including the use of manual in-line stabilisation.
- Integration of own expertise, environment and the equipment requirements necessary for providing safe airway management of a patient in the following scenarios:
  - Operating theatre and recovery room
  - Day surgery suite
  - Out-of-theatre
  - Sedation suite
  - Transport of patient needing airway assistance
  - ICU
  - Postoperative care
  - Out-of-hospital

2.5.3 Criteria for extubation and postoperative care

- Planning for extubation and knowledge of extubation criteria and post-extubation complications
- Safe airway management with transport to recovery and then safe handover in postoperative anaesthesia care unit (PACU)
- Postoperative care and placement

2.6 Technical skills

2.6.1 Clinical

- Checking of airway equipment
- Determination of the appropriate airway device depending on the circumstances
- Maintenance of an adequate airway with the necessary skills to use the available airway equipment.

2.6.2 Administrative

- Documentation in the anaesthetic record of airway devices used.
- Documentation of airway management and any complications as well as informing patients if they had difficult airway management by providing alternatives and information for the next anaesthetic provider.

2.6.3 Organisational

- Ensuring appropriate range, quality and quantity of airway devices

PROOF OF COMMENT

- Availability and display of difficult airway algorithms and cognitive aids

2.7 Non-technical skills

2.7.1 Leadership and teamwork

- Leading the team during airway management, especially difficult or failed airway management
- Instructing assistants on the requirements for airway management
- Training of assistants to assist in the management of the normal airway.

2.7.2 Collaborator

- Collaboration with the perioperative team to ensure that the airway device and plan used will be appropriate for the surgical procedure being performed.

2.7.3 Communicator

- Communication with nursing staff or assistants to ensure a smooth airway management procedure.
- Communication with the team so that there is always a clear plan to follow in case of unanticipated difficult airway management.
- Communication of airway plans and possible complications to the patient and gaining consent for airway procedures.

2.7.4 Context awareness

- Recognition of the anticipated difficult airway and appropriate referral to more experienced colleagues when appropriate
- Recognition of airway crisis or complication

2.7.5 Health advocate

- Advocacy for airway equipment
- Maintenance of infection control during airway management

2.7.6 Professionalism

- Correct documentation of airway assessment and management

FCA I

Physiology

2.8.1 Respiratory system

- Functional anatomy of the respiratory system
- Mechanism of spontaneous ventilation
- Control of breathing, role of the central nervous system and muscles of breathing
- Pressures in the respiratory system
- Flow, resistance, elasticity and compliance (surfactant)
- Work of breathing
- Lung volumes and capacities
- Respiratory minute volume, alveolar ventilation, dead space
- Pulmonary circulation
- Oxygen and carbon dioxide homeostasis
- Effects of barometric pressure
- Ventilation
- Alveolar gas exchange
- Ventilation-perfusion relationships
- Regulation of the respiratory system
- Non-respiratory pulmonary function
- Hypoxia and hypercarbia (e.g. pulmonary oedema, acute respiratory distress syndrome, pneumothorax, pneumonia, asthma)

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- Pulmonary function tests
- Physiology of mechanical ventilation
- Preoxygenation, oxygen cascade, hypoxaemia

Pharmacology

2.9.1 Medications used with the airway and respiratory system.

- Premedication agents (anxiolysis, sedation and amnesia, aspiration prophylaxis, gastric emptying, antisialogogues)
- Inhalational agents
- Bronchodilators
- Surfactant
- Pulmonary vasodilators
- Intravenous anaesthetic agents
- Medications affecting the neuromuscular junction.
- Local anaesthesia and topical agents (medications blocking nerve conduction)
- Topical vasoconstrictors
- Analgesia (acute and chronic pain)
- Intravenous fluids
- Antiemetics
- Emergency drugs

Physics

2.10.1 Equipment

- Masks and oxygen delivery devices (including High-Frequency Nasal Oxygenation [HFNO] and THRIVE devices)
- Airway devices
- Tracheal intubation equipment (e.g. laryngoscopes and bronchoscopes)
- Breathing circuits, oxygen delivery systems and anaesthesia machine
- Gas sources and gasses used during anaesthesia, including cylinders, pressure, capacities, regulators and flow meters.
- Ventilators
- Jet ventilation
- Nebulisers
- Humidifiers
- Monitoring required during airway management and methods of confirmation of correct airway placement.
- Drips and needles
- Defibrillators
- Diathermy
- Lasers
- Warming and cooling devices

2.10.2 Airway ultrasound

- Waves, motion and sound
- Generation and detection of sound
- Properties of ultrasound
- Scanning techniques
- Doppler effect and its application in anaesthesia

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FCA II

In addition to all the issues listed in DA and FCA I above:

2.11 Anatomy, physiology and pharmacology

2.11.1 Anatomy

2.11.1.1 Normal anatomy

2.11.1.2 Special populations:

- Paediatric airway:
  - Specific considerations for the neonatal patient
  - Considerations for airway management in syndromic children (see below)

2.11.2 Pharmacology, physiology and physics related to the airway (see FCA I Section 2.8, 2.9, 2.10)

2.11.3 The abnormal airway and airway in concurrent disease

In addition to DA part 2.1.3. above, the following are to be considered:

- **Masses causing airway obstruction:**
  - External masses, e.g. benign and non-benign neck masses (airway tumours, infections, abscesses, cysts, thyroid enlargement, arteriovenous or lymphatic malformations, foreign bodies)
  - Airway masses, distortion or infections, e.g. airway tumours, radiation scarring, burns contractures, infective processes, papillomatosis, laryngotracheobronchitis.
  - Acquired or congenital airway malformations, e.g. webs, polyps, laryngotracheomalacia, stenosis, post-tracheostomy
- Traumatic injuries:
  - Trauma to the airway, e.g. facial fractures, head and neck trauma
  - Thermal or chemical burns of the airway and management of airway fires
- Systemic diseases with airway effects, including:
  - Connective tissue diseases (SLE, systemic sclerosis, rheumatoid arthritis, ankylosing spondylitis)
  - Endocrine disorders (diabetes mellitus, acromegaly, congenital growth hormone deficiency)
- Congenital syndromes/diseases with airway implications, including:
  - Mucopolysaccharidoses, trisomy 21, Beckwith-Wiedemann syndrome
  - Pierre Robin sequence, Treacher Collins syndrome, Apert syndrome, Klippel-Feil syndrome, Goldenhar syndrome, Freeman-Sheldon syndrome
- Obesity syndromes and central or obstructive sleep apnoea

2.12 Airway devices and equipment

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2.12.1 Classification of airway equipment, devices and adjuncts

- Airways and connectors, e.g.:
  - Oropharyngeal and nasopharyngeal airway
  - Atomiser devices
  - Fibreoptic bronchoscopes and connectors
- Masks and oxygen delivery devices, e.g.:
  - Anaesthetic face mask
  - Venturi masks, CPAP masks, NIV ventilation devices
  - Nasal cannula, with and without CO_2 monitoring
  - High-flow nasal oxygen delivery devices
- Jet ventilation – indications, procedure and complications
- Supraglottic airway devices (SGAD), e.g.:
  - First, second and third generation SGAD (e.g. generation and inflating or non-inflating, preformed)
  - Specific intubation conduit SGAD
- Non-anatomical SGAD airway devices
- Infraglottic devices, e.g.:
  - Tracheal tubes single, cuffed or uncuffed as relevant, e.g. oral and nasal, reinforced, modified tip, microlaryngeal tubes, high-pressure low-volume cuff tubes, tubes with integrated suction, laser-compatible tubes (single or double cuff), preformed tubes.
- Lung separation/isolation devices, e.g.:
  - Tracheal tubes double-lumen, bronchial blockers
- Surgical airway devices:
  - Tracheostomy tubes, cricothyroidotomy sets, cannulae.
  - Retrograde intubation devices and methods
- Direct laryngoscopes and intubating stylets, e.g.:
  - Direct laryngoscope with different blades and handles, e.g. straight, curved, amongst others.
  - Intubating stylets – malleable and rigid
- Indirect/video laryngoscopy – classification:
  - Channelled
    - Airway
      Blade,
    - Video-stylets
    - Rigid vs Flexible,
- Flexible scopes:
  - Visual, flexible scopes, e.g. fibreoptic bronchoscope, video bronchoscope and single-use scopes
- Visual, composite,
- Additional items:
  - Malleable stylets to use in tracheal tube.
  - Bougies, hollow and solid
  - Custom-shaped forceps
  - Suction catheters
  - Bag-valve resuscitator
  - Equipment for LASER techniques
  - Exchange catheters – hollow with oxygenation attachment

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2.13 Airway planning and assessment

See DA

2.13.1 Purpose

The anaesthesiologist should be able to:

- Identify the likelihood and anticipated clinical impact of seven basic problems that may occur alone or in combination:
  - difficulty with patient cooperation or consent
  - difficult mask ventilation
  - difficult supraglottic airway placement
  - difficult laryngoscopy
  - difficult intubation
  - difficult surgical airway access
  - difficult extubation or postoperative airway
- Consider the relative merits and feasibility of basic choices:
  - awake versus asleep techniques.
  - non-invasive versus invasive techniques
  - use of additional equipment, e.g. video laryngoscopy
  - preserved/spontaneous versus assisted ventilation.
- Identify alternative approaches that can be used if the primary approach fails or is not feasible.

2.13.2 History

- Past airway management and difficulties or complications by review of previous notes, including technique used and prolonged ICU intubation.
- Current difficulties, including positional symptoms and level of cooperation.
- Fasting state and risks for regurgitation and aspiration

2.13.3 General examination principles

- Elucidating vitals and oxygenation, level of consciousness
- Disease processes contributing to potential difficult airway management, oxygenation or ventilation.
- Breathing mechanics, use of accessory muscles, positional symptoms, stridor or obstructed breathing, tracheal position
- Airway-specific examination (see next section)

2.13.4 Airway examination and prediction of difficult airway management

- Definitions and classification of difficult airway management, e.g. difficult mask ventilation, insertion of supraglottic devices or intubation:
  - Predicted difficult airway.
  - Unpredicted/unanticipated difficult airway

Perform bedside tests and prediction scores

- Other predictors, including dentition, tongue, body habitus, facial hair.
  - Medical and surgical conditions
  - Airway risk scores, single and composite (e.g. Wilson risk score, Colorado Paediatric Airway Score)
  - Sensitivity and specificity of single or multiple tests
- Investigations and imaging, including:
  - Lung/pulmonary function tests and interpretation

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- Airway, neck and chest X-rays – views and interpretation
- Blood gas testing
- CT scan and MRI of upper and lower airway
- Application of ultrasound for the airway (e.g. diagnostic, confirmation of device placement)

2.14 Preparation for airway management

2.14.1 Theatre and airway cart preparation

- Equipment checklist, including airway cart, anaesthesia machine and monitoring and safe surgical checklist.
- Medication for anaesthesia and emergency drugs
- Infection control and protection of the patient and staff performing airway management:

2.14.2 Preparation for optimal patient positioning and intubation

- Description of optimal position and preparation of equipment required.
- Age-related recommendations for positioning
- Indications for ramping and preparation of the obese patient
- Three Axis Alignment Theory, two curve theory, three column theory.

2.14.3 Sequential airway maintenance and rescue plan

- Plan devised and discussed with team and anaesthesia assistant at the time of surgical safety checklist.
- Patient preparation and counselling
- Informed consent with specific focus on airway risks, techniques, complications and alternatives

2.14.4 Fasting status and regurgitation/aspiration risk preventive medication

- Fasting guidelines
- NPO status and regurgitation or aspiration risk
- Premedication or adjuvants to facilitate airway management.
- Anti-reflux or prokinetic pretreatment
- Role of cricoid pressure and nasogastric tubes

2.14.5 Role of the anaesthesia assistant

- Understanding of airway plan and equipment
- Ability to perform manoeuvres to optimise views (e.g. ELM/BURP)
- Ability to perform cricoid pressure if required.

2.15 Airway procedures and skills for management of routine and difficult airway

2.15.1 Use of airway gases

- Preoxygenation: indications, physiology and procedure
- Oxygenation and ventilatory support

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2.15.2 Manoeuvres

- Placement of oro- or nasopharyngeal airways
- Chin lift, head tilt and jaw thrust – efficacy, indications and contraindications.
- Laryngeal manipulation, e.g. BURP (backward upward rightward position), OELM (optimal external laryngeal manipulation), including technique of cricoid pressure (CP) and controversies of use.
- Manual in-line stabilisation and management of patients with cervical spine injuries

2.15.3 Maintenance of oxygenation

- Face mask and use of bag-mask ventilation, including correct selection of appropriately sized masks, including but not limited to:
  - Assembly and use of self-inflating ventilation devices
  - Use and troubleshooting of non-self-inflating ventilation devices, including Ayre's T-piece.
  - Two-person mask techniques

2.15.4 Role of PEEP/CPAP

- CPAP or NIV techniques and indications
- Role of positive end expiratory pressure (PEEP)
- Role of APL valve and reservoir bag
- Nasal prongs, high-flow oxygenation devices

2.15.5 Insertion of supraglottic devices

- Indications and contraindications
- Use as intubation conduit.
- Use for rescue in COCI (cannot oxygenate, cannot intubate) and difficult airway algorithms.
- Controversies, e.g. use in airway surgery as an alternative to endotracheal intubation.

2.15.6 Intubation

- Indications, including but not limited to:
  - Airway obstruction not relieved by basic manoeuvres.
  - Airway protection, obtunded patients
  - Trauma, burns
  - Anaesthesia and surgery in cases requiring muscle relaxants, surgery around head and neck, airway procedures, bronchoscopy, biopsies and therapeutic procedures.
- Conduct of routine intubation/controlled sequence induction and intubation (CSII)
- Conduct of rapid sequence induction and intubation (RSII) and modified mRSII:
  - Indications, contraindications and process steps
  - RSII in neonates and children
  - Modifications, e.g. medication used, method of preoxygenation, process steps, alterations required for cervical spine injuries or airway trauma.
- Description of views obtained (e.g. C-L grades, POGO, and video classification 3-part score)

2 .16 Additional airway techniques

2.16.1 Double-lumen tube and technique for thoracic surgery

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- Indications and technique/process, including correct placement checks.
- Management of failed placement and hypoxia
- Alternative devices or techniques for lung separation

2.16.2 Nasal intubation

- Indications, techniques and complications

2.16.3 Surgical airway and FONA

- Elective tracheostomy, percutaneous tracheostomy
- Management of old or fresh stoma
- Emergency FONA
- Retrograde techniques

2.16.4 Fibreoptic/video-bronchoscopy intubation and airway blocks

- Indications and technique, both oral and nasal
- Airway preparation and blocks, including anatomy, medications and complications.
- Topical anaesthesia and use of vasoconstrictor or antisialagogue medication
- Fibreoptic/flexi-assisted techniques, e.g.:
    - Fibreoptic assisted video intubation (FAVI)
    - Video-assisted flexible intubation (VAFI)
    - Hybrid techniques (e.g. fibreoptic through supraglottic airway assisted intubation)

2.16.5 Awake techniques

- Patient preparation and counselling
- Use of adjuvant medication or sedation to facilitate fibreoptic or other awake airway procedures.

2.16.6 Airway management during sedation or monitored anaesthesia care.

- Equipment, monitoring standards
- Interventions following airway obstruction, poor ventilation or oxygenation.
- Fibreoptic/video-bronchoscopy for diagnostic or therapeutic procedures

2.16.7 Non-operating room airway management

- Challenges and solutions for hostile or unfamiliar environments, e.g. prehospital or roadside, accident and emergency departments and wards
- Airway management in angiography suites or catheter labs or MRI
- Intensive care intubation
- Controversies, e.g. type of sedative and neuromuscular blocking agents, use of tracheal tube or SGAD, training of non-physician staff as primary airway manager

2.16.8 Shared airway and airway surgery (See Domain 7 **for further details)**

- Airway surgery or shared airway procedures, maxillofacial, ENT surgery, neurosurgery
- Tubeless techniques
- Specialised equipment and devices

2.17 Extubation and postoperative care

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- Criteria for extubation and prediction of airway difficulties, including use of extubation algorithms.
- Management of deep and awake extubation
- Safe airway management with transport to recovery and safe handover in postoperative anaesthetic care unit (PACU)
- Management of postoperative stridor, airway obstruction and or hypoxemia in PACU
- Post-anaesthetic consultation if needed for possible future airway management.
- Decision of postoperative care level (ward, HC, ICU)

2.18 Management of the difficult airway

2.18.1 General considerations

- Knowledge and application of risk assessment, equipment alternatives, techniques, difficult airway algorithms and recommendations for difficult airway management, including but not limited to:
  - Predicted versus unpredicted difficult airway.
  - Awake and asleep strategies
  - Strategies for failed oxygenation/ventilation and failed intubation
  - Role and use of regional anaesthesia in patients with a difficult airway
  - Challenges or alterations in practice for special patient populations (e.g. paediatric and obstetric patients)

2.18.2 Algorithms, cognitive aids, drill and simulation (see attachments)

- Knowledge of common airway algorithms and cognitive aids, including:
  - Algorithms for routine, difficult and failed airway and extubation
  - Understanding the use of drills and simulation
  - Strengths and weaknesses (e.g. ASA algorithm, DAS)
  - Special populations (e.g. obstetric patients, paediatric algorithms)

2.18.3 Maintenance of oxygenation

- Understanding of the concept of oxygenation rather than intubation
- In high-risk populations and during difficult or failed airway management (i.e. CICO vs. CICV) and alternative approaches (e.g. Vortex Approach)
- Role of rescue techniques and performance thereof
- Role of non-technical skills and team leadership during routine, advanced and rescue situations

2.19 Complications of airway management or intubation

2.19.1 Obstruction

Causes and complications of airway obstruction, including but not limited to hypercarbia/acidosis, hypoxia, aspiration, foreign body, upper airway infection, angioneurotic oedema

2.19.2 Recognition and management

Proficiency in immediate recognition and management of the patient with an acutely obstructed airway, including but not limited to basic life support protocols:

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- Assessing patient responsiveness
- Obtaining assistance
- Patient positioning and recovery position
- Manoeuvres to optimise airway management.
- Instituting cardiopulmonary resuscitation

2.19.3 Common and rare complications and management thereof

- Sore throat, damage to teeth or soft tissue structures and airway trauma, including nasal trauma or epistaxis.
- Endobronchial intubation, oesophageal intubation, accidental extubation
- Difficult or failed airway management or intubation in paralysed or non-paralysed patients
- Bronchospasm, laryngospasm, postoperative stridor
- Regurgitation and aspiration, including preventive strategies.

2.19.4 Team debrief following airway complications.

- Team to debrief and review good and bad performance.
- Disclosure to patient following airway complications.

2.19.5 Documentation, safety monitoring, reporting and training.

- Safety monitoring and documentation:
  - Importance of airway registries and audit
  - Documentation of airway management and use of difficult airway alert forms for future anaesthetics and airway alert cards for patients
- Education and training:
  - Teaching and training junior colleagues and anaesthesia assistants in clinical situations
  - Role of simulation in training and skills development/maintenance
  - Continuous practice development and updating (e.g. airway workshops)

2.20 Technical skills

In addition to standard list in Background above, the following need particular attention:

2.20.1 Clinical

- Appropriate history taking, examination and interpretation of investigations to identify airway risks and formulate a management plan appropriately tailored to the patient.
- Skill in use of all airway devices and equipment to ensure oxygenation and safe airway management.
- Technical proficiency in use of advanced airway equipment to secure the airway or manage a difficult or failed airway situation.
- Ability to perform airway blocks and FONA.

2.20.2 Organisational

- Airway planning and communication to patient and team
- Team leadership during airway management, especially difficult/failed airway management
- Set up of difficult airway cart and check theatre equipment.

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2.20.3 Administrative

- Ensuring the theatre complex has the appropriate equipment and devices for airway management.
- Ensuring compliance with guidelines for airway management
- Documentation and monitoring of airway management and events

2.21 Non-technical competencies

2.21.1 Leadership

- Coordination of theatre team for safe airway management

2.21.2 Collaborator

- Role of other clinicians and nurses, especially in the case of a shared airway or adverse events
- Effective delegation of roles
- Performance of team drills for difficult airway management

2.21.3 Communicator

- Provision of patient-centred information regarding planned airway management, alternative options and potential risks to gain patient cooperation and understanding.
- Disclosure of complications of airway management to patients and families and provide airway alert forms and cards.
- Effective information sharing, consultation planning with nurses and clinicians regarding airway plans

2.21.4 Context awareness

- Sensitivity to and recognition of patient anxiety regarding airway and anaesthesia risks
- Recognition of airway crisis and avoidance of fixation errors in emergencies and personal limitations
- Awareness of resource limitation, which might impact on equipment or device availability and implications for airway management.

2.21.5 Health advocate

- To motivate for appropriate airway equipment and training for the theatre unit and team

2.22 Appendices to be included.

2.22.1 Difficult Airway Society algorithms, download from: https://das.uk.com/

1. DAS difficult intubation guidelines adult
2. DAS extubation guidelines
    a. Basic algorithm
    b. Low-risk algorithm
    c. "At risk" algorithm

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3. DAS paediatric difficult airway guidelines
    a. Difficult mask ventilation
    b. Unanticipated difficult intubation
4. DAS ICU guidelines
5. DAS obstetric algorithms (composite, and 1 to 6)
6. VORTEX APPROACH, download form http://vortexapproach.org
7. Fibreoptic-guided tracheal intubation through SAD using Aintree Intubation Catheter
8. Airway alert form and airway alert card

2.22.2 Checklists

1. Preoperative airway trolley checklist – SASA link
2. Pre-intubation checklists

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Domain 3: Pain Management

Summary

COMPETENCES	DA	FCA I	FCA II	Metcomp
Anticipating, diagnosing and managing painful conditions				
Application of pharmacological and nonpharmacological pain management strategies				ME/ Sc
Organising and managing a perioperative pain management service				ME/ Sc
KNOWLEDGE				ME/ Sc
The physiology and pathophysiology of pain				ME/Sc/ Cm
Aetiology of acute pain				ME/ Sc
The transition from acute to chronic pain				ME
The assessment of pain				ME/ Sc/ Le/ HA
The mechanism of action of analgesic and adjuvant drugs				ME/ Sc
Modes of administration of analgesic drugs				ME/ Sc
Nonpharmacological modes of managing pain				ME/Sc/ Cm

DA

3.1 Basic sciences of acute and chronic pain

3.1.1 Defining and differentiating acute from chronic pain

3.1.2 The anatomy and physiology of nociception (fundamental concepts)

- 3.1.2.1 Nociceptors (peripheral and central) and special senses
- 3.1.2.2 Conduction of pain
- 3.1.2.3 Mediators, pathways and reflexes
- 3.1.2.4 Central processing of pain
- 3.1.2.5 Central and peripheral pain modulation
- 3.1.2.6 Peripheral and central sensitization
- 3.1.2.7 Pain and the autonomic nervous system

3.1.3 Adverse effects of pain/systemic response to pain

3.1.4 Concepts in the pathophysiology of chronic pain and the progression of acute to chronic pain.

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3.2 Therapeutic options for pain management

3.2.1 **Pharmacology of the following agents (pharmacokinetics and pharmacodynamics, mode of action, dosages, side effects, drug interaction:**

- Alpha agonists
- Anticonvulsants
- Antidepressants (acute pain)
- Cannabinoids
- Corticosteroids
- Gabapentinoids
- Local anaesthetic agents
- N-Methyl-D-aspartic acid (NMDA) antagonists
- Non-steroidal anti-inflammatory medications (NSAIDs) and cyclooxygenase-2 (COX-2) antagonists
- Opioids
- Paracetamol
- Novel opioids (e.g. tapentadol and tramadol)
- Combination analgesics
- Volatiles and gases
- Alternative medication (e.g. nutraceuticals)

3.2.2 Medications used to counter the side effects of analgesia, including:

- Antiemetics
- Reversal agents

3.2.3 Modes of analgesic drug delivery (indications, contraindications, ethical considerations):

- Oral
- Intramuscular
- Subcutaneous
- Intravenous (including continuous infusion)
- Patient-controlled analgesia (PCA)
- Neuraxial and patient-controlled epidural analgesia (PCEA)
- Regional nerve blocks:
    - Other, including topical, transdermal, rectal, transmucosal (intranasal, inhalational, sublingual, buccal), intra-articular, incisional.

3.3 Assessment and management of pain

3.3.1 Assess pain and the outcome of pain treatment using a targeted history and clinical examination

3.3.2 Distinguish between acute and chronic pain.

3.3.3 Pain measurement tools and their application in clinical practice (e.g. visual analogue scale)

3.3.4 Recognise the limitations of pain measurement techniques, particularly in certain patient groups (e.g. persistent pain, children, patients with cognitive impairment)

3.3.5 Core concepts in the nonpharmacological management of acute and chronic pain, including:

3.3.5.1 Psychological interventions
3.3.5.2 Physical therapy and acupuncture
3.3.5.3 Electrical stimulation (transcutaneous, spinal cord and intracerebral)

3.3.6 PCA

3.3.6.1 Pre-emptive and preventative analgesia
3.3.6.2 Multimodal pain control perioperatively
3.3.6.3 Therapeutic, nonpharmacological adjuncts

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3.3.7 Management of cancer pain

3.4 Substance abuse in patients and staff
3.4.1 Tolerance, physical dependence and addiction

3.4.2 Common licit and illicit medications of abuse

3.4.3 Management and anaesthesia for patients with a history of substance abuse, including:

- Monitoring
- Drug therapy
- Rehabilitation

3.5 Technical skills – Clinical

Provide, or assist with, the clinical evaluation of patients with acute pain by obtaining a specific pain history:

3.5.1 Onset, location, nature, duration, intensity, aggravating and relieving factors.

3.5.2 Appreciate the physical, psychological and social consequences of the patient's pain.

3.5.3 Formulate a perioperative/acute pain/chronic pain management plan and evaluate the outcome.

3.5.4 Use and understand the anatomy, technique, indications, contraindications and complications of:

3.5.4.1 Central neuraxial blocks
3.5.4.2 Regional techniques
3.5.4.3 Peripheral and plexus blocks of the upper and lower limb

3.5.5 Document acute and chronic pain findings and refer patients to relevant disciplines (medical or paramedical)

3.6 Technical skills – Organisational
3.6.1 General principles in the management of acute pain, including:

3.6.1.1 Compliance with the relevant policies, recommendations and guidelines for practice as per the SASA Acute Pain Guidelines
3.6.1.2 Work within an acute pain management team
3.6.1.3 Engage with chronic pain clinics/specialists.

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FCA I

Physiology

3.7.1 (See DA 3.1.2)
3.7.2 Pain pathways in detail
3.7.3 Mechanism of progression from acute to chronic pain
3.7.4 Injury response to acute pain
3.7.5 Applied physiology and psychology of neuropathic pain
3.7.6 Effects of pain and analgesia on injury-induced organ dysfunction and the neuroendocrine stress response
3.7.7 Pathophysiology of chronic opioid abuse and addiction
3.7.8 Alterations to physiology and perception of pain in extremes of age

Pharmacology

As outlined in 3.2.1 (DA), but should include in-depth knowledge of chemical structure, pharmacokinetics, pharmacodynamics, mode of action, dosage side effects, drug interaction and reversal agents

Physics

3.9.1 Pumps used in pain management (syringe drivers, PCA, volumetric and elastomeric)
3.9.2 Needles used in pain management (intravenous, epidural, spinal, local anaesthesia block)
3.9.3 Nerve locators (stimulators) and ultrasound (see regional domain)
3.9.4 Monitoring of analgesia
3.9.5 Theoretical mechanism and efficacy of TENS in analgesia

FCA II

3.10 Assessment of acute pain

3.10.1 Objective measures of nociception
3.10.2 Pain biomarkers

3.11 Management

3.11.1 Formulate a plan for acute pain management.
3.11.2 Predictive factors for chronic postsurgical pain and outline measures to prevent or minimise its occurrence.

3.12 Substance Abuse Issues

3.12.1 Diagnosing and managing patients with substance abuse:

- Definitions and differences of addiction, tolerance, and dependence
- Special physiological, pharmacokinetic, and pharmacodynamic issues in the tolerant or abusing patient
- Biopsychosocial aspects of substance abuse and its interaction with analgesic therapy
- Management strategies for opioid-tolerant patients with acute pain

3.13.1 Technical skills – Clinical

Identify patients who require further investigation and select appropriate investigations.
3.13.1 Assess patients with acute pain, including:
3.13.1.1 Pain scores
3.13.1.2 Objective versus subjective pain
3.13.1.3 Functional status
3.13.1.4 Psychological and social factors impacting pain.
3.13.1.5 Appropriate use and administration of intravenous and local anaesthetic and/or adjuvant drugs

3.13.2 Technical – Organisational

3.13.2.1 Lead a pain management team to identify and follow up patients in pain and collaborate with surgical and nursing colleagues.

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3.13.2.2 Set up a work environment for interventional pain procedures or regional analgesia cases with all the necessary equipment to provide a safe environment.
3.13.3 Technical – Administrative
3.13.3.1 Document perioperative and postoperative analgesic use and effects
3.13.3.2 Continuous practice development and updating (e.g. regional ultrasound workshops [cervical plexus blocks, upper and lower limb blocks])
3.13.3.3 Scheduled drug documentation and management
3.13.4 Sensitivity to and recognition of patient anxiety regarding pain, management of pain, potential complications and risks

3.14 Non-technical skills

3.14.1 Leadership – Coordinate acute pain management team*
3.14.2 Collaboration – With other clinicians and nurses to ensure adequate proactive pain management.
3.14.3 Health advocacy – Care with prescription and distribution of habit-forming medications and scheduled drugs

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Domain 4: Regional and Local Anaesthesia

SUMMARY

COMPETENCES	DA	FCA I	FCA II	Metcomp
Intergrade the knowledge and principles of regional and local anaesthesia with respect to anatomy, physiology, physics and pharmacology				All
Provide safe regional and local anaesthesia with respect to techniques, indications and contraindications, complications, consent and ethics				All
KNOWLEDGE				
Anatomical landmarks and structures relevant to all regional techniques				ME/Sc
Physiology of nerve conduction				ME/Sc
Physics of ultrasound				ME/Sc
Physics of nerve stimulators				ME/Sc
Pharmacology of all local anaesthetic agents and additive agents used to enhance the regional technique				ME/Sc
Pharmacology of all emergency and rescue medication that may be necessary to deal with complications				ME/Sc
Indications and contraindications of all regional techniques				ME/Sc
Requirements for monitoring and documentation before, during and after the block				ME/Sc/Pr/CA
Complications of regional technique and the management thereof				ME/Sc/Pr
Requirements for consent				ME/Sc/Pr/HA /Cm/Hu

DRAFT FOR CONSENT

Contents

DA

4.1 Knowledge and approach to regional and local anaesthesia
4.2 Anatomy
4.3 Physiology
4.4 Pharmacology
4.5 Physics
4.6 Monitoring and documentation
4.7 Specific clinical skills

FCA I

4.8 Physiology
4.9 Pharmacology
4.10 Physics

FCA II

4.11 Basic science principles as applicable to the performance of local and regional anaesthesia
4.12 Specific regional techniques
4.13 Monitoring
4.14 Documentation
4.15 Management of complications
4.16 Consent
4.17 Specific clinical skills
4.18 Other technical skills

SKILLS (DA, FCA I, FCA II). (Consider after knowledge)
Technical skills: Clinical

- Appropriate patient selection, assessment, examination, investigation and management of regional technique throughout perioperative period.
- Ability to safely perform regional techniques as per level of training (see below).

Technical skills: Organisational

- Ensure that the organisation can provide safe care of the patient throughout the perioperative period, with an emphasis on the postoperative follow-up care of the patient who has had regional or local anaesthesia.
- Ensure that organisational checklists and safety checks are in place to monitor for and identify complications of regional/local anaesthesia.

Technical skills: Administrative

- Manage the postoperative prescription, aftercare instructions and follow-up for the patient specific to the safe management of regional/local anaesthesia.

NON-TECHNICAL SKILLS

Context awareness

- Awareness of the limitations of surroundings and resources with respect to provision of regional/local anaesthesia and need for escalation should complications arise.

Communication

- Ensure appropriate patient counselling and disclosures, effective consultations, safe handover, and optimal perioperative care, especially to ward staff monitoring for complications after regional/local anaesthesia.

Collaboration (refer to generic NTS**)**
Humaneness (refer to generic NTS**)**
Health advocacy (refer to generic NTS**)**
Leadership (refer to generic NTS**)**

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DA

4.1 Safe approach to regional and local anaesthesia

4.1.1 Appropriate patient preoperative assessment when a regional technique is considered.
4.1.2 Consent to administer regional/local anaesthesia:
4.1.3 Complications and management of neuraxial anaesthesia
4.1.4 Complications of peripheral nerve blocks and management thereof, including:

4.2 Anatomy

4.2.1 Vertebral column, spinal cord, caudal and epidural space
4.2.2 Dermatomal innervations
4.2.3 Common peripheral nerve blocks and related structures
4.2.4 Anatomical landmarks and structures relevant to all regional techniques

4.3 Physiology

4.3.1 Nerve conduction
4.3.3 Pain and sensory pathways
4.3.3 Physiological effects of neuraxial blockade, including complications and their management.

4.4 Pharmacology

4.4.1 Local anaesthetic agents, including:
- 4.4.1.1 Mechanism of action
- 4.4.1.2 Comparative pharmacology of different agents
- 4.4.1.3 Differences between amides and esters
- 4.4.1.4 Toxicity

4.4.2 Rationale for using adjuvant agents to enhance the quality or extend the duration of block, including:
- 4.4.2.1 Adrenaline
- 4.4.2.2 Bicarbonate
- 4.4.2.3 Opioids
- 4.4.2.4 Alpha agonists

4.4.3 Pharmacokinetics of medications administered in the epidural and subarachnoid spaces and pharmacology of an epidural infusion, including:
- 4.4.3.1 Drugs
- 4.4.3.2 Infusion rates
- 4.4.3.3 Monitoring
- 4.4.3.4 Complications

4.4.4 Appropriate use of eutectic mixture of local anaesthetics (EMLA), including:
- 4.4.4.1 Patient selection
- 4.4.4.2 Timing
- 4.4.4.3 Indications
- 4.4.4.4 Contraindications
- 4.4.4.5 Complications

4.4.5 Local anaesthetic systemic toxicity, including:
- 4.4.5.1 Risk factors
- 4.4.5.2 Mechanism
- 4.4.5.3 Identification/manifestation
- 4.4.5.4 Management
- 4.4.5.5 Pharmacology of Intralipid, including:
  - Indications
  - Mechanism of action
  - Dose

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- Contraindications

4.4.6 Considerations for patients using anticoagulants.

4.5 Physics

4.5.1 Nerve stimulators

4.5.1.1 Nerve location, including:

- Advantages
- Disadvantages
- Limitations
- Complications

4.5.1.2 Nerve location/mapping with a nerve stimulator

4.5.1.3 Different types of needles used to perform regional and local anaesthesia.

4.5.2 Ultrasound

4.5.2.1 Location of nerves when performing blocks, including:

- Advantages
- Disadvantages
- Limitations
- Complications

4.5.2.2. Identification of specific peripheral nerves using basic ultrasound skills (e.g. brachial plexus, femoral, sciatic)

4.5.2.3 Use in combination with nerve stimulator to reduce complications.

4.6 Patient positioning, monitoring and accurate documentation before, during and after the block

4.7 Clinical skills

4.7.1 Neuraxial (e.g. spinals, saddle, caudal)

Perform core nerve blocks:
(Sequence UL, LL, Trunk)

4.7.1.1 Ankle
4.7.1.2 Brachial plexus
4.7.1.3 Bier block
4.7.1.4 Femoral/sciatic
4.7.1.5 Inguinal/iliohypogastric
4.7.1.6 Penile
4.7.1.7 Transabdominal plane
4.7.1.8 Wrist and digital

4.7.2 Infiltration techniques
4.7.3 Adequacy of block for surgery and management of an inadequate block
4.7.4 Appropriate sedation technique during surgery under peripheral/neuraxial block
4.7.5 Appropriate monitoring during regional/neuraxial blockade
4.7.6 Appropriate management of the theatre environment during surgery while under regional blockade/sedation
4.7.7 Manage the postoperative prescription, aftercare instructions and follow-up.
4.7.8 Follow protocols for monitoring of blocks postoperatively and how complications will be managed.
4.7.9 Aseptic techniques required for neuraxial, peripheral and local blocks.

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FCA I

Physiology

4.8.1 Nervous system
- 4.8.1.1 Functional anatomy and structure
- 4.8.1.2 Membrane potential, action potential and graded responses
- 4.8.1.3 Synaptic transmission
  - Neurotransmitters
- 4.8.1.4 Sensory mechanisms
  - Basic aspects and special senses
  - Physiology of pain
- 4.8.1.5 Motor function (basic aspects)
  - Neuromuscular transmission
  - Skeletal muscle, smooth muscle and cardiac muscle physiology
  - Reflexes
- 4.8.1.6 Autonomic nervous system

Pharmacology

4.9.1 Premedication agents

4.9.2 Local anaesthesia agents
- 4.9.2.1 Adjuncts to local anaesthetics
- 4.9.2.2 Emergency medications for local anaesthetic systemic toxicity (LAST)

Physics

4.10.1 Neuromuscular monitoring and nerve location

4.10.2 Ultrasound and the Doppler principle
- 4.10.2.1 Waves, motion and sound
- 4.10.2.2 Generation and detection of sound
- 4.10.2.3 Properties of ultrasound
- 4.10.2.4 Scanning techniques
- 4.10.2.5 Doppler effect and its application in anaesthesia

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FCA II

4.11 Basic science principles

4.11.1 Anatomy

4.11.1.1 Microanatomy (nerve structure)

4.11.1.2 Macroanatomy

- Anatomical regions and their innervations
- Dermatomes, myotomes and osteotomes
- Adjacent anatomical structures that may be injured whilst performing regional anaesthesia

4.11.2 Physiology

4.11.2.1 Nerve conduction

4.11.2.2 Effect of specific nerve blockade, for example:

- Haemodynamic effects
- Horner syndrome

4.11.2.3 Ganglion and plexus blockade

- Cervical/stellate
- Coeliac

4.11.3 Physics

4.11.3.1 Catheters and needles

4.11.3.2 Equipment

4.11.3.3 Nebulisers and atomisers for topicalisation of airway

4.11.3.4 Nerve stimulation

4.11.3.5 Pressure monitors

4.11.3.6 Ultrasound

4.11.4 Pharmacology

4.11.4.1 Local anaesthetics

4.11.4.2 Adjuncts

4.11.4.3 Emergency and rescue medication, including Intralipid.

4.11.5 Pathophysiology and complications of concurrent diseases and their treatment that may have implications for regional anaesthesia practice (indications and contraindications)

4.11.6 Anticoagulation and the associated risks with regional anaesthesia

4.11.7 Infection control

4.12 Specific regional anaesthetic techniques, including the physiological consequences.

4.12.1 Evidence-based comparison of different blocks, including efficacy.

4.13 Patient positioning and monitoring during and after block

4.14 Documentation before, during and after blocks

4.15 Possible complications and management of blocks

4.16 Consent

4.17 Clinical skills

4.17.1 Appropriate patient selection for type of regional technique

4.17.2 Patient and environmental preparation for the proposed procedure

4.17.3 Use of specialised monitoring and equipment to optimally perform blocks and provide care for patients.

4.17.4 Perform regional anaesthesia pertaining to the following regions:

4.17.4.1 Head and neck

- Eye blocks, including awake eye surgery
  - Appropriate topical local anaesthetic agents

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    - Sub-Tenon's (episcleral) nerve block
    - Peribulbar block limitations and complications
    - Retrobulbar block limitations and complications
  - Blocks for airway intubation, including topicalisation (refer to Domain 2)
  - Cervical plexus
  - Dental blocks
  - Scalp blocks, including awake craniotomy
  - Stellate ganglion

4.17.4.2 Upper limbs, including:

- Axillary
- Brachial plexus blocks
- Hand blocks
  - Wrist
  - Cutaneous nerve
- Interscalene
- Infraclavicular
- Intravenous anaesthesia (Bier block)
- Supraclavicular

4.17.4.3 Lower limbs, including:

- Ankle block
- Fascia iliaca block
- Femoral nerve block
- Lateral femoral cutaneous nerve of thigh
- Lumbar plexus
- Mid-thigh
- Obturator
- Popliteal block
- Saphenous nerve block
- Sciatic nerve block
- Sub-gluteal
- Trans-gluteal

4.17.4.4 Thoracic wall, including:

- Erector spinae
- Intercostal nerve block
- Paravertebral block
- Pectoral (Pecs) block
- Serratus anterior plane block

4.17.4.5 Abdominal wall, including:

- Ilioinguinal/iliohypogastric nerve block
- Quadratus lumborum plane block
- Rectus sheath blocks
- Transversus abdominis plane block

4.17.5 Perform neuraxial techniques.

4.17.5.1 Spinal anaesthesia, including saddle blocks.

4.17.5.2 Epidural anaesthesia

4.17.5.3 Combined spinal epidural.

4.17.5.4 Caudal anaesthesia

4.17.6 Advanced techniques

4.17.6.1 Indwelling catheter techniques

4.17.6.2 Ambulatory techniques

4.17.7 Management of all perioperative complications relating to regional anaesthesia

4.17.8 Appropriate postoperative patient care and placement

4.17.9 Management of postoperative pain and follow-up service provision

4.18 Other technical skills (FCA II only)

4.18.1 Organisational

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4.18.1.1 Organisation of post-anaesthesia care unit (PACU), high care, intensive care unit, with appropriate staffing and equipment tailored to the level of care following regional anaesthesia.

4.18.1.2 Set up regional anaesthesia service for day case surgery.

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Domain 5: Perioperative care

COMPETENCES	DA	FCA 1	FCA 2	MetComp
Conduct thorough patient assessment for various surgical procedures and understand concurrent diseases and their perioperative management.				ME/Sc/CA
Conduct safe and appropriate preoperative preparation				ME/Sc/CA/Le
Deliver safe intraoperative anaesthesia care				ME/Sc/L/Pr/ Hu
Deliver safe post-anaesthesia care.				ME/Sc
Monitor and manage complications related to the provision of anaesthesia				ME/Cl/Pr
KNOWLEDGE				
Principles of preoperative assessment of patient, surgical procedure and environment.				ME/ Sc/CA/Hu
Pathophysiology of concurrent diseases and their impact on anaesthesia.				ME/Sc
Preoperative preparation of the patient, including premedication, starvation guidelines and informed consent, and the environment.				Pr/HA/Cm
Maintaining perioperative physiological homeostasis				ME/Cl/Cm/Sc
Perioperative care pathways				ME/Cl/Cm/Sc

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Summary

Domain 5 will explore the following:

Section A: Diplo

KNOWLEDGE

5.1 Preoperative assessment of patient and context
- 5.1.1 Evaluation of the patient
- 5.1.2 Evaluation of anaesthetic risk
- 5.1.3 Evaluation of surgical risk
- 5.1.4 Assessment of the environment

5.2 Normal Physiology, Pathophysiology & anaesthesia implications of concurrent diseases

5.3 Investigations

5.4 Preoperative preparation
    5.4.1 Premedication
    5.4.2 Starvation guidelines
    5.4.3 Consent Domain 6
    5.4.4 Preparation of the environment
5.5 Maintenance and restoration of homeostasis
5.6 Post-anaesthesia care
5.7 Complications of Anaesthesia

DA

5.1 Preoperative assessment of the patient and context

5.1.1 Preoperative patient assessment

5.1.1.1 General principles of preoperative assessment

- Assessment, evaluation of severity and optimization of different conditions for safe perioperative outcomes
- Imaging and investigations on appropriately selected patients
- Collating information from past and current medical records
- Drug and allergy history.
- Approach to patient with comorbidities: diagnosis, optimization, interdisciplinary consultation, and referral as appropriate

5.1.1.2 Cardiovascular assessment:

- Cardiovascular- specific history and examination including functional capacity
- Special tests:
    - Blood tests: basic tests and cardiac biomarkers for diagnosis and risk stratification of cardiac conditions
    - Role of CXR, ECG, echo
    - Application of cardiovascular risk evaluation tools, *inter alia*, revised cardiac risk index.

5.1.1.3 Respiratory assessment

- Relevant history and examination
- Interpreting special tests eg CXR, ABG, lung function tests, functional capacity
- Risk stratification of patients with respiratory pathology presenting for surgery.

5.1.1.4 Neurological assessment

- History and examination for acute and chronic conditions affecting the brain and spinal cord, mental illness, and substance abuse.
- Blood tests interpretation
- Therapeutic drug monitoring, eg antiepileptic drug levels
- Clinical toxicology: screening for substance abuse when appropriate
- Imaging
    - Optic nerve sheath sonography for intracranial hypertension
    - CT scan results interpretation, as applicable
- Neurological assessment scores eg Glasgow coma scale, AVPU

5.1.1.5 Gastrointestinal & hepatic assessment

- Identification and evaluation of GIT and hepatic conditions:
    - patients at risk of reflux or delayed gastric emptying, and peptic ulcer disease.
    - Autonomic neuropathy and its impact on the GIT

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- Malnutrition
- Complications in patients with known acute and chronic hepatic disease

- Blood test interpretation:
  - Liver function tests
  - renal function tests
  - coagulation tests

5.1.1.6 Renal System and Biochemistry assessment

- Screening for renal and metabolic conditions
- Blood and urine test interpretation:
  - Urea and electrolytes,
  - Calcium, Magnesium, Phosphate
  - Arterial and venous blood gases
  - Therapeutic drug monitoring
  - Clinical toxicology (screening for substance abuse)
  - Urine tests for electrolytes and proteins to identify various conditions.
- Imaging
  - Interpretation of ultrasound and doppler studies in renal disease

5.1.1.7 Musculoskeletal, skin, and soft tissue assessment

- Identify musculoskeletal and skin conditions, and evaluate linkages with other systems, eg Connective tissue disease, crush syndrome.
- Blood tests and Imaging, *inter alia* CXR, Cervical spine Xray where applicable

5.1.1.8 Endocrine and metabolic assessment

- Screening for common endocrine conditions
- Blood and urine tests, imaging to diagnose and monitor common endocrine conditions and their emergency presentations, *Inter alia*:
  - Pituitary gland pathology
  - Thyroid and parathyroid disease,
  - Diabetes mellitus,
  - Adrenal medulla
  - Adrenal cortex
  - Carcinoid
  - Other endocrine disorders

5.1.1.9 Haematologic assessment

- Screening for haematological conditions, *inter alia*, anaemia, bleeding diathesis, thromboembolic conditions.
- Blood tests for the diagnosis and monitoring of haematologic conditions
  - Indications of full blood count**,** differential count, and other related tests
  - Investigations for causes of anaemia and thrombocytopaenia
  - Coagulation screen
    - Screening for congenital, traumatic, infective, Inflammatory, neoplastic, degenerative conditions affecting coagulation.
    - Managing patients on long-term anticoagulation therapy in the perioperative period with respect to:
      - Indications and methods of bridging with LMWH or unfractionated heparin
      - Timing of discontinuation and reinstatement of anti-coagulant therapy
      - Managing neuraxial anaesthetics and other deep plexus blocks

5.1.2 Evaluation of specific anaesthesia-related risk

5.1.2.1 Difficult airway risk (cross reference with domain 2)

5.1.2.2 Risk of malignant hyperthermia, and scoline apnoea

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5.1.2.3 Risk of post-operative nausea and vomiting (PONV)
5.1.2.4 Porphyria risk and safe anaesthetic technique.
5.1.2.5 Other anaesthetic risk, allergies, and relevant social and family history
5.1.2.6 Scoring systems for Anaesthetic risk stratification

- American Society of Anaesthesiologists (ASA) physical status classification
- African Surgical Outcomes Study (ASOS) risk determination
- Functional assessment in risk evaluation E.g. exercise capacity, performance of activities of daily living, frailty scale.

5.1.3 Risk assessment of the surgical procedure
5.1.3.1 Classify surgical procedures as either minor, intermediate, or major surgery
5.1.3.2 Identify surgical procedures with an increased risk of haematological complications.:

- Haemorrhage risk and manage cases according to blood conservation principles.
- thromboembolic risk and manage patients accordingly using both mechanical and pharmacological prophylaxis.

5.1.3.3 Identify surgical procedures that increase the risk for post-operative pulmonary complications and mitigate this in the perioperative period
5.1.3.4 Understand the risk involved with requirements of specific surgery, *interalia,* patient position, endoscopic surgery, laser surgery
5.1.4 Assessment of environmental risk
Cross reference with domain 1
5.1.4.1 Operating theatre safety
5.1.4.2 Non-Operating Room Anaesthesia Including Radiology Suite

- equipment and infrastructure, including post-anesthesia care facilities.
- Principles of radiation protection
- Principles of magnetic resonance imaging (MRI) safety
- Contrast-induced nephropathy (CIN) and risk mitigation.
- Monitored anaesthesia care (MAC)

5.1.4.3 Day Surgery

- Types of day surgery e.g. ambulatory surgery, same-day surgery, office-based surgery, remote location e.g. radiology suite
- Requirements of a day surgery facility including services, equipment and protocols in a day surgery suite

5.2 Normal Physiology, Pathophysiology & anaesthesia implications of concurrent diseases

5.2.1 Normal Systemic Physiology
The candidate is expected to acquire knowledge of normal and abnormal physiology relevant to anaesthesia safe delivery with special focus on the following systems:
5.2.1.1 Cardiovascular physiology (cross reference with domain 1 and DA domain 7.10)
5.2.1.2 Respiratory physiology (cross reference with domain 1 and DA domain 7.11)
5.2.1.3 Neurophysiology (cross reference with domain 1 and DA domain 7.7)
5.2.1.4 Neuromuscular physiology (cross reference with domain 1 and DA domain 7.7)
5.2.1.5 Renal physiology (cross reference with domain 1 and DA domain 7.14)
5.2.1.6 Hepatic physiology (cross reference with domain 1 and DA domain 7.2)
5.2.1.7 Endocrine physiology (cross reference with domain 1 and DA domain 7.2)
5.2.1.8 Maternal and Foetal physiology (cross reference with DA Domain 7.4)
5.2.1.9 Physiology specific to the paediatric patient (cross reference with DA Domain 7.6)
5.2.1.10 Physiology specific to the geriatric patient (cross reference with Domain 1)

- Age-related anatomical and physiological variations

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- Frailty and how it impacts anaesthetic risk.

5.2.2 Pathophysiology, comorbidities, and anaesthesia implications of concurrent disease

DA candidates should be able to identify and manage patients presenting to theatre with co-morbid diseases and understand the changes in physiology due to concurrent diseases.

In the DA scope of practice, patient comorbidities are grouped into two categories:

1. **Category 1:** The Diplomate should be able to diagnose, optimize, and anaesthetise patients with these co-morbidities.
2. **Category 2:** The Diplomate should be able to diagnose and refer patients with these co-morbidities, to be anaesthetised by a specialist. Diplomates shall only anaesthetize these patients under specialist supervision OR for life and limb saving procedures, in the absence of a specialist.

5.2.2.1 Cardiovascular System

- Category 1
    - Controlled hypertension
    - Stable cardiovascular complications of illicit substances
    - Compensated cardiac failure.
- Category 2
    - Uncontrolled hypertension and hypertensive emergencies
    - Peripheral vascular disease (know and refer unless an acute emergency)
    - Ischaemic heart disease
    - Cardiac arrhythmia's
    - Cardiac failure: Severe decompensated
    - Congenital heart disease
    - Valvular heart disease
    - High-risk cardiac arrhythmia's
    - Other acquired diseases, e.g. Myxoma, cardiomyopathy, pericarditis
    - Pulmonary hypertension
    - Pulmonary embolism
    - Patient with pacemaker and/or ICD

5.2.2.2 Respiratory System

- Category 1
    - Emergency trauma patients with acute respiratory distress including preoperative chest tube placement.
    - Stable Controlled Obstructive airways disease including asthma and COPD
    - Stable controlled restrictive airways disease (parenchymal and musculoskeletal)
    - Respiratory complications from smoking, vaping, and marijuana
- Category 2
    - Cystic Fibrosis /bronchiectasis ME, Sc
    - Bullous lung disease ME, Sc
    - Bronchopleural fistula ME, Sc
    - Recurrent aspiration
    - ARDS
    - Infection: pneumonia, upper respiratory tract infection, empyema
    - Pneumothorax and other pleural space diseases
    - Obstructive or central sleep apnoea

5.2.2.3 Neurological System

- Category 1
    - Mild traumatic brain injury and recovered traumatic brain injury
    - Controlled Seizure disorders
    - Stable previous cerebrovascular events CVA/TIA

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    - Cognitive impairment: dementia
    - Peripheral neuropathy
    - Established spinal cord lesions.
    - Psychiatric disorders including substance abuse.
- Category 2
    - Raised ICP
    - Space occupying lesions, e.g. tumours, cerebral abscesses
    - Movement disorders: Parkinson's disease

5.2.2.4 Gastrointestinal System

- Category 1
    - Malnutrition
- Category 2
    - Gastro-oesophageal reflux disease
    - Gastric outlet obstruction
    - Acute liver failure
    - Chronic liver failure
    - Hydatid cyst

5.2.2.5 Haematological System

- Category 1
    - Anaemia and other blood dyscrasias
    - Thrombocytopaenia
    - Hypercoagulable states
- Category 2
    - Severe forms of category 1 pathology

5.2.2.6 Musculoskeletal, Soft Tissue and Skin

- Category 1
    - Stable Connective tissue and skin diseases
        - Rheumatoid arthritis: Stable, well controlled with minimal complications
- Category 2
    - Myopathies and muscular dystrophies
    - Neuromuscular disorders: myasthenia gravis

5.2.2.7 Renal and urogenital system

- Category 1
    - Electrolyte and acid-base disorders
    - AKI
- Category 2
    - CKD

5.2.2.8 Endocrine system

- Category 1
    - Diabetes Mellitus
    - Thyroid disease
    - Obesity & metabolic syndrome
- Category 2
    - Acute and chronic pancreatitis
    - Adrenal gland conditions: Conn's, Addison's, Cushing's, Phaeochromocytoma
    - Carcinoid syndrome
    - Pituitary gland conditions
    - Hyper insulinomas

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5.3 Perioperative Investigations

- DA candidates should be able to order investigations balancing cost to benefit, interpret reports and respond to clinical problems in the context of perioperative patient assessment.
- DA candidates should be able to perform and interpret point-of-care tests as necessary, and understand the limitations of calibration and quality, *inter* alia
    - Arterial blood gases
    - Coagulation tests
    - Ultrasound imaging
- Specific tests are listed by system in the patient assessment domain 5.1.1
- Additional investigations:
    - Microbiology: blood cultures, antibiotic sensitivities, intraoperative dosing requirements

Cross reference with ICU domain 7.1

5.4 Preoperative preparation

5.4.1 Premedication and handling of chronic medication

Candidates should be able to identify the need to either prescribe or withhold certain medications during the perioperative period, *inter* alia

5.4.1.1 Aspiration prophylaxis
5.4.1.2 Anxiolytics and antisialogogues
5.4.1.3 Antidiabetic treatment
5.4.1.4 Antihypertensives
5.4.1.5 Fluid therapy
5.4.1.6 Anticoagulation

5.4.2 Starvation guidelines

5.4.2.1 Starvation guidelines as published by SASA and PACSA
5.4.2.2 Prehabilitation in selected patients

5.4.3 Informed consent

Cross reference with Domain 6

5.4.3.1 Informed consent, the ethical principles and laws relating to informed consent, inclusive of all interventions undertaken during the perioperative period.
5.4.3.2 Consent process

- Threshold elements
- Informational elements
- Consent elements.
- Confirmation elements
- Dealing with family and caregivers

5.4.4 Preparation of the environment

Cross reference with Domain 1

The DA candidate should be able to adequately prepare any operating environment (theatre, remote location, radiology suite, endoscopy suite) for the safe administration of sedation and anaesthesia, preparing the following:

5.4.4.1 Resuscitation equipment and medications
5.4.4.2 Operating theatre equipment
5.4.4.3 Fluid and blood products
5.4.4.4 Warming devices
5.4.4.5 Safe sharps disposal system
5.4.4.6 Non-operating room considerations

- Radiology suite
- Remote location

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5.5 Maintenance and restoration of homeostasis

Cross reference with domains 1,2,3,4

5.5.1 Monitoring standards as guided by SASA

5.5.2 Anaesthetic agents for induction and maintenance

5.5.3 Analgesia techniques

5.5.4 Intravenous fluids and blood product use

5.5.5 Temperature management

5.6 Post-anaesthesia care

5.6.1 Monitoring requirements for all types of anaesthesia

5.6.2 PACU discharge safety including scoring systems

5.6.3 Precautions for high-risk populations, inter alia obstructive sleep apnoea, paediatrics, obstetrics

5.6.4 Post anaesthesia recovery for ambulatory/ outpatient surgery and remote anaesthesia

5.6.2 Safe patient handover

5.7 Complications of Anaesthesia

5.7.1 Classification of Anaesthetic complications, *inter alia*

5.7.1.1 General vs regional anaesthesia

5.7.1.2 Minor vs major

5.7.1.3 System involvement

5.7.2 Quantifying and communicating the risk of complications in preoperative assessment and consent taking.

5.7.3 Monitoring and prevention of complications

5.8 DA Skills

5.8.1 Technical skills

5.8.1.1 Clinical

- Performing preoperative assessment
- Preparing a patient for theatre minimizing perioperative risk
- Management of the bleeding patient
- Management and stabilisation of a patient presenting as a dire emergency in theatre, for example respiratory distress requiring preoperative chest tube placement.
- Management of a patient with thromboembolic complications
- Provision of safe anaesthesia, post-operative care and surveillance, and management of complications
- Prevention and management of postop cardiac and pulmonary complications
- Prevention and management of position related complications
- Prevention and management of complications related to specific types of surgery

5.8.1.2 Organisational

- Ability to manage a theatre list from commencement to completion, ensuring staff availability, coordinating multidisciplinary teams, ward staff, laboratory and blood bank services to ensure adequate preparation of the patient and the environment.

5.8.1.3 Administrative

- Accurate recording of assessments, investigations, clinical and non-clinical procedures, and ethical management of confidential patient documentation.
- Ensuring that all paperwork indicates the requests, patient consent and findings of all special investigations during the perioperative period.

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- Ensuring that documents are up to date with clear evidence of availability and functioning of equipment and drugs.

5.8.2 Non-technical skills

All non-technical skills are applicable in domain 5.

Special reference to the following:

5.8.2.1 Medical expertise: decision making-subdomain

- Make appropriate decisions regarding the patient's optimisation after determining the anaesthetic risk for the patient.
- Demonstrate insight into the various health conditions which pose risk to the patient.
- Decision-making relating to postponement or cancellation of surgery, considering the patient condition and the DA scope of practice.

5.8.2.2 Communication

- Liaise with members of the perioperative team in a multidisciplinary approach when optimising patients prior to theatre.
- Communicate with the patient in a manner that elucidates the risk of anaesthesia and surgery to the patient.

5.8.2.3 Collaboration

- Include all members of the perioperative team and the patient in the planning and patient risk assessment to achieve the best outcome for the patient.

FCA I

Physiology

5.9 Physiology

- Knowledge: domain 1
- Technical skills: Apply all elements of knowledge in domain 1 to perioperative care
- Nontechnical skills: Apply all nontechnical skills as elaborated in chapter 1

Cross reference to domain 1 FCA 1 and Domain 7.1 to 7.16 Anatomy and Physiology sections

Pharmacology

5.10 Pharmacology

- Knowledge: domain 1
- Technical skills: Apply all elements of knowledge in domain 1 to perioperative care
- Nontechnical skills: Apply all nontechnical skills as elaborated in chapter 1

Cross reference to domain 1 FCA 1 and Domain 7.1 to 7.16 Pharmacology sections

Physics

5.11 Physics

- Knowledge: domain 1
- Technical skills: Apply all elements of knowledge in domain 1 to perioperative care
- Nontechnical skills: Apply all nontechnical skills as elaborated in chapter 1

Cross reference to domain 1 FCA 1 and Domain 7.1 to 7.16 Physics sections

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FCA II

FCA II candidates are expected to have mastered the knowledge and competencies expected of the DA and FCA I. Further application, integration, evaluation, critical appraisal, and teaching of the concepts is expected. Where DA candidates manage a limited space and patient set, FCA II candidates are expected to assume more responsibility in managing the entire perioperative service.

5.12 Preoperative assessment of patient and context

5.12.1 Pre-operative assessment:

All DA competences: see domain 5.1

5.12.2 Perioperative Risk stratification:

5.12.2.1 Perioperative risk assessment tools

5.12.2.2 Risk assessment of cardiac patient for non-cardiac surgery

5.12.2.3 Reducing cardiac risk

- Pharmacological strategies
- Pre-operative revascularization: indications, challenges, controversies, management of medication, and scheduling of surgery.
- Role of prehabilitation
- Enhanced post-operative monitoring.

5.12.2.4 Respiratory risk assessment

- Impact of concurrent respiratory diseases
- Anticipated difficult or unique airways.
  Cross reference with domain 2

5.12.2.5 Reducing respiratory risk

- Special precautions for contagious respiratory infections
- Role of smoking cessation
- Balancing delaying surgery to optimise respiratory function with the urgency of surgery.
- Identifying patients who will require post-operative ventilatory support and monitoring

5.12.2.6 Impact of urgent and emergent surgery on risk stratification and on patient outcome

5.12.2.7 Specific investigations to assist with risk stratification and reduction according to specific diseases and affected organ systems

5.12.2.8 Counselling the patient on overall condition and likelihood of special intraoperative measures and site of postoperative care

5.12.3 Pre-operative evaluation of surgical risk

Cross-reference with DA domain 5.1.6

5.12.3.1 The impact of previous surgical procedures on current anatomy and physiology and anaesthetic implications e.g. post organ transplantation

5.12.3.2 Facilitating multiple concurrent procedures

5.12.3.3 Prolonged surgical procedures

5.12.3.4 Positioning considerations

5.12.3.5 Impact of urgent and emergent surgery on risk stratification and on patient outcomes.

5.12.4 Assessment of the operative environment

Cross reference to Domain 1

5.12.5 Safe provision of anaesthesia in traditional and alternative anaesthesia locations with respect to infrastructure, equipment, staff competence, and care processes.

5.12.5.1 Effective peri-operative processes to optimize patient outcomes.

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- Patient selection, preparation, risk assessment, risk mitigation, post-operative monitoring and surveillance.
- Protocols, guidelines and checklists to optimise patient outcomes, inter alia. fasting, antibiotic prophylaxis, resuscitation, post-anaesthesia monitoring, and intrahospital transport.
- Regular equipment maintenance in place

5.12.5.2 Effective clinical governance to assess and improve quality of care.

- Cross reference to domain 6

5.12.5.3 Requirements for the safe provision of remote location anaesthesia, including resuscitative equipment and drugs.

- Physical Layout
    - Area design with respect to safety, equipment availability and conformity to national standards.
    - Access to traditional theatre space in the event of surgical mishap.
- Personnel training and practice standards,
- Considerations of specific remote locations
    - Radiation hazards,
    - MRI suite considerations
    - Electroconvulsive therapy (ECT) considerations (cross reference with domain 7.7)
    - Adaptations for restricted patient access e.g., secure airways, long circuits.
    - Adverse reactions to medications such as contrast media
    - Potential procedure complications and their management e.g. cardiac arrest

5.12.5.4 Safe provision of ambulatory anaesthesia

- Patient selection
    - inclusion and exclusion criteria
    - Considerations for patients with concurrent disease
    - Type of surgery, anaesthetic and post-operative monitoring requirements
- Streamlining perioperative care pathways in ambulatory surgery: Pre-, intra- and postoperative care
    - Discussions with patients and information sharing for preparation and postoperative planning
- Specific paediatric concerns
- Clinical governance
- Accreditation standards for suites/areas for the provision of ambulatory surgery.
    - Types of ambulatory surgical procedures
    - Provisions for acute resuscitations and emergencies
        - Procedures for evacuations in case of hazards/fires and with patients requiring ICU/resuscitation.
        - Staff training
    - Evaluation of the quality of the service by ascertaining, inter alia,
        - Number of admissions, Incidence of post-operative complications

5.12.6 Occupational hazards of anaesthesia e.g. radiation exposure, inadequate scavenging

5.13 Pathophysiology & anaesthesia implications of concurrent diseases

Cross-reference with domains 7.1 to 7.16

The FCA 2 candidate should:

- Understand the pathophysiology of concurrent diseases, grade severity, risk stratify and determine how they might be optimised pre-operatively to reduce perioperative risk.

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- Know the implications of concurrent diseases and their treatment, for anaesthesia delivery.
- Know and anticipate the impact of all types of anaesthesia on organ systems and the progression of the disease.
- Know and deliver the perioperative anaesthetic management of traumatic, noncommunicable, congenital and acquired, degenerative, neoplastic, infective and inflammatory conditions affecting all organ systems, for related surgeries or as comorbidities. The conditions are classified by organ system as listed below:

5.13.1 Cardiovascular system disorders
5.13.2 Respiratory system disorders
5.13.3 Neurological System disorders
5.13.3.1 Central and peripheral nervous system
5.13.3.2 Psychiatric disorders including substance abuse
5.13.4 Gastrointestinal System disorders
- Includes the alimentary tract and hepatobiliary system

5.13.5 Haematological disorders
5.13.6 Renal and urogenital system disorders including metabolic, fluid compartments, electrolyte and acid base abnormalities
5.13.7 Endocrine disorders
5.13.8 Skin and musculoskeletal disorders
5.13.9 Infectious diseases
5.13.10 Malignancies
5.13.11 Immune system disorders
5.13.12 Pregnancy-related disorders
5.13.13 Paediatric disorders

5.14 Perioperative Investigations

5.14.1 Laboratory, point of care tests and Imaging
- Application of sustainable, cost-effective peri-operative testing practices
- Awareness of test limitations in various contexts, for different applications in diagnosis and patient management
- Application of point of care tests with an understanding of their pitfalls.

5.14.1.1 Be able to interpret and apply the results of the following studies to assess risk and appropriately modify perioperative management:
- Cardiovascular system *inter alia*:
    - ECG
    - Troponins
    - BNP
    - Echocardiography
        - Basic views and interpretation of chamber and dynamic images for emergency haemodynamic assessment
    - Stress testing.
    - Angiography
    - Nuclear medicine perfusion studies
    - Pulse contour analysis in fluid status assessment
- Airway & Respiratory:
    - Chest X-ray
    - Arterial blood gas
    - Pulmonary function tests
    - Flow – volume loops

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    - Chest ultrasound: basic images to detect life threatening respiratory complications
    - Airway ultrasound: basic views of vital airway anatomy for front of neck airway access
    - Ventilation/perfusion scans
    - CT scans/CT angiography
- Renal
    - Biochemistry: urea, creatinine, glomerular filtration ratio (GFR), creatinine clearance
    - Urinalysis results: pH, Na, osmolarity, protein, ketones, haematuria, sediment, specific gravity
    - Other electrolytes: Calcium, magnesium, phosphate
- Haematology
    - Full blood count: Haemoglobin, platelets, haematocrit, white cell count & differential count
    - Point of care haemoglobin measurement
    - Iron studies
    - In-vitro: Viscoelastic and platelet function analysis
    - In-vivo: Clotting profiles and platelet count
- Hepatic
    - Liver function testing
    - Hepatitis studies
- Inflammatory biomarkers, including Interleukins, TNF
- Infectious diseases including HIV, TB, multidrug resistant bacteria
- Sepsis biomarkers, including procalcitonin, CRP, B-D-Glucan
- Neurological
    - C-spine Imaging
    - Head imaging.
    - Spinal imaging
    - EEG and EMG
- Gastrointestinal
    - Abdominal/pelvic ultrasound as part of emergency assessment of shock
    - Ultrasound for gastric emptying assessment
- Endocrine
    - Glucose analysis
    - Interpreting various hormone assays, *inter alia:*
        - Thyroid functions, hypothalamic pituitary axis, pancreas

5.15 Pre-operative preparation

Also refer to DA domain 5.4

5.15.1 Premedication

- FCA 2 candidates should be able to appropriately choose pre-operative medication for patients in preparation for a surgical procedure,
- Understand the indications, contraindications, complications and limitations of each medication class.

5.15.1.1 Categories of premedication

- Anxiolytics
- Antisialogogues
- Sedatives
- Aspiration prophylaxis

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- Analgesics
- Prophylactic antibiotics
- Medication for perioperative control of chronic conditions e.g. antihypertensives

5.15.1.2 Impact of pre-medications on the proposed surgical procedure, anaesthetic, and recovery from anaesthesia.

5.15.1.3 Considerations for concurrent diseases, age and organ function,

5.15.1.4 Premedication interactions with chronic medications, anaesthetics, over-the-counter treatments.

5.15.1.5 Premedication in special populations, *inter alia* Psychiatric conditions and substance abuse

5.15.2 Preoperative fasting and reducing the risk of aspiration

5.15.2.1 Rationale and theories of pre-operative fasting

- Gastric volume and pH
- Regurgitation & pulmonary aspiration risk
- Apply fasting guidelines in paediatrics, adults and other special populations, inter alia diabetics, emergencies
- Implications of lack of fasting, impact on anaesthesia and mitigation of risk.
- Quantifying the risk of regurgitation and aspiration.
- Role of gastric ultrasound assessment of gastric emptying
- Risks associated with fasting in both paediatrics and adults
- Applying mechanisms to reduce fasting complications, such as intravenous fluid and electrolyte administration

5.15.2.2 Mechanisms to reduce the risk of aspiration.

- Pharmacological agents
- Use of multiple agents
- Role of rapid sequence induction and its risks and benefits

5.15.3 Consent

Cross reference with DA domain 5.4.3 and domain 6

5.15.3.1 Understand the ethical principles applicable to informed consent.

5.15.3.2 Ensure that relevant risks and benefits are fully disclosed to the patient.

5.15.3.3 Understand capacity with respect to informed consent.

- Assessment of capacity
- Circumstances of limited capacity to provide consent

5.15.3.4 Legalities of consent in South Africa

- Legal age for medical and surgical treatments
- Relevant laws and guidance pertaining to informed consent in South Africa
- Differentiation of requirements for anaesthesia, surgery and research.
- Surrogates or substitute decision makers and the regulations pertaining to such
- Advanced directives and their implications for the provision of anaesthesia.
- Duty to provide the patient with alternatives in instances of refusal to proposed therapies

5.15.4 Preparation of the environment

Cross reference to DA domain 5.4.4 and Domain 1

5.15.4.1 Infrastructure requirements for provision of safe anaesthesia, inter alia:

- Layout of theatre and recovery areas, equipment, lighting, piped gas supplies, and infection and pollution control measures, temperature, and humidity control in operating suites.
- Special considerations for remote theatre sites
- Location of supporting facilities such as the intensive care unit and radiology and plans for safe intrahospital transport.

5.15.4.2 Equipment, medications, consumables

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- Requirements and regulatory safety standards as per South African Society of Anaesthesiologists (SASA) guidelines
- Environmental impact of anaesthetic agents

5.15.4.3 Practitioner safety concerns

- Radiation, MRI equipment and injuries, noise exposure.
- Principles of occupational health and safety, e.g. infection control and sharps policies, and preventing injuries or harm.

5.16 Maintenance and restoration of homeostasis during and after anaesthesia

5.16.1 Conduct a well-planned and co-ordinated anaesthetic

5.16.1.1 Rationale for choices of anaesthesia technique

5.16.2 Role of surgical safety checklists

5.16.3 Standard and advanced intraoperative monitoring

5.16.4 Intraoperative monitoring targets for organ preservation

5.16.5 Principles of organ protection

5.16.6 Role and principles of damage control surgery and anaesthesia in traumatic and nontraumatic contexts

5.16.7 Application of crisis management principles in identification and management of emergent life-threatening intraoperative complications.

- Using a systematic, priority-orientated approach in resuscitation, assessment, investigation and emergency management
- Resuscitations in abnormal patient positions
- Judging which patients to resuscitate
- Decisions regarding the completion of the operation following life-threatening complications.
- Appropriate post-operative management and surveillance of patients.

5.17 Post-anaesthesia care

FCA II candidates should be able to ensure safe patient recovery from anaesthesia, and appropriate placement, monitoring, and surveillance in the post-operative period.

5.17.1 Decisions regarding postoperative placement

5.17.1.1 Pre-operative evaluation to facilitate planning for post-operative placement.

5.17.1.2 Intra-operative course in the decision on post-operative placement

5.17.1.3 Assessment of staffing, monitoring and patient care resources in decisions on postoperative placement.

5.17.1.4 Utility of risk scores for predicting postoperative complications and deterioration, e.g. ASOS risk score, Postop pulmonary complications risk score

5.17.2 Post-anaesthesia care unit (PACU) organisation

5.17.2.1 Physical, staffing, equipment, monitoring and medication requirements

5.17.2.2 Patient management requirements

- Minimum monitoring requirements
- Fluid and electrolyte management with accurate documentation
- Communication regarding the goals of resuscitation and
- Prescriptions and instructions to PACU team
- Appropriately diagnosis, grading and management of acute pain
- Appropriate management of post-operative nausea and vomiting
- Discharge criteria from PACU and use of appropriate scoring systems

5.17.2.3 Identification, management, and prevention of postoperative complications

- Airway

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    - Recognition and treatment of upper airway obstruction, stridor, aspiration, obstructive sleep apnoea
- Respiratory *inter alia*:
    - Laryngospasm and bronchospasm
    - Negative pressure and other types of pulmonary oedema
    - Hypoxemia and hypoventilation
- Cardiovascular *inter alia:*
    - Hypotension and Hypertension
    - Myocardial ischemia/chest pain
    - Brady/tachycardia
    - Dysrhythmias
    - Cardiogenic shock
    - Cardiogenic pulmonary oedema
- Transfusion reactions and complications.
- Pharmacology-related complications
- Anaphylaxis/ allergic reactions
- Sub-optimal analgesia
- Renal
    - Oliguria/Polyuria
    - Assessment of volume status
    - Post-operative renal impairment
    - Bladder distention
    - TURP and Hysteroscopy syndrome
- Neurological
    - Agitation and Delirium
    - Delayed Emergence
    - Decreased level of consciousness
    - Acute cerebrovascular accident (CVA)
    - Post operative blindness
    - Seizures
    - Neuromuscular weakness
- Metabolic
    - Fluid, electrolyte, glucose and acid-base abnormalities
- Thermoregulation abnormalities
    - Post-operative fever
    - Malignant Hyperthermia
    - Hypothermia and shivering
- Postoperative nausea and vomiting (PONV)

5.17.2.4 Effective handovers to staff in PACU or the intensive care unit.

5.17.2.5 Post-operative patient consultation

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5.18 Complications of anaesthesia

5.18.1 Prevent, anticipate, recognise and manage complications timeously.

Comprehensive knowledge of frequent and severe complications related to the provision of anaesthesia including, aetiologies, risks factors, prevention, diagnosis, management and follow-up.

5.18.1.1 Intraoperative complications, *inter alia:*

- Awareness
- Hyper- or hypocarbia
- Dental injury
- Airway injuries

- Pneumothorax
- Intraoperative fires and burns

In addition to list on 5.17.2.3

5.18.1.2 Postoperative complications:

Postoperative complications related to specific types of surgery are listed in domain 7.

As listed in 5.17.2.3

5.18.1.3 Identify and manage complications of regional anaesthesia

Cross reference with domain 4

5.18.1.4 Pharmacological complications of anaesthetic and non-anaesthetic drugs, including:

Cross reference with domain 1

5.18.1.5 Complications related to pharmacogenetic factors that impact anaesthetic agents such as:

Cross reference with domain 1

5.18.1.6 Complications related to fluid and blood/products administration.

Cross reference with domain 1

5.18.1.7 Complications related to monitoring.

- *Inter alia* sepsis, pneumothorax, limb ischaemia

5.18.1.8 Complications related to patient positioning, *inter alia*

- Pressure point, nerve and traction injuries.
- Injuries of the eye and its structures e.g. corneal abrasion post-operative visual loss
- Venous air embolism
- Positions causing inadequate distal perfusion e.g. carotid artery occlusion, compartment syndrome.
- Abnormal positions e.g. Prone, beach chair, lateral positioning
- Risk related to change of positioning during surgery.
- Other specific surgery-related complications that occur intra-operatively

5.18.1.9 Prevention and management peri-operative occupational hazards

- Needle stick injuries.
- Infections: contact and airborne
- environmental exposures e.g. volatiles and laser**,** fire safety, noise pollution, radiation
- Physical and emotional harm e.g. heavy lifting, violent patient, post-traumatic stress disorder
- Fatigue and risk of human errors

5.19 Perioperative care pathways

5.19.1 Emergency and elective scheduling and triage

5.19.2 Enhanced recovery programmes

5.19.3 Anaesthesiology clinics

5.20 Technical skills

As per DA section

5.20.1 Clinical

- Ability to take a history and examine each system meticulously, to diagnose, and assess the severity of the surgical condition and comorbid diseases.
- Conduct an Anaesthetic specific history and examination, interalia assessment of the airway, coagulopathy risk, vascular access sites, regional block sites.
- Ability to appropriately assess surgical and anaesthetic risk and need for standard or escalated intra- and post-operative monitoring and management.

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- Ability to respond accordingly to unexpected clinical emergencies and crises, intra- and postoperatively.
- Ability to conduct emergency drills with perioperative teams in preparation for unforeseen complications.

5.20.2 Organisational

- Establishing a multidisciplinary preoperative evaluation service with surgeons and other relevant disciplines
- Establishing multidisciplinary enhanced recovery programmes
- Organizing the logistics of equipment and competent staff in operating room suites and non-operating room locations, day surgery, ambulatory practice.
- Ability to arrange patient or family meetings to discuss anaesthesia, procedures, therapies, perioperative risks and benefits, consequences of refusal of treatment, and alternatives available to the patient.
- Ability to anticipate likely complications and make pre-operative plans to mitigate risks and reduce the incidence of complications.
- Ability to ensure that the PACU has all necessary resources to provide the appropriate level of post-operative surveillance, monitoring, and management.
- Ability to co-ordinate intra-operative team should a complication arise to allow for timeous intervention.
- Conduct debriefing of the peri-operative team to analyse complication(s) and prevent re-occurrence.
- Perform quality assurance measures including data monitoring to ensure safety, efficiency and cost-effective resource utilisation.

5.20.3 Administrative

- Clearly document clinical findings, assessment, and conclusions during patient evaluation.
- Document multidisciplinary discussions and decisions around patient care choices including opposing views.
- Ability to acquire relevant legal documentation regarding advanced directives.
- Accurately document the pre-operative informed consent process, providing documentation of risks and benefits of proposed anaesthesia, procedures, or therapies
- Ensure clear documentation and communication of pre-medication prescriptions and instructions such as fasting orders for nursing staff, surgical colleagues, and patients.
- Keep contemporaneous anaesthetic records and document anaesthetic and other challenges including adverse medication reactions.
- Document PACU monitoring and status at discharge.
- Document handover to post-operative team and document appropriate therapies and targets.
- Accurately document complications and their management.
- Document debriefing sessions and team discussions
- Document full disclosures to patients of anaesthesia-related complications

5.21 Non-technical skills (NTS)

5.21.1 Leadership/Teamwork:

Lead and co-ordinate the peri-operative team to provide the most appropriate therapy for the patient, considering the need for surgery, concurrent disease states, the environment, and available resources.

5.21.2 Context Awareness:

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- Awareness of the suitability of the surgery considering the co-morbidities and resources.
- Awareness of the patient's vulnerability and emotional status prior to surgery to assess the need for pre-medication and additional support
- Ability to adapt theatre list planning to accommodate specific patient needs e.g. diabetics, paediatric patients.
- Ability to adapt traditional anaesthesia to accommodate limitations whilst still maintaining optimal patient outcomes.
- Be able to assess the suitability of the post-operative location for the patient and adjust, if necessary, with possible escalation of care.

5.21.3 Medical expertise: decision making/Insight:

- Applying insight and expertise to take decisions in various situations and contexts in perioperative care to ensure optimal outcomes.

5.21.4 Communication:

- Establish a rapport with the patient to appropriately reassure, disclose risk, and provide further information and answers to patient concerns.
- Inform patients pre-operatively of complications that may arise because of anaesthesia and ensure that appropriate informed consent has been obtained
- Effective communication with the surgeon and nursing staff during the preoperative preparation.
- Consult patients routinely post-operatively to assess their physiological recovery from anaesthesia or intra-operative complications.
- Ongoing communication of information and updates for any outstanding issues.
- Be aware of South African law with regards to communication with next -of- kin.
- Being mindful of patient rights to privacy of communication.
- Effective communication with hospital managers and allied disciplines to ensure that routine and non-routine locations can provide safe anaesthesia.

5.21.5 Professionalism:

- Appropriate interactions with all members of peri-operative team.
- Ensure that the process of informed consent follows ethical and legal prescripts as prescribed by law, the HPCSA and by the South African Society of Anaesthesiologists.
- Take time to consult with patients post-operatively to gauge their opinions of one's anaesthetic practice, and then self-reflect and –regulate, if necessary.
- Take steps to address deficiencies in relevant technical or non-technical skills based on post-operative patient consultations.
- Ability to be honest and disclose complications that have occurred under anaesthesia.

5.21.6 Collaboration:

- Collaborate with other clinicians and role players to optimize the perioperative care of the patient.

5.21.7 Health Advocate

- Ensure physical, psychological, and emotional needs of the patient are met.
- Encourage health-seeking behaviour to optimize perioperative outcomes
- Advocate for evidence based beneficial interventions such as multidisciplinary perioperative clinics and enhanced recovery programmes
- Ensure patient safety during the entire perioperative journey.
- Advocate for and manage limitations to recovery to premorbid level of functioning and independence, especially in elderly/frail and disabled patients

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5.21.8 Humaneness

- Be mindful of the need to be empathetic, respectful and consider patient diversity in beliefs, religion, circumstances.
- Be sensitive to emotional and psychological stressors of patients.
- Interact with all patients, especially paediatrics, with compassion, empathy and kindness.
- Be aware of clinical situations where patients may be making decisions based on coercion, fear, anxiety, stress or other psychological or emotional factors.
- Be mindful of literacy and language differences in communication of consent elements.
- Endeavor to provide patient-centred care.

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Domain 6: Quality of Practice

Summary

COMPETENCES	DA	FCA I	FCA II	MetComp
Ensure safety, quality and risk management in the practice of Anaesthesia				ME/Sc/HA/Pr/CA
KNOWLEDGE				
Clinical Governance, and Quality Assurance				ME/Sc/HA/Pr/CA
Research and Evidence-based Practice				ME/Sc/HA/CA
Health economics, practice and theatre management including private practice considerations				ME/Sc/HA/Pr/CA
Ethics and Medicolegal issues in the Practice of Anaesthesia				ME/Sc/HA/Pr/CA
Anaesthesia in resource-poor environments and outreach				ME/Sc/HA/Pr/CA
Social determinants of health and outcomes				ME/Sc/HA/Pr/CA
Human performance				ME/Sc/HA/Pr/CA

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DA

6.1 Risk awareness, avoidance & Management

6.1.1 Clinical governance in anaesthetic practice

6.1.2 Patient safety and harm from healthcare delivery, including incidents

6.1.3 Strategies that promote patient safety and address human and system factors, for example:

- WHO Surgical Safety Checklist
- American Society of Anesthesiologists (ASA) classification system
- African Surgical Outcomes Study (ASOS) risk calculator
- Discharge checklists (recovery, etc.)
- SASA practice guidelines

6.2 Anaesthesia in resource-poor environments

6.2.1 Minimum requirements for safe anaesthetic practice in resource-poor facilities (e.g. obstetrics)

6.2.2 ESMOE guidelines and their application in anaesthesia practice

6.2.3 Patient and resources advocacy

6.3 Social determinants of health, patient outcomes and patient advocacy

6.3.1 Awareness of Justice, Equity, Diversity and Inclusion (JEDI) in patient care and collegial relationships

6.3.2 Awareness of the healthcare disparities in different communities

6.3.3 Awareness of patient context and its impact on health and perioperative outcomes, e.g.:

- Access to healthcare and the impact of delayed access on disease progression
- Impact of patient support on discharge safety (e.g. day case surgery)

6.3.4 Advocacy for patient rights in health matters (see also Background)

6.4 Outreach

6.4.1 Telemedicine in anaesthesia

6.4.2 Participate in safe outreach programmes

6.5 Human performance

6.5.1 What constitutes good performance and underperformance

6.5.2 Components of healthcare worker wellness and its impact on anaesthetic safety

6.5.3 Recognition of physician impairment or disability, including substance abuse, fatigue, ageing, visual and auditory impairment in self and others

6.6 Ethics and professionalism of practice

6.6.1 Ethical principles:

- Altruism
- Patient autonomy
- Beneficence
- Non-maleficence
- Fidelity
- Social justice
- Utility

6.6.2 HPCSA ethical guidelines as they apply to anaesthetics practice:

- Booklets 1–16: https://www.hpcsa.co.za/Uploads/professional_practice/ethics

6.6.3 Professionalism and its applications in practice, for example:

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- Duty to oneself on personal health and the maintenance of competence to practice
- Accountability
- Honour and integrity in all conduct, including the generation and use of resources
- Respect for others, including a commitment to teamwork and conflict resolution
- Appropriate response to clinical error
- Respect for confidentiality

6.6.4 SASA practice guidelines: https://www.sasaweb.com/

6.7 Medico-legal issues

6.7.1 Laws of anaesthetic practice in South Africa and their application in the clinical context

6.7.1.1 National Health Act 61 of 2003
6.7.1.2 Occupational Health and Safety Act 85 of 1993
6.7.1.3 Children's Act 38 of 2005
6.7.1.4 Choice on Termination of Pregnancy Act 92 of 1996
6.7.1.5 Mental Health Care Act 17 of 2002
6.7.1.6 Laws of perioperative deaths:
- Definitions of unnatural death
- Inquests Act 58 of 1959
- Health Professions Act 56 of 1974
- Health Professions Amendment Act 29 of 2007
- Births and Deaths Registration Act of 1992

6.7.1.7 Promotion of Access to Information Act 2 of 2000 (PAIA)
6.7.1.8 Protection of Personal Information Act 4 of 2013

6.7.2 Advanced directives in South African anaesthetic practice

6.8 Practice and theatre management

6.8.1 Health infrastructure requirements for anaesthetics (refer also to Domain 1)
6.8.2 Administration and management of own theatre
6.8.3 Differences between private and public sectors
6.8.4 Quality assurance
6.8.5 Ethical, legal and indemnity issues:
- Consent
- Confidentiality
- Critical incident reporting
- Malpractice preparedness
- Record keeping
- Responding to HPCSA complaints

6.9 Health economics

6.9.1 Demographic and resource utilisation data relevant to anaesthesia practice (for planning)
6.9.2 Financial aspects of anaesthesia practice management
6.9.3 Practice planning and budgeting in private practice
6.9.4 Environmental concerns – "green anaesthesia" (also see Domain 1)
6.9.5 Drug cost-effectiveness – direct and indirect implications

6.10 Private practice considerations

6.10.1 Statutory registrations – HPCSA, board of healthcare funders, medical malpractice insurance
6.10.2 Billing practices – rates, codes, accuracy, ethical billing
6.10.3 Patient communication – informed consent and billing contracts

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6.10.4 Remunerative work outside the public service (RWOPS) – ethical application

6.11 Clinical governance and its components in anaesthetic clinical practice

6.11.1 Participation in audit, quality improvement projects, patient safety incidents, monitoring and reporting

6.11.2 Awareness of standards of quality and safety, as per national and international guidelines

6.11.3 Requirements of audit as applied to anaesthetic practice and how to report the findings

6.11.4 Application of Quality Improvement methodologies for analysis of own practice, clinical and health system problems (e.g. perform a root cause analysis) and to devise and implement solutions (e.g. medication errors)

6.11.5 Awareness of limitations of surroundings, resources and need for escalation effective consultations

6.11.6 Safe handover

FCA I

Pharmacology

6.12 Pharmacology

6.12.1 Technicalities and legalities of drug storage, prescribing and off-label use

6.12.2 Section 21 processes

6.12.3 Generics

Physics

6.13 Physics, physical measurement and the anaesthesia environment

(See Domain 1)

6.13.1 Theatre standards

6.13.2 Infection control in theatre, including humidification, air flow, equipment sterilisation

6.13.3 Patient safety:

- Preventing fires in the operating room
- Diathermy burns
- Preventing falls

Basic Research Methodology

6.14 Basic research methodology

6.14.1 Developing a research question

6.14.2 Writing a protocol

6.14.3 Designing a study:

- Study designs
- Hypothesis testing
- Types of error
- Power analysis
- Sampling and data collection
- Types of data
- Accuracy, bias and precision

6.14.4 Ethical requirements for conducting research including informed consent

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6.14.5 Statistical analysis, including:
- Application of statistical tests
- Descriptive and inferential statistics
    - Types of distribution (Gaussian and non-Gaussian)
    - Measures of central tendency – mean, median and mode
    - Measures of dispersion – standard deviation, standard error of the mean
    - Methods of displaying data graphically – histograms, etc.
    - Percentiles
    - Probability and p-values
    - Confidence intervals
    - Hypothesis testing for significance
    - Degrees of freedom, one-tail and two-tail tests
    - Student's t-test
    - Analysis of variance
    - Chi-square test; non-parametric tests (Wilcoxon, Mann-Whitney, Spearman)
    - Correlation and regression
    - Bland-Altman analysis

6.14.6 Define the following statistical terms and concepts and state their differences where appropriate:
- Sensitivity
- Specificity
- Positive predictive value
- Negative predictive value
- Receiver operating characteristic curve
- Incidence
- Prevalence
- Odds ratio
- Relative risk
- Absolute risk
- Number needed to treat (NNT)
- Number needed to harm (NNH)
- Intention-to-treat analysis

6.14.7 Principles of scientific writing

6.14.8 Scientific misconduct

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FCA II

Preceding DA and FCA I sections, in addition:

6.15 Administration and management of a theatre complex

6.15.1 Scheduling and triaging elective and emergency operations

6.15.2 Application of QI methodologies for the analysis and resolution of clinical and health system problems (including theatre utilisation)

6.15.3 Theatre quality indicators

6.15.4 Record keeping, data storage and management

6.16 Principles of evidence-based medicine

6.17 Education and training of staff

6.18 Care bundles in quality healthcare

6.18.1 Sepsis bundles

6.18.2 Crew resource management principles:

- Adaptability/flexibility
- Assertiveness
- Communication
- Decision-making
- Leadership
- Analysis
- Situational awareness

6.19 Human resource management

- Staffing, rostering, performance reviews
- Mentoring
- Team support
- Conflict resolution
- Management of staff involved in patient safety incidents, including debriefing and counselling
- Implementing and monitoring JEDI in patient care and collegial relationships

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Domain 7: Specific Areas of Practice

7.1 Intensive Care

7.2 Anaesthesia for General Surgery

7.3 Anaesthesia for Trauma Surgery

7.4 Anaesthesia for Orthopaedic Surgery (include rheumatology)

7.5 Anaesthesia for Obstetrics & Gynaecology

7.6 Paediatric Anaesthesia

7.7 Anaesthesia for Neurosurgery

7.8 Anaesthesia for Cardiac Surgery

7.9 Anaesthesia for Thoracic Surgery

7.10 Anaesthesia for Vascular Surgery

7.11 Anaesthesia for Head & Neck Surgery

7.12 Anaesthesia for Ophthalmic Surgery

7.13 Anaesthesia for Aesthetic and Reconstructive Surgery (including Burns)

7.14 Anaesthesia for Urological & Renal Surgery

7.15 Anaesthesia for Transplant Surgery

7.16 Pain medicine

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Summary

Aims:

To guide the trainee to acquire expertise in the specific areas of Anaesthetics practice including the following:

General Surgery, Trauma, Orthopaedic Surgery (including rheumatology), Obstetrics & Gynaecology, Paediatric Surgery, Neurosurgery, Cardiac Surgery, Thoracic Surgery, Vascular Surgery, Head & Neck Surgery, Ophthalmic Surgery, Aesthetic and Reconstructive Surgery (including Burns), Urological & Renal Surgery, Transplant Surgery, Critical care and Chronic pain

Knowledge:

Core and additional knowledge to enable patient management in the specific areas of practice, covering: Relevant aspects of basic science principles: physiology, anatomy, pharmacology and physics (equipment, measurement and monitoring) of each of the specific areas of practice.	ME/Sc
Pathophysiology and complications of concurrent diseases and their implications for anaesthesia practice	ME/Sc
Assessment, examination, and appropriate investigation of patients pre-operatively	ME/CA/HA
Pre-operative optimisation	ME/HA
Perioperative care including maintenance and restoration of homeostasis	ME/Sc
Knowledge of critical care principles at a level to manage the post-op surgical patient and to assist the specialist intensivist.	ME/Sc
Advanced, tailored pain management principles: diagnosis, pharmacological and non-pharmacological treatment	ME/Sc/CA/Hu/Le

Skills:

TECHNICAL	
Clinical:	
Clinically assess, diagnose, investigate, manage, monitor and care for patients in the specific areas of practice: General Surgery, Trauma Surgery, Orthopaedic Surgery (include rheumatology), Obstetrics & Gynaecology, Paediatric Surgery, Neurosurgery, Cardiac Surgery, Thoracic Surgery, Vascular Surgery, Head & Neck Surgery, Ophthalmic Surgery, Aesthetic and Reconstructive Surgery (including Burns), Urological & Renal Surgery, Transplant Surgery, critical care and chronic pain	ME/Sc/HA/Cl/Cm/Pr
Appropriate patient selection for type of surgery	ME/HA/CA

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Patient and environmental preparation for the proposed procedure	ME/HA/CA/Le/Cm/Cl
Use of specialised monitoring and equipment to optimally care for the patients	ME
Management of all perioperative complications	ME/CA/Cl /Cm/Pr
Therapeutic interventions	ME/Cl/Cm/Pr
Appropriate post-operative care and placement	ME/Cl/Cm/Hu/CA/HA
Organisational:	
Organising and planning for the routine and the unforeseen eventualities.	ME/CA/Le
Managing a preoperative clinic	Le/HA/Cl/ME/Cm/Pr
Postoperative pain and follow-up service	ME/HA/Le/Cl/Cm/Pr
Multidisciplinary teams for holistic patient care, ERAS pathways	Le/HA/Cl/Cm/Pr
High care and intensive care unit, PACU organisation with appropriate staffing and equipment	Le/HA/Cl/CA
Setting up chronic and acute pain service.	Le/Cl/CA/Pr
Administrative:	
Ensuring documentation of the patients and processes in the operating theatres and ICU is well archived (and POPIA compliant)	Pr/CA
Meticulous completion of Anaesthetic and ICU records	Pr
Monitoring and evaluation for audit purposes	Pr/Le/Cl/Cm
Management of medicolegal documentation eg consent, living wills	Pr
NON-TECHNICAL	
Team leader or team player: Form part of teams (as leader or player) in perioperative space, ICU and other areas of specific practice that will optimise patient outcomes and increase productivity. Identify the specific roles to be played within every team, Be aware of team dynamics and demands and changing roles.	Le/CA/Hu
Situational awareness: Awareness and responsiveness to clinical surroundings; incl. but not exclusive- patient, staff, environment and equipment. Preparedness and foreseeing imminent change of variables within an event. Timeous intervention to prevent complications.	CA
Decision making/Insight:	CA/ME

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Integration of knowledge, skill and having certain attributes to make the correct clinical and organizational decisions. Appropriate decisions in various situations and contexts to ensure optimal outcomes.	
Communication: Ensure appropriate patient counselling and disclosures, effective consultations, safe handover, and optimal peri-operative care in these specific areas of practice, including the intensive care unit and the acute and chronic pain clinics Effective communication with colleagues Communication with next-of kin, being cognisant of confidentiality	Cm/Hu
Professionalism: Appropriate interactions with all members of peri-operative team.	Pr
Collaboration: Collaborate with other clinicians, nursing teams and patient and patient's kin to ensure that the patient is managed appropriately during the peri-operative period.	Cl

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7.1 Intensive Care Medicine

COMPETENCES	DA	FCA I	FCA II	MetComp
Ensure specialist anaesthetists can provide safe care and continuing management of patients presenting with medical and surgical illness and procedural or anaesthetic complications that require critical care				All
Manage the ongoing resuscitation and stabilisation of patients who require transfer to an intensive care unit (ICU) or more specialised ICUs				All
Provide continued high-quality management during anaesthesia of critically ill patients through surgical or procedural interventions				All
Contextually, with the relative deficiency of intensive care specialists and resources to provide care to all, provide basic high-quality intensive care and oversight in peripheral adult ICUs, preferably in consultation with critical care specialists				All
Manage the resuscitation, stabilisation, referral and transport of critically ill children				All
KNOWLEDGE				
Assess and define clinical problems in the critically ill patient and develop and facilitate diagnostic and management plans				Sc/HA/CA`
Apply knowledge acquired through other domains of the curriculum in all clinical disciplines to the management of critically ill patients				All
Demonstrate knowledge of a basic understanding of the management of an ICU, including but not limited to professional practice, triage, team-based care, communication, ICU planning and electricity, equipment and gas supply troubleshooting				All

Please note that the aims and knowledge for domain 7.1 do not expect the specialist anaesthetist to qualify with the same understanding of complex intensive care medicine expected of a critical care specialist but rather enable the foundation to achieve the aims of this subdomain and for those wishing to gain further experience and skills in intensive care.

The level of knowledge, skills and expertise expected of practitioners with the DA or registrars-in-training will be commensurate with their level of experience.

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Summary

Domain 7.1 will explore the following:

General intensive care unit (ICU) issues

7.1.1 General considerations for admission to the ICU

7.1.2 Supportive care of the critically ill patient

7.1.3 Nutrition, fluid and electrolyte support

7.1.4 Sepsis and multi-organ dysfunction

7.1.5 General critical care complications

Specific systems and disorders

7.1.6 Acute circulatory failure and cardiac disorders

7.1.7 Respiratory failure and intensive care support for respiratory disorders

7.1.8 Renal, fluid and electrolyte disorders

7.1.9 Metabolic and endocrine disorders

7.1.10 Neurological and neuromuscular disorders

7.1.11 Severe trauma

7.1.12 Intensive care of the obstetric patient

7.1.13 Haematological, rheumatological and oncological disorders

7.1.14 Gastrointestinal (GI) disorders

7.1.15 Infectious disorders

7.1.16 Management of poisoning and drug-related complications

7.1.17 Postoperative care

7.1.18 Ethical considerations in the intensive care setting

Skills

Technical skills: Clinical

7.1.19 Patient assessment and resuscitation

7.1.20 Supportive care of critically ill patients

7.1.21 Respiratory system – recognition, assessment and management of pathophysiology

7.1.22 Cardiovascular system – recognition, assessment and management of acute circulatory problems

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7.1.23 Neurological system – recognition, assessment and management of pathophysiology

7.1.24 Metabolic and nutrition management

7.1.25 GI system – recognition, assessment and treatment of GI crises

7.1.26 Haematological system – recognition, assessment and treatment of pathophysiology

7.1.27 Renal system – recognition, assessment and basic management of pathophysiology

7.1.28 Infection – recognition, assessment and basic management of pathophysiology

7.1.29 Trauma management

7.1.30 Monitoring and life support devices

7.1.31 Pharmacology

Technical skills: Organisational

7.1.32 Patient assessment, resuscitation and admission to the ICU

7.1.33 ICU curation and monitoring of the critically ill patient

Technical skills: Administrative

7.1.34 Administrative patient professional requirements

7.1.35 Administrative ICU requirements

Non-technical skills in the ICU setting

7.1.36 Leadership

7.1.37 Context awareness

7.1.38 Communication

7.1.39 Collaboration

7.1.40 Health advocate

7.1.41 Humaneness

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DA

Knowledge

GENERAL ICU ISSUES

7.1.1 General considerations for admission to the ICU

7.1.1.1 Triage and admission to an intensive care setting:

- Principles of triage

7.1.1.2 Standard precautions as applied to critically ill patients

7.1.1.3 Importance of setting therapeutic goals for admission to intensive care

7.1.1.4 Principles of safe intra- and inter-hospital transfer of critically ill patients (transport)

7.1.2 Supportive care of the critically ill patient

7.1.2.1 Airway management:

- Airway management principles in the critically ill patient

7.1.2.2 Mechanical ventilation:

- Physiology of oxygen therapy and mechanical ventilation and its use in critical care, its indications, contraindications and side effects
- Investigation and management of patients with respiratory failure
- Methods of and indications for providing ventilator assistance in respiratory failure
- Advantages, disadvantages, indications and contraindications of high-flow nasal oxygen (HFNO), non-invasive and invasive positive pressure ventilation
    - Ventilation strategies and non-ventilator therapies to optimise oxygenation and ventilation and minimise lung injury
    - Initiation of non-invasive ventilation (NIV) and management of patients receiving NIV in the intensive care setting
    - Roles and selection of different modes of ventilation, including but not limited to continuous mandatory ventilation, volume control modes, pressure control modes, synchronised intermittent mandatory ventilation, pressure support, continuous positive airway pressure (CPAP)
    - Haemodynamic effects of positive pressure ventilation (heart-lung interactions)
    - Interpret and use blood gas analysis to guide respiratory support
    - Ventilator graphics (pressure, flow, volume, loops)

7.1.2.3 Vasoactive agents (inotropes, vasopressors, vasodilators):

- Indications
- Relevant pharmacology in critically ill patients
- Effects and endpoints for the use of vasoactive agents

7.1.2.4 Pharmacology in intensive care:

- Commonly used medications in critical care, including altered pharmacokinetics in organ failure
- Principles of antibiotic use:
    - Indications, mechanisms of action, adverse effects and resistance
    - Adverse effects of antimicrobial agents in the critically ill patient
    - Antimicrobial stewardship, empirical and directed antimicrobial therapy
    - Implications of organ dysfunction/failure for antibiotic prescribing and efficacy
- Principles of sedation and analgesia:
    - Provision and assessment of analgesia and sedation for critically ill patients
    - Sedation procedures in the ICU
- Muscle relaxants/paralysis:
    - Monitoring for muscle relaxation

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7.1.3 Nutrition, fluid and electrolyte support

7.1.3.1 The principles of fluid management
7.1.3.2 The metabolic response to critical illness and starvation
7.1.3.4 Adverse consequences of malnutrition, dehydration and fluid overload
7.1.3.5 Glycaemic control in the critically ill

7.1.4 Sepsis and multi-organ dysfunction

7.1.4.1 Be able to define sepsis and its severity:
- Pathophysiology of sepsis and septic shock

7.1.4.2 Sepsis management, including Surviving Sepsis Campaign guidelines
7.1.4.3 Community versus healthcare-associated infections

7.1.5 General critical care complications

7.1.5.1 Healthcare-associated infection
7.1.5.2 Thromboembolic disease
7.1.5.3 Stress ulceration
7.1.5.4 Pressure-related injuries

SPECIFIC SYSTEMS AND DISORDERS

7.1.6 Acute circulatory failure and cardiac disorders

7.1.6.1 Pathophysiology, causes, classification and management of shock
7.1.6.2 Monitoring in the management of shock:
- Indicators of tissue oxygenation
- Role of blood gas analysis

7.1.6.3 Causes of cardiorespiratory arrest and the effects on physiological systems
7.1.6.4 Advanced Cardiac Life Support (ACLS) guidelines
7.1.6.5 Post-cardiac arrest care
7.1.6.6 Management of cardiac Dysrhythmias
7.1.6.7 Use of vasopressors, inotropic and lusitropic agents
7.1.6.8 Investigation and management of patients with acute circulatory failure in the following categories:
- Valvular heart disease
- Endocarditis, myocarditis and pericarditis
- Pulmonary embolic disorders, including pulmonary thromboembolism, fat embolism, amniotic fluid embolism and air embolism
- Anaphylaxis
- Congestive cardiac failure
- Ischaemic heart disease and myocardial infarction (see below)
- Myocardial contusion

7.1.6.11 Acute coronary syndromes
7.1.6.12 Diagnosis of ischaemic heart disease and myocardial infarction:
- Optimise oxygen supply and demand balance in the heart
- Principles of management of acute myocardial infarction: ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI), including thrombolysis, angioplasty, stenting, pacing and surgery
- Medical management of NSTEMI
- Immediate, late and long-term effects of acute myocardial infarction

7.1.6.13 Causes of hypertension and management in the critically ill patient, including:
- Differential diagnosis, including phaeochromocytoma, thyroid storm, renal failure and neuroleptic malignant syndrome
- Pharmacology and appropriate use of antihypertensive agents
- Diagnosis and management of a hypertensive crisis

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7.1.6.14 ACLS guidelines for the management of Dysrhythmias, including:

- Asystole
- Atrial flutter and fibrillation
- Atrioventricular (AV) block
- Other supraventricular tachycardias
- Pulseless electrical activity of symptomatic bradycardia
- Ventricular tachycardia and ventricular defibrillation
- Wolff-Parkinson-White re-entry tachycardia

7.1.7 Respiratory failure and intensive care support for respiratory disorders

7.1.7.1 Define respiratory failure and differentiate between various types

7.1.7.2 The differences between acute and chronic respiratory failure and the implications for management

7.1.7.3 Appropriate use and interpretation of blood gas analysis, chest X-ray (CXR) and pulmonary function tests in respiratory failure

7.1.7.4 Resuscitative management of patients in respiratory arrest

7.1.7.5 Pathophysiology of acute lung injury (ALI) and ARDS

7.1.7.6 Management of pneumonia in the intensive care setting

7.1.7.7 Pathophysiology and management of the following pulmonary disorders:

- Pulmonary oedema (cardiogenic, non-cardiogenic, ARDS)
- Fat embolism syndrome
- Acute severe asthma
- Acute exacerbations of chronic obstructive pulmonary disease (COPD)

7.1.7.11 Diagnosis and management of specific airway and respiratory disorders encountered in anaesthesia often requiring ICU admission:

- Airway obstruction
- Airway stenosis and tracheomalacia
- Aspiration syndromes
- Pneumothorax and tension pneumothorax

7.1.8 Renal, fluid and electrolyte disorders

7.1.8.1 Definition, classification, pathophysiology, investigation and management of acute and chronic renal failure

7.1.8.2 Strategies to prevent acute kidney injury the perioperative setting

7.1.8.3 Causes of acute kidney injury, including contrast-induced nephropathy, rhabdomyolysis and their management

7.1.8.4 Implication of renal failure on drug pharmacokinetics

7.1.8.5 Haemodialysis use in the intensive care setting

7.1.8.6 Approach to the perioperative management of fluids and blood products to optimise medical and surgical outcomes

7.1.8.7 Options for fluid replacement in the critical care setting

7.1.8.8 Aetiology, diagnosis and management of fluid and electrolyte disturbances in the critically ill patient

7.1.8.9 Clinical management of acid-base disturbances in critically ill patients

7.1.9 Metabolic and endocrine disorders

7.1.9.1 Metabolic response to critical illness, stress, sepsis, starvation, surgery and trauma

7.1.9.3 Lactic acidosis

7.1.9.4 Management of severe hypo- and hyperthermia

7.1.9.5 Management of malignant hyperthermia

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7.1.9.6 Management of endocrine emergencies including thyroid storm, adrenocortical insufficiency (Addison's disease, Conn's and Cushing syndromes), complications of steroid therapy, diabetic ketoacidosis and hyperglycaemic nonketotic coma

7.1.10 Neurological and neuromuscular disorders

7.1.10.1 The determinants and control of intracranial and intraspinal pressure, cerebral blood flow and spinal cord perfusion

7.1.10.2 Pathophysiology, investigation and management of delirium in the ICU

7.1.10.3 Management of neurological deterioration due to ischaemic and haemorrhagic stroke and subarachnoid haemorrhage

7.1.10.4 Causes, pathogenesis and intensive care management of cerebral oedema, raised intracranial pressure, traumatic brain injury, prolonged seizures and acute spinal cord injury

7.1.10.5 Investigation and management of ICU patients who emerge with neurological impairment

7.1.11 Severe trauma

7.1.11.1 Effects of severe trauma on organs and organ systems

7.1.11.2 Principles of resuscitation and damage control in the management of severe trauma

7.1.11.3 Principles of the early management of severe trauma and the advantages of an organised team approach

7.1.11.4 Principles of the safe transfer of injured children and adults and portable monitoring and supportive systems

7.1.11.5 Management of trauma patients, including but not limited to:

- Principles of Advanced Trauma Life Support (ATLS)
- Hypovolaemia, coagulopathy, massive blood transfusion, hypothermia
- Blunt and penetrating injury
- Management of maxillofacial and airway injuries, including technique of cricothyroidotomy
- Management of neurotrauma and acute spinal cord injury, including:
  - Head injury and Glasgow Coma Scale (GCS)
  - Cervical spine injuries
  - Spinal shock
- Thoracic trauma; pneumothorax and tension pneumothorax
- Abdominal trauma and abdominal compartment syndrome
- Pelvic injuries
- Long bone trauma
- Crush injury
- Environmental injuries
- Electrocution, burns, near-drowning, envenomation, drug overdose, corrosive ingestion, altitude sickness and decompression syndromes

7.1.12 Intensive care of the obstetric patient

7.1.12.1 The differences in basic and advanced life support of the pregnant patient, including cardiac arrest

7.1.12.2 Intensive care management of preeclampsia, eclampsia, haemolysis and elevated liver enzymes and low platelets (HELLP) syndrome

7.1.12.3 Peri- (placental abruption, uterine rupture) and postpartum haemorrhage and amniotic fluid embolism

7.1.12.4 Postpartum sepsis

7.1.12.5 Thromboembolic disease in pregnancy

7.1.12.6 Trauma during pregnancy

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7.1.13 Haematological, rheumatological and oncological disorders

7.1.13.1 Defects in haemostasis, including disseminated intravascular coagulation (DIC) and hypercoagulability syndromes

7.1.13.2 Anaemia and thrombocytopaenia in intensive care

7.1.13.3 Rational use of blood products in the intensive care setting

7.1.13.4 Investigation and management of transfusion reactions

7.1.13.5 Appropriate use of anticoagulants in patients in the intensive care setting, including prevention and management of venous and arterial thrombosis and thromboembolism

7.1.14 Gastrointestinal disorders

7.1.14.1 Aspiration prevention and management

7.1.14.2 Post-major abdominal surgery

7.1.14.3 Prevention of stress ulceration in the intensive care setting

7.1.14.4 Differential diagnosis and management of life-threatening upper and lower GI haemorrhage

7.1.14.5 Diagnosis and management of the patient with life-threatening abdominal conditions, including peritonitis and abdominal sepsis, abdominal compartment syndrome, ischaemic, perforated or obstructed GI tract and major abdominal trauma

7.1.15 Infectious disorders

7.1.15.1 Antibiotic therapy and timing

7.1.15.2 Tapering, escalation and de-escalation of antibiotic therapy

7.1.15.3 Infection prevention and control (IPC) as it relates to patients and health workers in the intensive care setting

7.1.16 Management of poisoning and drug-related complications

7.1.16.1 Physiological consequences and management of patients after common poisonings, drug overdoses, severe drug reactions and exposure to agents used in bioterrorism, including:

- Benzodiazepines
- Beta blockers
- Calcium-channel blockers
- Carbon monoxide poisoning
- Corrosive substance ingestion
- Digitalis toxicity
- Opiates
- Organophosphate poisoning
- Paracetamol

7.1.16.2 Diagnosis and management of idiosyncratic/drug reactions, including:

- Malignant hyperthermia
- Serotonin syndrome

7.1.16.3 Anaphylactic and anaphylactoid reactions

7.1.16.4 Drug addiction and withdrawal syndromes and their associated complications in the ICU

7.1.17 Postoperative care

7.1.17.1 Critical care management after major surgical procedures, including:

- Trauma
- Obstetrics

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7.1.18 Ethical considerations in the intensive care setting

7.1.18.1 Patient confidentiality and privacy legislation
7.1.18.2 Patient autonomy
7.1.18.3 Principles of informed consent and decision-making
7.1.18.4 Consent/refusal related to ventilation, critical and procedural care, drug treatment, blood and blood products
7.1.18.5 Next of kin designation
7.1.18.6 End-of-life decision-making
7.1.18.7 Organ procurement for transplantation
7.1.18.8 Management and review of adverse events
7.1.18.9 Communication with families in crisis
7.1.18.10 Cultural aspects/consideration in critical care

Skills

TECHNICAL SKILLS: CLINICAL

7.1.19 Patient assessment and resuscitation

7.1.19.1 Accurate and efficient assessment of life-threatening problems in a critically ill patient
7.1.19.2 Undertake and provide emergency management of critically ill patients, including basic and advanced life support (including primary and secondary surveys)

7.1.20 Supportive care of critically ill patients

7.1.20.1 Vasoactive therapy:

- Recognise when to use inotrope, vasopressor and vasodilator therapy
- Timing and use of appropriate agent, dose, clinical endpoint and route of administration
- Review of the efficacy of vasoactive therapy at regular intervals

7.1.20.2 Real-time monitoring (and interpretation thereof) and retrospective review of patient vital organ systems in the intensive care setting

7.1.21 Respiratory system – recognition, assessment and management of pathophysiology

7.1.21.1 Airway:

- Intubation (oral, nasotracheal) and maintenance of the airway (ME, S, Com)
- Initiating and following a difficult airway algorithm and application of skills thereto, including cricothyroidotomy and the principles of percutaneous tracheotomy

7.1.21.2 Ventilation/oxygenation:

- Oxygen therapy and humidification
- Bag mask ventilation
- Mask ventilation – CPAP and NIV
- Invasive ventilation – establishment, selection of appropriate modes, assessment of adequacy, troubleshooting desynchrony, weaning, extubation, graphics interpretation and complications

7.1.21.3 Diagnosis and management of pneumothorax
7.1.21.4 Interpretation of blood gases (arterial, mixed venous)
7.1.21.5 Basic interpretation of bedside CXR
7.1.21.6 Performance of bedside pulmonary function tests and assessment of pulmonary mechanics

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7.1.22 Cardiovascular system – recognition, assessment and management of acute circulatory problems

7.1.22.1 ACLS
7.1.22.2 Assessment and treatment of electrocardiogram (ECG) and accompanying clinical abnormalities and rhythm disturbances
7.1.22.3 Insertion of monitoring lines (arterial, venous, right heart, pulmonary arterial)
7.1.22.4 Measurement of indices made possible using these devices, e.g. central venous pressure (CVP), cardiac output, and echocardiography
7.1.22.5 Application of cardiac output monitors, including flow and Doppler-type monitors
7.1.22.6 Cardioversion (electrical and medical) and defibrillation
7.1.22.7 Transcutaneous and transvenous pacing
7.1.22.8 Application of ultrasound and echocardiography related to the assessment of the cardiovascular system

7.1.23 Neurological system – recognition, assessment and management of pathophysiology

7.1.23.1 Assessment of levels of sedation and analgesia in critically ill patients
7.1.23.2 Lumbar puncture
7.1.23.3 Maintenance of cerebral perfusion pressure and intracranial pressure monitoring
7.1.23.4 Management principles of head injury
7.1.23.5 Use and basic interpretation of neurological function and cerebral perfusion monitors (e.g. electroencephalogram, brainstem auditory evoked potential)
7.1.23.6 Basic interpretation of brain computed tomography (CT) scan
7.1.23.7 Monitoring of levels of neuromuscular blockade
7.1.23.8 Epidural anaesthesia implementation and management
7.1.23.9 Local and regional anaesthesia

7.1.24 Metabolic and nutrition management

7.1.24.1 Assessment of intravascular volume status and implementation and management of fluid therapy
7.1.24.2 Interpretation and management of acid-base abnormalities
7.1.24.3 Interpretation of blood and urine electrolytes and management of electrolyte disorders
7.1.24.4 Management of hypo- and hyperthermia

7.1.25 GI system – recognition, assessment and treatment of GI crises

7.1.25.1 Insertion of nasogastric tube/enteral feeding device
7.1.25.2 Implementation of stress ulcer prophylaxis

7.1.26 Haematological system – recognition, assessment and treatment of pathophysiology

7.1.26.1 Implementation and control of anticoagulant and fibrinolytic treatment
7.1.26.2 Utilisation of blood component therapy and synthetic colloids
7.1.26.3 Management of massive blood transfusion

7.1.27 Renal system – recognition, assessment and basic management of pathophysiology

7.1.27.1 Establishment of a fluid and electrolyte balance plan
7.1.27.2 Understanding indications for and principles of continuous renal replacement therapy

7.1.28 Infection – recognition, assessment and basic management of pathophysiology

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7.1.28.1 Appropriate and sterile collection/sampling of sites (blood and other sites) and interpretation of lab reports
7.1.28.2 Use of aseptic techniques and prevention of nosocomial infection
7.1.28.3 Management of wounds and drains in critically ill patients

7.1.29 Trauma management
7.1.29.1 Primary and secondary surveys – ATLS
7.1.29.2 Recognition and management of spinal cord injury
7.1.29.3 Initial management and stabilisation of burns and trauma patients
7.1.29.4 Temporary immobilisation of fractures

7.1.30 Monitoring and life support devices
7.1.30.1 Utilisation, zeroing and calibration of transducers
7.1.30.2 Use of monitoring equipment
7.1.30.3 Assessment and interrogation of the reliability of measured data
7.1.30.4 Operation of ventilators and other oxygen delivery devices
7.1.30.5 Operation of defibrillators, cardioversion devices and temporary pacemakers
7.1.30.6 Troubleshooting equipment, electricity supply and gas supply

7.1.31 Pharmacology
7.1.31.1 Implementation and control of adequate sedation and analgesia
7.1.31.2 Knowledge, selection and application of medications individualised to critically ill patients (with and without renal and hepatic impairment)
7.1.31.3 Appropriate use and management of muscle relaxants

TECHNICAL SKILLS: ORGANISATIONAL

7.1.32 Patient assessment, resuscitation and admission to the ICU
7.1.32.1 Apply principles of triage acutely (who and who not to resuscitate
7.1.32.2 Judge and apply the priorities of immediate resuscitation on a per-patient basis
7.1.32.3 Enabling supportive intensive care within the team
7.1.32.4 Institute an appropriate plan for the general care of the critically ill patient, including nutritional support, GI care (oral care, bowel care), pressure and skin care, eye care and maintenance of mobility and muscle strength

TECHNICAL SKILLS: ADMINISTRATIVE

7.1.33 Administrative patient professional requirements:

- Clearly document patient information, including but not limited to presenting problems, management plans and progress
- Generate a list of differential diagnoses and priorities in investigations
- Manage medicolegal documentation on a per-patient basis (e.g. living will, consent)
- Ensure all patients discharged are transferred with appropriate documentation, referral letters and discharge summaries enabling their ongoing quality care

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7.1.34 Administrative ICU requirements:

- Ensure relatives of patients who demise receive appropriate and timeous access to administrative documentation required for their civil, cultural and religious obligations

Non-technical skills

All NTS applicable, in specific application:

7.1.35 Leadership:

- Participating in a ward round in the ICU
- Coordinating the transfer of a patient to or from the ICU
- Resource assessment and allocation (context-specific triage)

7.1.36 Communication:

- Ensure appropriate patient and family counselling and disclosures, effective consultations, safe handover and optimal care in the intensive care setting
- Develop and ensure practical application of informed consent and decision-making for patients and next of kin in the intensive care setting
- Effective and consistent communication with patients and next of kin, including a shared plan of care, being cognisant of professional rules of practice and the Protection of Personal Information Act (POPI Act)
- Provision of, or arranging the provision of, psychosocial support that may be necessary for patients and next of kin
- Communicating effectively with the intubated patient
- Effective communication during a crisis in the facility, intensive care setting or during a resuscitation
- Effective communication with colleagues, the ICU team and with colleagues and departments that interact with and integrate with patient care requirements in the intensive care setting
- Effective communication regarding end-of-life decision-making and care within the team and with patient relatives (e.g. withholding/withdrawing therapy, organ donation)

7.1.37 Collaboration:

- End-of-life decision-making within the team and with patient relatives
- Participate in quality assurance processes in the intensive care setting (e.g. monitoring hospital-acquired infections and patient outcomes)
- End-of-life decision-making within the team and with patient relatives (e.g. withholding/withdrawing therapy, organ donation)

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Knowledge

GENERAL ICU ISSUES

7.1.2 General considerations for admission to the ICU

7.1.2.1 Triage and admission to an intensive care setting:

- Principles of triage
- Critical care resource allocation
- Scoring systems to assess the severity of illness

7.1.2.2 Standard precautions as applied to critically ill patients

7.1.1.3 Importance of setting therapeutic goals for admission to intensive care

7.1.1.4 Medical ethics and personal ethical considerations related to end-of-life decisions and care, conflicting resource needs informing triage, social and distributive justice.

7.1.1.5 Principles of safe intra- and inter-hospital transfer of critically ill patients (transport)

7.1.2 Supportive care of the critically ill patient

7.1.2.1 Airway management:

- Airway management principles in the critically ill patient
- Indications, contraindications, timing and subsequent management of tracheotomies, percutaneous tracheotomies (including the procedure), including common complications in the critically ill patient
- Assessment and management of extubation in ICU patients who have been intubated for airway obstruction (e.g. Ludwig's angina, epiglottitis, angioneurotic oedema)

7.1.3.2 Mechanical ventilation:

- Physiology of oxygen therapy and mechanical ventilation and its use in critical care, its indications, contraindications and side effects
- Investigation and management of patients with respiratory failure
- Methods of and indications for providing ventilator assistance in respiratory failure
- Initiation of ventilation and management of patients on ventilators in the intensive care setting
- Advantages, disadvantages, indications and contraindications of high-flow nasal oxygen (HFNO), non-invasive and invasive positive pressure ventilation
    - Ventilation strategies and non-ventilator therapies to optimise oxygenation and ventilation and minimise lung injury
    - Initiation of non-invasive ventilation (NIV) and management of patients receiving NIV in the intensive care setting
    - Roles and selection of different modes of ventilation, including but not limited to continuous mandatory ventilation, volume control modes, pressure control modes, synchronised intermittent mandatory ventilation, pressure support, *inverse ratio ventilation, continuous positive airway pressure (CPAP), bilevel/airway pressure release ventilation and high-frequency oscillation
    - Complications of ventilation and the strategies to minimise ventilator-induced lung injury, including the ventilation of acute respiratory distress syndrome (ARDS) patients
    - Haemodynamic effects of positive pressure ventilation (heart-lung interactions)
    - Pathophysiology of and approach to the management of patient-ventilator dyssynchrony
    - Interpret and use blood gas analysis to guide respiratory support
    - Ventilator graphics (pressure, flow, volume, loops)

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- Decisions to wean ventilation, strategies for weaning patients from ventilator support and assessment of success
- Deliberate indications for the use of extracorporeal membrane oxygenation (ECMO) in respiratory failure and the principles of its delivery

7.1.3.3 Vasoactive agents (inotropes, vasopressors, vasodilators):

- Indications
- Relevant pharmacology in critically ill patients
- Effects of critical illness and concomitant therapies on receptor function
- Effects and endpoints for the use of vasoactive agents

7.1.3.4 Pharmacology in intensive care:

- Commonly used medications in critical care, including altered pharmacokinetics in organ failure
- Principles of antibiotic use:
  - Antimicrobial classification according to the mode of action and spectrum of activity
  - Indications, mechanisms of action, adverse effects and resistance
  - Adverse effects of antimicrobial agents in the critically ill patient
  - Antimicrobial stewardship, empirical and directed antimicrobial therapy
  - Implications of organ dysfunction/failure for antibiotic prescribing and efficacy
- Principles of sedation and analgesia:
  - Provision and assessment of analgesia and sedation for critically ill patients
  - Sedation procedures in the ICU
  - Effect of critical illness on the pharmacokinetics and pharmacodynamics of sedative and analgesic agents
  - Impact of organ dysfunction and critical illness on the efficacy of analgesia and sedation
  - Weaning protocols of sedative and analgesic agents and strategies to prevent withdrawal phenomena
- Muscle relaxants/paralysis:
  - Indications for and contraindications to the use of neuromuscular blockade and pharmacology of neuromuscular blocking drugs
  - Complications of the use of neuromuscular blockade
  - Monitoring for muscle relaxation

7.1.4 Nutrition, fluid and electrolyte support

7.1.3.3 The principles of fluid management
7.1.3.4 The metabolic response to critical illness and starvation
7.1.3.5 The principles of nutrition and malnutrition in critically ill patients, including the estimation of nutritional requirements
7.1.4.4 Principles of enteral and parenteral nutrition
7.1.4.5 Complications associated with enteral and parenteral nutritional support
7.1.4.6 Adverse consequences of malnutrition, dehydration and fluid overload
7.1.4.7 Glycaemic control in the critically ill

7.1.5 Sepsis and multi-organ dysfunction

7.1.4.1 Be able to define sepsis and its severity:

- Pathophysiology of sepsis and septic shock
- Mechanisms of organ dysfunction in the septic patient
- Ways to investigate and manage the septic patient

7.1.4.4 Sepsis management, including Surviving Sepsis Campaign guidelines
7.1.4.5 Community versus healthcare-associated infections

7.1.5 General critical care complications

7.1.6.1 Healthcare-associated infection

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7.1.6.2 Thromboembolic disease
7.1.6.3 Stress ulceration
7.1.6.4 Pressure-related injuries
7.1.6.5 The long-term complications of prolonged intensive care admission

SPECIFIC SYSTEMS AND DISORDERS

7.1.7 Acute circulatory failure and cardiac disorders

7.1.6.1 Pathophysiology, causes, classification and management of shock
7.1.6.3 Monitoring in the management of shock:

- Indicators of tissue oxygenation
- Role of blood gas analysis
- Cardiac output monitoring and optimisation of fluid therapy

7.1.6.9 Causes of cardiorespiratory arrest and the effects on physiological systems
7.1.6.10 Advanced Cardiac Life Support (ACLS) guidelines
7.1.6.11 Post-cardiac arrest care
7.1.6.12 Management of cardiac Dysrhythmias
7.1.6.13 Indications for and principles of use of intra-aortic balloon pumps and ventricular assist devices in the intensive care setting
7.1.6.14 Use of vasopressors, inotropic and lusitropic agents
7.1.6.15 Investigation and management of patients with acute circulatory failure in the following categories:

- Valvular heart disease
- Endocarditis, myocarditis and pericarditis
- Pulmonary embolic disorders, including pulmonary thromboembolism, fat embolism, amniotic fluid embolism and air embolism
- Anaphylaxis
- Congestive cardiac failure
- Ischaemic heart disease and myocardial infarction (see below)
- Myocardial contusion

7.1.6.10 Investigation and management of traumatic aortic injury and acute thoracic aortic dissection
7.1.6.11 Acute coronary syndromes
7.1.6.12 Diagnosis of ischaemic heart disease and myocardial infarction:

- Optimise oxygen supply and demand balance in the heart
- Principles of management of acute myocardial infarction: ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI), including thrombolysis, angioplasty, stenting, pacing and surgery
- Medical management of NSTEMI
- Indications for transvenous pacemaker, right heart catheterisation, angiography, echocardiography and interpretation of the results
- Immediate, late and long-term effects of acute myocardial infarction
- Troponin leak implications

7.1.6.13 Causes of hypertension and management in the critically ill patient, including:

- Differential diagnosis, including phaeochromocytoma, thyroid storm, renal failure and neuroleptic malignant syndrome
- Pharmacology and appropriate use of antihypertensive agents
- Diagnosis and management of a hypertensive crisis

7.1.6.14 ACLS guidelines for the management of Dysrhythmias, including:

- Asystole
- Atrial flutter and fibrillation
- Atrioventricular (AV) block
- Other supraventricular tachycardias
- Pulseless electrical activity of symptomatic bradycardia

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- Ventricular tachycardia and ventricular defibrillation
- Wolff-Parkinson-White re-entry tachycardia

7.1.7 Respiratory failure and intensive care support for respiratory disorders

7.1.7.1 Define respiratory failure and differentiate between various types

7.1.8.2 The differences between acute and chronic respiratory failure and the implications for management

7.1.8.3 Appropriate use and interpretation of blood gas analysis, chest X-ray (CXR) and pulmonary function tests in respiratory failure

7.1.8.4 Resuscitative management of patients in respiratory arrest

7.1.8.5 Pathophysiology of acute lung injury (ALI) and ARDS and their intensive care management

7.1.8.6 Management of pneumonia in the intensive care setting

7.1.8.7 Prevention and management of ventilator-associated pneumonia (VAP)

7.1.8.8 Pathophysiology and management of the following pulmonary disorders:

- Pulmonary oedema (cardiogenic, non-cardiogenic, ARDS)
- Fat embolism syndrome
- Acute severe asthma
- Acute exacerbations of chronic obstructive pulmonary disease (COPD)

7.1.8.9 The issues associated with long-term ventilation of patients with chronic neuromuscular disorders and factors important in deciding to initiate assisted ventilation in these patients

7.1.8.10 Principles of management of bronchopleural fistula

7.1.7.11 Diagnosis and management of specific airway and respiratory disorders encountered in anaesthesia often requiring ICU admission:

- Airway obstruction
- Airway stenosis and tracheomalacia
- Aspiration syndromes
- Pneumothorax and tension pneumothorax

7.1.9 Renal, fluid and electrolyte disorders

7.1.8.1 Definition, classification, pathophysiology, investigation and management of acute and chronic renal failure

7.1.9.2 Strategies to prevent acute kidney injury in the critically ill patient and the perioperative setting

7.1.9.3 Causes of acute kidney injury, including contrast-induced nephropathy, rhabdomyolysis and their management

7.1.9.4 Implication of renal failure on drug pharmacokinetics

7.1.9.5 Principles of renal replacement therapy (indications, different modalities, goals, assessment of efficacy) and complications in the intensive care setting

7.1.9.6 Haemodialysis use in the intensive care setting including indications related to poisoning/ingestion and other metabolic abnormalities

7.1.9.7 Approach to the perioperative management of fluids and blood products to optimise medical and surgical outcomes

7.1.9.8 Options for fluid replacement in the critical care setting

7.1.9.9 Aetiology, diagnosis and management of fluid and electrolyte disturbances in the critically ill patient

7.1.8.10 Clinical management of acid-base disturbances in critically ill patients

7.1.8.11 Principles of postoperative care of the renal transplant recipient

7.1.8.12 Pathophysiology and management of hepatorenal syndrome

7.1.10 Metabolic and endocrine disorders

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7.1.9.2 Metabolic response to critical illness, stress, sepsis, starvation, surgery and trauma
7.1.9.7 Lactic acidosis
7.1.9.8 Management of severe hypo- and hyperthermia
7.1.9.9 Management of malignant hyperthermia and neuroleptic malignant syndrome
7.1.9.10 Management of endocrine emergencies including thyroid storm, phaeochromocytoma, adrenocortical insufficiency (Addison's disease, Conn's and Cushing syndromes), complications of steroid therapy, diabetic ketoacidosis and hyperglycaemic nonketotic coma and carcinoid syndrome

7.1.11 Neurological and neuromuscular disorders

7.1.10.1 The determinants and control of intracranial and intraspinal pressure, cerebral blood flow and spinal cord perfusion
7.1.10.2 Principles and application of cerebral function monitoring and intracranial pressure monitoring in practice
7.1.10.3 Pathophysiology, investigation and management of delirium in the ICU
7.1.10.4 Management of neurological deterioration due to ischaemic and haemorrhagic stroke and subarachnoid haemorrhage
7.1.10.6 Management of cerebral vasospasm
7.1.10.7 Diagnosis and management of meningitis and encephalitis
7.1.10.8 Causes, pathogenesis and intensive care management of cerebral oedema, raised intracranial pressure, traumatic brain injury, prolonged seizures and acute spinal cord injury
7.1.10.8 Principles of management of hemiplegia, paraplegia, quadriplegia, postoperative neurosurgical patients, diabetes insipidus and cerebral salt wasting
7.1.10.9 Pathophysiology and indications for intensive care management of patients with tetanus, rabies, botulism, Guillain-Barré syndrome, myasthenia gravis, myotonia and muscular dystrophies and critical illness myoneuropathy
7.1.10.10 Investigation and management of ICU patients who emerge with neurological impairment
7.1.10.11 Diagnosis and management of coma and persistent vegetative state
7.1.10.12 Clinical diagnosis of brain death and the confirmatory investigations

7.1.12 Severe trauma

7.1.11.1 Effects of severe trauma on organs and organ systems
7.1.11.6 Principles of resuscitation and damage control in the management of severe trauma
7.1.11.7 Principles of the early management of severe trauma and the advantages of an organised team approach
7.1.11.8 Principles of the safe transfer of injured children and adults and portable monitoring and supportive systems
7.1.11.9 Management of trauma patients, including but not limited to:

- Principles of Advanced Trauma Life Support (ATLS)
- Hypovolaemia, coagulopathy, massive blood transfusion, hypothermia
- Blunt and penetrating injury
- Management of maxillofacial and airway injuries, including technique of cricothyroidotomy, tracheostomy and mini tracheostomy
- Management of neurotrauma and acute spinal cord injury, including:
  - Head injury and Glasgow Coma Scale (GCS)
  - Cervical spine injuries
  - Spinal shock
- Thoracic trauma; pneumothorax and tension pneumothorax
- Abdominal trauma and abdominal compartment syndrome
- Vascular trauma, including aortic injuries
- Pelvic injuries

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- Long bone trauma
- Crush injury
- Environmental injuries
- Electrocution, burns, near-drowning, envenomation, drug overdose, corrosive ingestion, altitude sickness and decompression syndromes

7.1.11.10 Organ donation and management of the brain-dead patient awaiting organ donation

7.1.12 Intensive care of the obstetric patient

7.1.12.1 Assessment of maternal and foetal viability (e.g. the patient with cardiovascular failure, respiratory failure or intracranial haemorrhage)
7.1.12.7 The differences in basic and advanced life support of the pregnant patient, including cardiac arrest
7.1.12.8 Intensive care management of preeclampsia, eclampsia, haemolysis and elevated liver enzymes and low platelets (HELLP) syndrome
7.1.12.9 Peri- (placental abruption, uterine rupture) and postpartum haemorrhage and amniotic fluid embolism
7.1.12.10 Postpartum sepsis
7.1.12.11 Thromboembolic disease in pregnancy
7.1.12.12 Postpartum management of the parturient with cardiovascular disease, specifically valvular heart disease and postpartum cardiomyopathy
7.1.12.13 Trauma during pregnancy

7.1.15 Haematological, rheumatological and oncological disorders

7.1.13.1 Defects in haemostasis, including disseminated intravascular coagulation (DIC) and hypercoagulability syndromes
7.1.13.6 Anaemia and thrombocytopaenia in intensive care
7.1.13.7 Rational use of blood products in the intensive care setting
7.1.13.8 Investigation and management of transfusion reactions
7.1.13.9 Appropriate use of anticoagulants in patients in the intensive care setting, including prevention and management of venous and arterial thrombosis and thromboembolism
7.1.13.10 Management of oncology emergencies, including primary diseases and sequelae (haematological malignancies and acute decompensations, vena cava obstruction, acute cord compression, pericardial effusion) secondary to treatment (graft vs. host disease, neutropenic sepsis [immunosuppression], tumour lysis syndrome)

7.1.16 GI disorders

7.1.14.1 Aspiration prevention and management
7.1.14.6 Post-major abdominal surgery
7.1.14.7 Diagnosis and management of GI disorders in the intensive care setting, including dysmotility, paralytic ileus, gastric distension, perioperative GI failure and malabsorption
7.1.14.8 Diagnosis, management and prevention of stress ulceration and its complications and treatment, including pseudomembranous colitis in the intensive care setting
7.1.14.9 Differential diagnosis and management of life-threatening upper and lower GI haemorrhage
7.1.14.10 Diagnosis and treatment of oesophageal perforation
7.1.14.11 Diagnosis and management of the patient with life-threatening abdominal conditions, including peritonitis and abdominal sepsis, abdominal compartment syndrome, ischaemic, perforated or obstructed GI tract and major abdominal trauma
7.1.14.12 Differential diagnosis and management of acute and acute-on-chronic liver failure, including indications for urgent liver transplantation

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7.1.14.13 Pathophysiology and management of complications in the critically ill patient with hepatic failure, including cerebral oedema, hepatic encephalopathy, coagulopathy, ascites, spontaneous bacterial peritonitis and hepatorenal and hepatopulmonary syndromes

7.1.14.14 Diagnosis and management of acute severe pancreatitis

7.1.17 Infectious disorders

7.1.15.1 Diagnosis and management of infectious diseases (e.g. bacterial and viral, including HIV/AIDS, COVID, tuberculosis, fungal, rickettsia, protozoa) in the critically ill or immunosuppressed patient

7.1.15.4 Severe community-acquired infections (e.g. meningococcal disease)

7.1.15.5 Nosocomial infections, particularly multiple antibiotic-resistant bacteria (e.g. methicillin-resistant *Staphylococcus aureus* [MRSA], extended-spectrum beta-lactamase (ESBL) Gram-negatives, carbapenem-resistant Enterobacteriaceae [CRE])

7.1.15.6 Antibiotic therapy and timing

7.1.15.7 Tapering, escalation and de-escalation of antibiotic therapy

7.1.15.8 Infection prevention and control (IPC) as it relates to patients and health workers in the intensive care setting

7.1.18 Management of poisoning and drug-related complications

7.1.16.1 Physiological consequences and management of patients after common poisonings, drug overdoses, severe drug reactions and exposure to agents used in bioterrorism, including:

- Benzodiazepines
- Beta blockers
- Calcium-channel blockers
- Carbon monoxide poisoning
- Corrosive substance ingestion
- Cyanide poisoning
- Digitalis toxicity
- Methanol/ethylene glycol/isopropyl alcohol
- Opiates
- Organophosphate poisoning
- Paracetamol
- Psychiatric medication – phenothiazines, lithium, monoamine oxidase inhibitors, tricyclic antidepressants
- Salicylates

7.1.16.3 Diagnosis and management of idiosyncratic/drug reactions, including:

- Malignant hyperthermia
- Neuroleptic malignant syndrome
- Propofol infusion syndrome
- Serotonin syndrome

7.1.16.3 Anaphylactic and anaphylactoid reactions

7.1.16.5 Drug addiction and withdrawal syndromes and their associated complications in the ICU

7.1.17 Postoperative care

7.1.17.1 Critical care management after major surgical procedures, including:

- Advanced directives
- Neurosurgery, trauma and obstetrics

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- Vascular surgery, including abdominal aortic aneurysm repair, limb revascularisation and carotid endarterectomy
- Solid organ transplant

7.1.18 Ethical considerations in the intensive care setting

7.1.19.1 Patient confidentiality and privacy legislation
7.1.19.2 Patient autonomy
7.1.19.3 Principles of informed consent and decision-making
7.1.19.4 Consent/refusal related to ventilation, critical and procedural care, drug treatment, blood and blood products
7.1.19.5 Next of kin designation
7.1.19.6 End-of-life decision-making
7.1.19.7 Organ procurement for transplantation
7.1.19.8 Management and review of adverse events
7.1.19.9 Communication with families in crisis
7.1.19.10 Cultural aspects/consideration in critical care

Skills

TECHNICAL SKILLS: CLINICAL

7.1.20 Patient assessment and resuscitation

7.1.19.1 Accurate and efficient assessment of life-threatening problems in a critically ill patient
7.1.20.2 Undertake and provide emergency management of critically ill patients, including basic and advanced life support (including primary and secondary surveys)

7.1.21 Supportive care of critically ill patients

7.1.20.1 Vasoactive therapy:
- Recognise when to use inotrope, vasopressor and vasodilator therapy
- Timing and use of appropriate agent, dose, clinical endpoint and route of administration
- Review of the efficacy of vasoactive therapy at regular intervals

7.1.21.2 Nutritional support – apply principles of nutrition timeously and appropriately as individualised to each critically ill patient
7.1.21.3 Real-time monitoring (and interpretation thereof) and retrospective review of patient vital organ systems in the intensive care setting

7.1.22 Respiratory system – recognition, assessment and management of pathophysiology

7.1.21.1 Airway:
- Intubation (oral, nasotracheal) and maintenance of the airway (ME, S, Com)
- Tracheostomy management
- Initiating and following a difficult airway algorithm and application of skills thereto, including cricothyroidotomy and the principles of percutaneous tracheotomy
- Fibreoptic intubation and bronchoscopy

7.1.21.7 Ventilation/oxygenation:
- Oxygen therapy and humidification
- Bag mask ventilation
- Mask ventilation – CPAP and NIV

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- Invasive ventilation – establishment, selection of appropriate modes, assessment of adequacy, troubleshooting dyssynchrony, weaning, extubation, graphics interpretation and complications

7.1.21.8 Diagnosis and management of pneumothorax
7.1.21.9 Interpretation of blood gases (arterial, mixed venous) and assessment of pulmonary gas exchange (A-a gradient, shunt fraction, etc.)
7.1.21.10 Basic interpretation of bedside CXR
7.1.21.11 Performance of bedside pulmonary function tests and assessment of pulmonary mechanics
7.1.21.12 Chest physiotherapy and incentive spirometry
7.1.21.13 Pleural drainage
7.1.21.14 Understanding of the advantages and/or application of pulmonary assessment using ultrasound
7.1.21.15 Extracorporeal respiratory assist devices

7.1.22 Cardiovascular system – recognition, assessment and management of acute circulatory problems

7.1.22.9 ACLS
7.1.22.10 Assessment and treatment of electrocardiogram (ECG) and accompanying clinical abnormalities and rhythm disturbances
7.1.22.11 Insertion of monitoring lines (arterial, venous, right heart, pulmonary arterial)
7.1.22.12 Measurement of indices made possible using these devices, e.g. central venous pressure (CVP), cardiac output, pulmonary capillary wedge pressure (PCWP), echocardiography and ultrasound
7.1.22.13 Application of cardiac output monitors, including flow and Doppler-type monitors
7.1.22.14 Cardioversion (electrical and medical) and defibrillation
7.1.22.15 Transcutaneous and transvenous pacing
7.1.22.16 Application and use of intra-aortic balloon pumps
7.1.22.17 Application of ultrasound and echocardiography related to the assessment of the cardiovascular system

7.1.25 Neurological system – recognition, assessment and management of pathophysiology

7.1.23.1 Assessment of levels of sedation and analgesia in critically ill patients
7.1.23.10 Lumbar puncture
7.1.23.11 Maintenance of cerebral perfusion pressure and intracranial pressure monitoring
7.1.23.12 Management principles of head injury
7.1.23.13 Use and basic interpretation of neurological function and cerebral perfusion monitors (e.g. electroencephalogram, brainstem auditory evoked potential)
7.1.23.14 Measurement and significance of jugular venous oxygen saturation
7.1.23.15 Basic interpretation of brain computed tomography (CT) scan
7.1.23.16 Monitoring of levels of neuromuscular blockade
7.1.23.17 Assessment of brain death
7.1.23.18 Epidural anaesthesia implementation and management
7.1.23.19 Local and regional anaesthesia

7.1.26 Metabolic and nutrition management

7.1.24.1 Implementation, monitoring and assessment of nutritional support (enteral and parenteral therapy)
7.1.24.5 Assessment of intravascular volume status and implementation and management of fluid therapy
7.1.24.6 Interpretation and management of acid-base abnormalities

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7.1.24.7 Interpretation of blood and urine electrolytes and management of electrolyte disorders
7.1.24.8 Management of hypo- and hyperthermia

7.1.25 GI system – recognition, assessment and treatment of GI crises
7.1.27.1 Insertion of nasogastric tube/enteral feeding device
7.1.27.2 Insertion of oesophageal balloon (bleeding varices), e.g. Sengstaken-Blakemore tube
7.1.27.3 Implementation of stress ulcer prophylaxis
7.1.27.4 Gastric lavage in drug overdose

7.1.28 Haematological system – recognition, assessment and treatment of pathophysiology
7.1.28.1 Interpretation of coagulation profiles including thromboelastogram (TEG)
7.1.28.2 Implementation and control of anticoagulant and fibrinolytic treatment
7.1.28.3 Utilisation of blood component therapy and synthetic colloids
7.1.28.4 Management of massive blood transfusion

7.1.29 Renal system – recognition, assessment and basic management of pathophysiology
7.1.27.1 Establishment of a fluid and electrolyte balance plan
7.1.27.3 Insertion of temporary haemodialysis catheters
7.1.27.4 Understanding indications for and principles of continuous renal replacement therapy

7.1.28 Infection – recognition, assessment and basic management of pathophysiology
7.1.29.5 Appropriate and sterile collection/sampling of sites (blood and other sites) and interpretation of lab reports
7.1.29.6 Use of aseptic techniques and prevention of nosocomial infection
7.1.29.7 Management of wounds and drains in critically ill patients

7.1.30 Trauma management
7.1.30.1 Primary and secondary surveys – ATLS
7.1.30.2 Recognition and management of spinal cord injury
7.1.30.3 Initial management and stabilisation of burns and trauma patients
7.1.30.4 Temporary immobilisation of fractures

7.1.30 Monitoring and life support devices
7.1.30.7 Utilisation, zeroing and calibration of transducers
7.1.30.8 Use of monitoring equipment
7.1.30.9 Assessment and interrogation of the reliability of measured data
7.1.30.10 Operation of ventilators and other oxygen delivery devices
7.1.30.11 Operation of defibrillators, cardioversion devices and temporary pacemakers
7.1.30.12 Troubleshooting equipment, electricity supply and gas supply
7.1.30.13 Use of ultrasound in the diagnosis and evaluation of cardiovascular, pulmonary and abdominal pathophysiology and monitoring response to therapy

7.1.31 Pharmacology
7.1.31.4 Implementation and control of adequate sedation and analgesia
7.1.31.5 Knowledge, selection and application of medications individualised to critically ill patients (with and without renal and hepatic impairment)

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7.1.31.6 Appropriate use and management of muscle relaxants

TECHNICAL SKILLS: ORGANISATIONAL

7.1.32 Patient assessment, resuscitation and admission to the ICU

7.1.32.5 Apply principles of triage acutely (who and who not to resuscitate) and in planning for the appropriate allocation of resources over time

7.1.32.6 Judge and apply the priorities of immediate resuscitation on a per-patient basis

7.1.32.7 Coordinate and manage admissions to the ICU taking unit resources and abilities into account

7.1.32.8 Enabling supportive intensive care within the team

7.1.32.9 Institute an appropriate plan for the general care of the critically ill patient, including nutritional support, GI care (oral care, bowel care), pressure and skin care, eye care and maintenance of mobility and muscle strength

7.1.33 ICU curation and monitoring of the critically ill patient

7.1.33.1 Basic staffing, equipment and administrative requirements to run and maintain an ICU, including:

- IPC architectural design to enable aseptic practices, sterile procedures and best IPC practice and appropriate availability of IPC barrier nursing and isolation when required
- Electrical supply, electrical safety and backup electrical supply for lighting, monitors, ventilators and extracorporeal devices
- Health worker and patient access to IPC resources, including aprons, surgical masks, respirators, eye protection and clothing
- Gas supply, backup supply, backup availability (e.g. manual bag ventilation) and ventilator capacity as it relates to compressed air, oxygen and suction
- Access to necessary equipment to enable the evacuation of critically ill patients in the event of a facility disaster or requirement to transfer patients to other wards or facilities
- Monitors and equipment required, principles of monitoring, systems available and complications that may arise from respective monitoring and devices

7.1.33.2 Ordering of appropriate laboratory and diagnostic tests

7.1.33.3 Curate and implement critical review of adverse events pre-admission, during the ICU stay and during transfers of all patients cared for in the ICU and enable implementation of improvement strategies

7.1.33.4 Curate and implement psychosocial support for staff as well as critical review and debriefing of all resuscitations and critical adverse events for all members of the care team as part of ongoing learning and psychological support

7.1.33.5 Recognise and facilitate multidisciplinary care and collaboration among medical specialists, allied medical disciplines (including physiotherapy, occupational therapy, psychology, social work, speech therapy), infection control, microbiology and others to achieve the best patient care and outcomes

7.1.33.6 Provide appropriate facilities for family, friends and relatives for rest/grieving assistance as well as room for family consultations and information sharing

7.1.33.7 Develop protocols that enable effective communication with relatives throughout patient admission and discharge, inclusive of cultural sensitivity alongside awareness and availability of translators where applicable

TECHNICAL SKILLS: ADMINISTRATIVE

7.1.34 Administrative patient professional requirements:

- Clearly document patient information, including but not limited to presenting problems, management plans and progress

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- Generate a list of differential diagnoses and priorities in investigations
- Manage medicolegal documentation on a per-patient basis (e.g. living will, consent)
- Ensure all patients discharged are transferred with appropriate documentation, referral letters and discharge summaries enabling their ongoing quality care

7.1.35 Administrative ICU requirements:

- Where possible, create and distribute a protocol sheet/intensive care manual documenting expected protocols and guidelines to be followed by staff working in the ICU to deliver consistent quality care
- Curate and collate microbial data to enable directed empiric therapy based on unit-specific organisms most cultured
- Document and evaluate outcomes of critical reviews for adverse events and resuscitations that will inform the implementation of strategies for improvement
- Ensure continuous monitoring and evaluation of patient care inclusive of appropriate predictive mortality and scoring systems and alignment to outcome data, infection control, nursing outcomes and quality metrics
- Ensure relatives of patients who demise receive appropriate and timeous access to administrative documentation required for their civil, cultural and religious obligations

Non-technical skills (NTS)

All NTS applicable, in specific application:

7.1.36 Leadership:

- Participating in or leading a ward round in the ICU
- Coordinating the transfer of a patient to or from the ICU
- Resource assessment and allocation (context-specific triage)
- Outlining the role of an ICU within a hospital, including postoperative care for complex/high-risk patients, patient arrest/resuscitation situations, outreach and education

7.1.37 Context awareness:

- Assessment and implementation of required staff and staff-to-patient ratios in an intensive care setting dependent on available resources and patient acuity of care requirements
- Describe the stressors that exist in intensive care and how these might be dealt with across the health worker complement in the intensive care setting

7.1.38 Communication:

- Ensure appropriate patient and family counselling and disclosures, effective consultations, safe handover and optimal care in the intensive care setting
- Develop and ensure practical application of informed consent and decision-making for patients and next of kin in the intensive care setting
- Effective and consistent communication with patients and next of kin, including a shared plan of care, being cognisant of professional rules of practice and the Protection of Personal Information Act (POPI Act)
- Provision of, or arranging the provision of, psychosocial support that may be necessary for patients and next of kin
- Communicating effectively with the intubated patient

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- Effective communication during a crisis in the facility, intensive care setting or during a resuscitation
- Effective communication with colleagues, the ICU team and with colleagues and departments that interact with and integrate with patient care requirements in the intensive care setting
- Effective communication regarding end-of-life decision-making and care within the team and with patient relatives (e.g. withholding/withdrawing therapy, organ donation)

7.1.39 Collaboration:

- End-of-life decision-making within the team and with patient relatives
- Participate in quality assurance processes in the intensive care setting (e.g. monitoring hospital-acquired infections and patient outcomes)
- Facilitation of teaching patients/families, students and other health professionals in intensive care through ICU educational and outreach activities
- Ensuring all disciplines referring to and participating in care in the ICU setting are meaningfully involved and integrated in shared decision-making and quality care initiatives
- End-of-life decision-making within the team and with patient relatives (e.g. withholding/withdrawing therapy, organ donation)

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7.2 Anaesthesia for General Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Conduct safe and appropriate perioperative management of patients undergoing emergent and elective surgical management of minor and intermediate surgical conditions including laparoscopic and open approaches.				All
Conduct safe and appropriate perioperative management of patients undergoing major and complex emergent and elective surgery.				All
KNOWLEDGE				
Anatomy, physiology, pharmacology relating to hepatobiliary, endocrine, GIT and head and neck surgery				Sc/ME
Pathophysiology of hepato-biliary endocrine, GIT and head and neck conditions and their effects and impact on anaesthesia.				Sc/ME
Appropriate and cost-effective preoperative assessment and optimisation of high-risk patients for general surgery as listed above.				Sc/ME

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Summary

Domain 7.2 will cover the following scope:

Knowledge

7.2.1 Hepato-biliary (HPB) system

7.2.2 The pancreas

7.2.3 The adrenal gland including Phaeochromocytoma

7.2.4 The anterior pituitary gland (See Neurosurgery)

7.2.5 The hypothalamus and posterior pituitary gland (See neurosurgery)

7.2.6 Carcinoid syndrome

7.2.7 The Oesophagus

7.2.8 The stomach

7.2.9 The bowel

7.2.10 The spleen

7.2.11 Parathyroid gland

7.2.12 Thyroid gland

7.2.13 Head and neck structures (salivary glands, soft tissue masses)

7.2.14 Breast and related structures such as lymph nodes

7.2.15 Abdominal compartment syndrome

DA

Knowledge

7.2.1 Hepato-biliary (HPB) system

7.2.1.1 Anatomy, physiology and pharmacology

- Functional anatomy of the liver
- Physiology of the splanchnic circulation
- Physiology of hepatic blood flow; oxygen and substrate delivery
- Physiology of pneumoperitoneum
- Physiological functions of the liver (synthetic; metabolic and excretory)
- General impact of anaesthesia on the liver and anaesthetic hepatotoxicity
- Role of the liver in pharmacokinetics and pharmacodynamics; hepatic enzyme induction and inhibition
- Alterations in pharmacology with liver disease especially cirrhosis peri-operatively.
- Physiology / pharmacology of neuro-muscular blockade including understanding of deep neuromuscular blockade
- Drug hepatotoxicity
- Pre-conditioning
- Interpretation of liver function tests and static and dynamic (point of care / visco-elastic) tests of coagulation
- Pathophysiology and complications of concurrent diseases and their implications for anaesthetic practice, including:
    - Diagnosis and aetiology of peri-operative liver dysfunction
    - Anaesthetic drug associated hepatitis
    - Acute hepatitis – causes and physiological/pharmacological implications
    - Pathophysiology of acute and chronic alcohol abuse
    - Pre-cirrhotic conditions e.g. non-alcoholic fatty liver disease (NAFLD)
    - Cirrhosis and end-stage liver disease – aetiologies; classification of severity for transplant and non-transplant surgery; physiological impact and multi-organ dysfunction (cardiac, pulmonary, renal)

7.2.1.2 HPB disorders

- Pathophysiology of secretory HPB tumours – phaeochromocytoma, paraganglioma and carcinoid
- Implications and pathophysiology of biliary sepsis
- Assessment, examination and appropriate investigation of patients with HPB disease pre-operatively, specifically:
    - Risk and severity assessment in cirrhotic patients – Child's Pugh classification and MELD score
    - Coagulation status
    - Degree and potential implications of portal hypertension
    - Assessment of severity and microbiology of biliary sepsis
    - Adequacy of control of secretory tumour effects
- The previous liver transplant patient
- Patients with alcohol-induced HPB disease
- Pre-operative optimization, including:
    - Nutritional status

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- Metabolic derangements
- Coagulopathy
- Sepsis
- Anaemia - patient blood management (PBM) principles
- Cirrhotic CVS disease including cardiomyopathy and pulmonary hypertension
- Hepatopulmonary Syndrome, Pleural effusions
- Hepato-renal dysfunction
- Clinical assessment, diagnosis, investigation, management, monitoring and care of patients with HPB disorders undergoing HPB surgery, including:
  - Patient selection, including utilisation of (American Society of Anaesthesiologists) ASA, Child's Pugh and Model for end-stage liver disease (MELD) scores to assess operative risk and intervene to correct correctable variables (sepsis, coagulopathy, encephalopathy)
  - Understanding limits of hepatic resection and liver function in liver resection to exclude patients unlikely to have sufficient residual liver function

- Assessment of extent of portal hypertension to identify or exclude patients with prohibitive operative risk
- Assessment for metastasis of local extension of malignant disease unlikely to permit successful surgery
- Knowledge and understanding of liver transplantation principles
- Nutritional assessment and pre-operative nutrition in patients with end-stage liver disease (ESLD), malignancy and chronic pancreatitis

7.2.2 Pancreas

7.2.2.1 Anatomy, physiology and pharmacology

- Principal hormones secreted from the endocrine pancreas, their cells of origin, and their chemical nature.
- Neural, and hormonal mechanisms that regulate pancreatic hormone release.
- Principal target organs for insulin and glucagon action and their major physiologic effects.
- Disease states caused by over secretion, under secretion, or decreased sensitivity to insulin, and describe the principal manifestations of each.
- Pharmacology of insulin preparations and oral hypoglycaemics.

7.2.2.2 Disorders

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of:
  - Diabetes Mellitus
  - Pancreatic malabsorption
  - Insulinoma
  - Severe acute pancreatitis

7.2.3 The oesophagus

7.2.3.1 Anatomy, physiology and pharmacology

- Knowledge of the position of and relationship to surrounding structures
- Knowledge and understanding of oesophageal mechanics and function
- Knowledge of various medications pertaining to oesophageal disease, include perioperative chemotherapeutic agents

7.2.3.2 Disorders

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
  - Malignancies (resectable and irresectable); may be associated with nutritional disorders

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- Gastro-oesophageal reflux
- Motility disorder (achalasia and systemic sclerosis)

7.2.4 The stomach

7.2.4.1 Anatomy, physiology and pharmacology

7.2.4.2 Disorders:

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
  - Haemorrhage
  - Gastric ulceration
  - Gastro-oesophageal reflux
  - Bariatric surgery

7.2.5 The small bowel and colon

7.2.5.1 Anatomy, physiology and pharmacology, in particular perioperative medication, including chemotherapeutic agents.

7.2.5.2 Disorders:

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
- Malignancies and the consequences, requiring elective or emergency surgery
- Haemorrhage
- Bariatric surgery
- Inflammatory bowel disease/Colitis

7.2.6 The spleen

7.2.6.1 Anatomy, physiology and pharmacology.

- Knowledge of patients' current therapy for splenic disorders

7.2.6.2 Clinical features, pathophysiology, anaesthetic considerations and perioperative management of

- Immune Thrombocytopenic Purpura
- Traumatic injury
- Haematological malignancies
- Hypersplenism

7.2.7 Adrenal gland

7.2.7.1 Anatomy, physiology and pharmacology

- Functional anatomy and zones of the adrenal glands and the principal hormones secreted from each zone.
- Regulation of synthesis and release of the adrenal steroid hormones (glucocorticoids, mineralocorticoids, and androgens) and the consequences of abnormalities in their biosynthetic pathways.
- Cellular mechanism of action of adrenal cortical hormones and identify their major physiologic actions, particularly during injury and stress.
- Major mineralocorticoids, their biologic actions, and their target organs or tissues.
- Regulation of mineralocorticoid secretion and relate this to the regulation of sodium and potassium excretion.
- Identify the causes and consequences of over secretion and under secretion of glucocorticoids, mineralocorticoids, and adrenal androgens.
- Identify the chemical nature of catecholamines and their biosynthesis and metabolism.

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- The biologic consequences of sympatho-adrenal medulla activation and identify the target organs or tissues for catecholamine effects along with the receptor types that mediate their actions.
- Integration of the interactions of adrenal medullary and cortical hormones in response to stress.
- Identify diseases caused by over-secretion of adrenal catecholamines.
- Metabolism of adrenal steroids and catecholamines.
- Perioperative steroid replacement regimes.

7.2.7.2 Disorders

- Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma with respect to clinical features and anaesthetic considerations.
- Problems associated with the anaesthetic management of Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma.
- Perioperative management goals when managing patients with Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma.

7.2.8 Carcinoid syndrome

- Demonstrate the understanding of carcinoid syndrome.
- Clinical feature, anaesthetic concerns and perioperative management of carcinoid syndrome.

7.2.9 Parathyroid Gland

7.2.9.1 Anatomy, physiology and pharmacology

- Origin, target organs and cell types, and physiologic effects of parathyroid hormone.
- Functions of osteoblasts and osteoclasts in bone re-modelling and the factors that regulate their activities.
- Regulation of parathyroid hormone secretion and the role of the calcium-sensing receptor.
- Sources of vitamin D and the biosynthetic pathway involved in modifying it to its biologically active form.
- The target organs and cellular mechanisms of action of vitamin D.
- The causes and consequences of excess or deficiency of parathyroid hormone and vitamin D.
- Vit D supplementation perioperatively and in the critically ill
- Regulation of calcitonin release and the cell of origin and target organs for calcitonin action.

7.2.9.2 Disorders

- Anaesthetic management of hyperparathyroidism and hypoparathyroidism.
- Perioperative management goals when managing patients with hyperparathyroidism and hypoparathyroidism.

7.2.10 Thyroid Gland

7.2.10.1 Anatomy, physiology and pharmacology

- Identify the steps and control factors of thyroid hormone biosynthesis, storage, and release.
- Distribution of iodine and the metabolic pathway involved in thyroid hormone synthesis.
- Importance of thyroid hormone binding in blood for free and total thyroid hormone levels.
- Significance of the conversion of tetraiodothyronine (T_4) to triiodothyronine (T_3) and reverse T_3 (rT_3) in extrathyroidal tissues.

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- How thyroid hormones produce their cellular effects.
- Thyroid hormone effects on development and metabolism.
- Causes and consequences of excess and deficiency of thyroid hormones.
- Pharmacological agents used to treat thyroid hormone disorders.

7.2.10.2 Disorders

- Demonstrate an understanding of hyperthyroidism, hypothyroidism, thyroid storm and myxoedema coma with respect to:
  - Clinical features
  - Anaesthetic considerations
  - Perioperative management

7.2.11 Breast disease

7.2.13.1 Anatomy, physiology and pharmacology

- Knowledge and understanding of the perioperative medication, including chemotherapeutic agents

7.2.13.2 Clinical features, pathophysiology, anaesthetic considerations and perioperative management

- Breast mass: benign and malignant
- Breast Abscess
- Lymph node clearance and its complications
- Breast and post-mastectomy pain syndromes

7.2.12 Oncology

- Perioperative considerations for specific cancer types
- Oncology emergencies
- Pain management

7.2.13 Soft Tissue including retroperitoneal tumours

7.2.14 Surgical risk stratification

- Definitions of emergencies and elective operations
- Triaging for surgical emergencies
- Scheduling and planning considerations

7.2.15 Perioperative Management

7.2.17.1 Peri-operative care including maintenance and restoration of homeostasis, including:

- Strategies for limitation of bleeding in liver resection including low preload and correction of coagulopathy
- Appropriate antibiotic choice in biliary sepsis
- Planning extent of liver resection to ensure adequate residual liver mass
- Optimisation of perfusion and substrate delivery to residual liver to avoid post-operative liver dysfunction
- Monitoring for detection of and intervention in major CVS shifts during liver resection and trans-jugular porto-systemic shunt (TIPSS)
- Control of systemic effects of secretory tumours
- Management of physiological effects of pneumoperitoneum
- Strategies for management of prone, sedated and out of theatre cases for Endoscopic Retrograde Cholangiopancreatography (ERCP).
- Management of deep neuromuscular blockade

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7.2.17.2 Therapeutic interventions in HPB and pancreatic surgery, including:

- Strategies to assess, control and correct intra-operative bleeding (venous pressure control; procoagulants; octreotide; blood products)
- Use of vaso-active and anti-secretory agents with secretory tumours
- Hepatic support and maximization of substrate delivery
- Upscaling of anti-microbial therapy
- Deep neuromuscular blockade

7.2.17.3 Management of peri-operative complications, *inter alia*:

- Peri-operative hydrostatic and coagulopathic bleeding
- Systemic effects from secretory tumours
- Deterioration of liver function during and after liver resection - “small for size”
- Development / deterioration of sepsis status
- Blood sugar control in major pancreatic surgery
- Adverse cardio-respiratory effects of pneumoperitoneum
- Accelerated ESLD after TIPSS

7.2.17.4 Post-operative care and placement, including:

- Supportive care for and management of post-operative liver dysfunction
- Management of coagulopathy
- Early enteral nutrition
- Monitoring for development of surgical complications e.g., pancreatic leaks / fistulae; anastomotic failure; ileus.
- Thrombo-embolism prophylaxis
- Targeted fluid management in major HPB surgery
- Appropriate antibiotic therapy – escalation and de-escalation
- Screening for and management of abdominal compartment syndrome in trauma cases with liver injury
- Management of severe acute pancreatitis

7.2.17.5 Pain management

- ERAS recommendations for analgesia in major HPB surgery
- Indications, contra-indications, advantages, disadvantages and management of thoracic epidural analgesia and spinal opioid techniques
- Wound catheter techniques for abdominal surgery
- Opioid free anaesthesia and analgesia

Skills

TECHNICAL SKILLS: CLINICAL

7.2.17.6 Patient and environmental preparation for proposed major procedures, including:

- Use of appropriate monitors including but not limited to point-of-care coagulation monitors, non-invasive cardiac output monitors, pressure transducers for arterial, pulmonary arterial, and venous pressure, invasive haemodynamic monitors, ultrasound machines with linear and trans-oesophageal probes, blood sugar monitors; neuro-muscular transmission (NMT) monitors and arterial blood gas analysers
- Planning for and placement of invasive lines and epidural catheters in major HPB/pancreatic cases.
- Techniques and devices for maintenance of normothermia

DRAFT FOR COMMENT

- Theatre layout and safe access planning for procedures – particularly remote venue procedures - involving large amounts of theatre furniture, prone patients etc – e.g. ERCP

Other Clinical Skills:

- Organisation/planning for expected or unforeseen eventualities:
  - Ensuring post-operative ICU facilities are available and communicating with intensivists.
  - Laboratory/blood bank notified and in possession of samples to hasten response in the event of major bleeding
  - Access to infusion devices and Vaso-active agents
  - Access to cell salvage
- Managing a pre-operative clinic
- Post-operative pain and follow-up service
  - Remain in contact with surgeon, intensivist, patient and family
  - Guide provision of analgesia
- Multi-disciplinary teams (MDT) for holistic patient care, ERAS pathways
  - Attend MDT meetings / obtain information regarding patient care pathway
  - Attend meetings to remain up to date on state of the art approaches
  - Discuss the proposed patient care pathway with surgeon to acquire situational awareness
  - Communicate care pathways with patients / family and post-operative care teams
- High-care / ICU / PACU organization – staffing & equipment
- Setting up acute / chronic pain service

Non-technical skills

All general NTS (See Background).

FCA

Knowledge

7.2.2 Hepato-biliary (HPB) system

7.2.1.1 Anatomy, physiology and pharmacology

- Functional anatomy of the liver
- Physiology of the splanchnic circulation
- Physiology of hepatic blood flow; oxygen and substrate delivery
- Physiology of pneumoperitoneum
- Physiological functions of the liver (synthetic; metabolic and excretory)
- General impact of anaesthesia on the liver and anaesthetic hepatotoxicity
- Role of the liver in pharmacokinetics and pharmacodynamics; hepatic enzyme induction and inhibition
- Alterations in pharmacology with liver disease especially cirrhosis peri-operatively.
- Physiology / pharmacology of neuro-muscular blockade including understanding of deep neuromuscular blockade
- Drug hepatotoxicity
- Pre-conditioning
- Interpretation of liver function tests and static and dynamic (point of care / visco-elastic) tests of coagulation

DRAFT FOR COMMENT

- Pathophysiology and complications of concurrent diseases and their implications for anaesthetic practice, including:
    - Diagnosis and aetiology of peri-operative liver dysfunction
    - Anaesthetic drug associated hepatitis
    - Acute hepatitis – causes and physiological/pharmacological implications
    - Pathophysiology of acute and chronic alcohol abuse
    - Pre-cirrhotic conditions e.g. non-alcoholic fatty liver disease (NAFLD)
    - Cirrhosis and end-stage liver disease – aetiologies; classification of severity for transplant and non-transplant surgery; physiological impact and multi-organ dysfunction (cardiac, pulmonary, renal)

7.2.2.2 HPB disorders

- Pathophysiology of secretory HPB tumours – phaeochromocytoma, paraganglioma and carcinoid
- Implications and pathophysiology of biliary sepsis
- Assessment, examination and appropriate investigation of patients with HPB disease pre-operatively, specifically:
    - Risk and severity assessment in cirrhotic patients – Child's Pugh classification and MELD score
    - Coagulation status
    - Degree and potential implications of portal hypertension
    - Assessment of severity and microbiology of biliary sepsis
    - Adequacy of control of secretory tumour effects
- The previous liver transplant patient
- Patients with alcohol-induced HPB disease
- Pre-operative optimization, including:
    - Nutritional status
    - Metabolic derangements
    - Coagulopathy
    - Sepsis
    - Anaemia - patient blood management (PBM) principles
    - Cirrhotic CVS disease including cardiomyopathy and pulmonary hypertension
    - Hepatopulmonary Syndrome, Pleural effusions
    - Hepato-renal dysfunction
    - Clinical assessment, diagnosis, investigation, management, monitoring and care of patients with HPB disorders undergoing HPB surgery, including:
        - Patient selection, including utilisation of (American Society of Anaesthesiologists) ASA, Child's Pugh and Model for end-stage liver disease (MELD) scores to assess operative risk and intervene to correct correctable variables (sepsis, coagulopathy, encephalopathy)
        - Understanding limits of hepatic resection and liver function in liver resection to exclude patients unlikely to have sufficient residual liver function
- Assessment of extent of portal hypertension to identify or exclude patients with prohibitive operative risk
- Assessment for metastasis of local extension of malignant disease unlikely to permit successful surgery
- Knowledge and understanding of the principles involved in liver transplantation
- Nutritional assessment and pre-operative nutrition in patients with end-stage liver disease (ESLD), malignancy and chronic pancreatitis

7.2.3 Pancreas

7.2.15.1 Anatomy, physiology and pharmacology

- Principal hormones secreted from the endocrine pancreas, their cells of origin, and their chemical nature.

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- Neural, and hormonal mechanisms that regulate pancreatic hormone release.
- Principal target organs for insulin and glucagon action and their major physiologic effects.
- Disease states caused by over secretion, under secretion, or decreased sensitivity to insulin, and describe the principal manifestations of each.
- Pharmacology of insulin preparations and oral hypoglycaemics.

7.2.15.2 Disorders

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of:
  - Diabetes Mellitus
  - Pancreatic malabsorption
  - Insulinoma
  - Severe acute pancreatitis

7.2.16 The oesophagus

7.2.16.1 Anatomy, physiology and pharmacology

- Knowledge of the position of and relationship to surrounding structures
- Knowledge and understanding of oesophageal mechanics and function
- Knowledge of various medications pertaining to oesophageal disease, include perioperative chemotherapeutic agents

7.2.16.2 Disorders

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
  - Malignancies (resectable and irresectable); may be associated with nutritional disorders
  - Gastro-oesophageal reflux
  - Motility disorder (achalasia and systemic sclerosis)

7.2.17 The stomach

7.2.17.1 Anatomy, physiology and pharmacology

7.2.17.2 Disorders:

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
  - Haemorrhage
  - Gastric ulceration
  - Gastro-oesophageal reflux
  - Bariatric surgery

7.2.18 The small bowel and colon

7.2.18.1 Anatomy, physiology and pharmacology, in particular perioperative medication, including chemotherapeutic agents.

7.2.18.2 Disorders:

- Clinical features, pathophysiology, anaesthetic considerations and perioperative management of
- Malignancies and the consequences, requiring elective or emergency surgery
- Haemorrhage
- Bariatric surgery
- Inflammatory bowel disease/Colitis

7.2.19 The spleen

7.2.19.1 Anatomy, physiology and pharmacology.

- Knowledge of patients' current therapy for splenic disorders

DRAFT FOR COMMENT

7.2.19.2 Clinical features, pathophysiology, anaesthetic considerations and perioperative management of

- ITP
- Traumatic injury
- Haematological malignancies
- Hypersplenism

7.2.20 Adrenal gland

7.2.20.1 Anatomy, physiology and pharmacology

- Functional anatomy and zones of the adrenal glands and the principal hormones secreted from each zone.
- Regulation of synthesis and release of the adrenal steroid hormones (glucocorticoids, mineralocorticoids, and androgens) and the consequences of abnormalities in their biosynthetic pathways.
- Cellular mechanism of action of adrenal cortical hormones and identify their major physiologic actions, particularly during injury and stress.
- Major mineralocorticoids, their biologic actions, and their target organs or tissues.
- Regulation of mineralocorticoid secretion and relate this to the regulation of sodium and potassium excretion.
- Identify the causes and consequences of over secretion and under secretion of glucocorticoids, mineralocorticoids, and adrenal androgens.
- Identify the chemical nature of catecholamines and their biosynthesis and metabolism.
- The biologic consequences of sympatho-adrenal medulla activation and identify the target organs or tissues for catecholamine effects along with the receptor types that mediate their actions.
- Integration of the interactions of adrenal medullary and cortical hormones in response to stress.
- Identify diseases caused by over-secretion of adrenal catecholamines.
- Metabolism of adrenal steroids and catecholamines.
- Perioperative steroid replacement regimes.

7.2.20.2 Disorders

- Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma with respect to clinical features and anaesthetic considerations.
- Problems associated with the anaesthetic management of Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma.
- Perioperative management goals when managing patients with Conn's disease, Addison's disease and acute adrenal crisis, Cushing's syndrome and phaeochromocytoma.

7.2.21 Anterior pituitary

Cross reference with Domain 7.7

7.2.21.1 Anatomy, physiology and pharmacology

- mechanisms that regulate anterior pituitary hormone production
- actions of tropic hormones on target organs
- negative feedback control of anterior pituitary hormone secretion
- over secretion or under secretion of anterior pituitary hormones
- receptor deficit for any of these hormones.

7.2.21.2 Disorders

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- Acromegaly and panhypopituitarism clinical features and perioperative management.
- Perioperative concerns associated with the anaesthetic management of acromegaly and panhypopituitarism.
- Perioperative management goals when managing patients with acromegaly and panhypopituitarism.

7.2.22 Hypothalamus and posterior pituitary

Cross reference with Domain 7.7

7.2.22.1 Anatomy, physiology and pharmacology

- Physiologic and anatomic relationships between the hypothalamus and the anterior and the posterior pituitary.
- Integrate hypothalamic and pituitary function and identify the different pathways used for hypothalamic-pituitary interactions.
- Appropriate hypothalamic releasing and inhibitory factors controlling the secretion of each of the anterior pituitary hormones.

7.2.22.2 Posterior pituitary disorders

- Clinical features and perioperative management of diabetes insipidus (DI) and Syndrome of Inappropriate Anti-diuretic Hormone (SIADH).

7.2.23 Carcinoid syndrome

- Demonstrate the understanding of carcinoid syndrome.
- Clinical feature, anaesthetic concerns and perioperative management of carcinoid syndrome.

7.2.24 Parathyroid Gland

7.2.24.1 Anatomy, physiology and pharmacology

- Origin, target organs and cell types, and physiologic effects of parathyroid hormone.
- Functions of osteoblasts and osteoclasts in bone re-modelling and the factors that regulate their activities.
- Regulation of parathyroid hormone secretion and the role of the calcium-sensing receptor.
- Sources of vitamin D and the biosynthetic pathway involved in modifying it to its biologically active form.
- The target organs and cellular mechanisms of action of vitamin D.
- The causes and consequences of excess or deficiency of parathyroid hormone and vitamin D.
- Vit D supplementation perioperatively and in the critically ill
- Regulation of calcitonin release and the cell of origin and target organs for calcitonin action.

7.2.24.2 Disorders

- Anaesthetic management of hyperparathyroidism and hypoparathyroidism.
- Perioperative management goals when managing patients with hyperparathyroidism and hypoparathyroidism.

7.2.25 Thyroid Gland

7.2.25.1 Anatomy, physiology and pharmacology

- Identify the steps and control factors of thyroid hormone biosynthesis, storage, and release.
- Distribution of iodine and the metabolic pathway involved in thyroid hormone synthesis.
- Importance of thyroid hormone binding in blood for free and total thyroid hormone levels.

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- Significance of the conversion of tetraiodothyronine (T_4) to triiodothyronine (T_3) and reverse T_3 (rT_3) in extrathyroidal tissues.
- How thyroid hormones produce their cellular effects.
- Thyroid hormone effects on development and metabolism.
- Causes and consequences of excess and deficiency of thyroid hormones.
- Pharmacological agents used to treat thyroid hormone disorders.

7.2.25.2 Disorders

- Demonstrate an understanding of hyperthyroidism, hypothyroidism, thyroid storm and myxoedema coma with respect to:
  - Clinical features
  - Anaesthetic considerations
  - Perioperative management

7.2.26 Breast disease

7.2.13.1 Anatomy, physiology and pharmacology

- Knowledge and understanding of the perioperative medication, including chemotherapeutic agents

7.2.13.2 Clinical features, pathophysiology, anaesthetic considerations and perioperative management

- Breast mass: benign and malignant
- Breast Abscess
- Lymph node clearance and its complications
- Breast and post-mastectomy pain syndromes

7.2.27 Oncology

- Perioperative considerations for specific cancer types
- Oncology emergencies
- Pain management

7.2.28 Soft Tissue including retroperitoneal tumours

7.2.29 Surgical risk stratification

- Definitions of emergencies and elective operations
- Triaging for surgical emergencies
- Scheduling and planning considerations

7.2.30 Perioperative Management

7.2.17.7 Peri-operative care including maintenance and restoration of homeostasis, including:

- Strategies for limitation of bleeding in liver resection including low preload and correction of coagulopathy
- Appropriate antibiotic choice in biliary sepsis
- Planning extent of liver resection to ensure adequate residual liver mass
- Optimisation of perfusion and substrate delivery to residual liver to avoid post-operative liver dysfunction
- Monitoring for detection of and intervention in major CVS shifts during liver resection and trans-jugular porto-systemic shunt (TIPSS)
- Control of systemic effects of secretory tumours
- Management of physiological effects of pneumoperitoneum

DRAFT FOR COMMENT

- Strategies for management of prone, sedated and out of theatre cases for Endoscopic Retrograde Cholangiopancreatography (ERCP).
- Management of deep neuromuscular blockade

7.2.17.8 Therapeutic interventions in HPB and pancreatic surgery, including:

- Strategies to assess, control and correct intra-operative bleeding (venous pressure control; procoagulants; octreotide; blood products)
- Use of vaso-active and anti-secretory agents with secretory tumours
- Hepatic support and maximization of substrate delivery
- Upscaling of anti-microbial therapy
- Deep neuromuscular blockade

7.2.17.9 Management of peri-operative complications, *inter alia*:

- Peri-operative hydrostatic and coagulopathic bleeding
- Systemic effects from secretory tumours
- Deterioration of liver function during and after liver resection - “small for size”
- Development / deterioration of sepsis status
- Blood sugar control in major pancreatic surgery especially insulinoma and insidioblastosis resection
- Adverse cardio-respiratory effects of pneumoperitoneum
- Accelerated ESLD after TIPSS

7.2.17.10 Post-operative care and placement, including:

- Supportive care for and management of post-operative liver dysfunction
- Management of coagulopathy
- Early enteral nutrition
- Monitoring for development of surgical complications e.g., pancreatic leaks / fistulae; anastomotic failure; ileus.
- Thrombo-embolism prophylaxis
- Targeted fluid management in major HPB surgery
- Appropriate antibiotic therapy – escalation and de-escalation
- Screening for and management of abdominal compartment syndrome in trauma cases with liver injury
- Management of severe acute pancreatitis

7.2.17.11 Pain management

- ERAS recommendations for analgesia in major HPB surgery
- Indications, contra-indications, advantages, disadvantages and management of thoracic epidural analgesia and spinal opioid techniques
- Wound catheter techniques for abdominal surgery
- Opioid free anaesthesia and analgesia

Skills

TECHNICAL SKILLS: CLINICAL

7.2.17.12 Patient and environmental preparation for proposed major procedures, including:

- Use of appropriate monitors including but not limited to point-of-care coagulation monitors, non-invasive cardiac output monitors, pressure transducers for arterial, pulmonary arterial, and venous pressure, invasive haemodynamic monitors, ultrasound machines with linear and trans-oesophageal probes, blood sugar monitors; neuro-muscular transmission (NMT) monitors and arterial blood gas analysers
- Planning for and placement of invasive lines and epidural catheters in major HPB/pancreatic cases.
- Techniques and devices for maintenance of normothermia

DRAFT FOR COMMENT

- Theatre layout and safe access planning for procedures – particularly remote venue procedures - involving large amounts of theatre furniture, prone patients etc – e.g. ERCP

Other Clinical Skills:

- Organisation/planning for expected or unforeseen eventualities:
  - Ensuring post-operative ICU facilities are available and communicating with intensivists.
  - Laboratory/blood bank notified and in possession of samples to hasten response in the event of major bleeding
  - Access to infusion devices and Vaso-active agents
  - Access to cell salvage
- Managing a pre-operative clinic
- Post-operative pain and follow-up service
  - Remain in contact with surgeon, intensivist, patient and family
  - Guide provision of analgesia
- Multi-disciplinary teams (MDT) for holistic patient care, ERAS pathways
  - Attend MDT meetings / obtain information regarding patient care pathway
  - Attend meetings to remain up to date on state of the art approaches
  - Discuss the proposed patient care pathway with surgeon to acquire situational awareness
  - Communicate care pathways with patients / family and post-operative care teams
- High-care / ICU / PACU organization – staffing & equipment
- Setting up acute / chronic pain service

Non-technical skills

- Leadership
- Situational awareness
  - Of resource limitations such as inadequate/ lack equipment, lack of medications and postoperative care (e.g. High Care and Intensive Care Units beds) required for high risk/ general surgery.
  - Of potential complications for specific endocrine conditions or intra-operative complications that may require a sudden change in course of procedure.
  - Activation of major bleeding team / response / protocol early in the context of surgical haemorrhage
- Collaboration
  - Requesting help from experienced colleagues when dealing with endocrine disorders one is unfamiliar with.
  - Collaborate with other clinicians and experts and nurses when managing endocrine disorders or complicated patients with multiple endocrine or HPB pathologies.
- Communication
  - Be aware of the importance of managing patient expectations with respect to perioperative outcomes and recovery for high-risk patients or for high-risk/general surgery.
  - Appropriate patient counselling and disclosures and accurate and effective information transfer to post-operative ICU and pain teams.
  - Communication with next-of-kin (having received patient consent pre-operatively). Awareness of security of electronic communications. Pre-, intra- and post-op communication about the clinical situation, e.g. resectability of malignant lesions

DRAFT FOR COMMENT

7.3 Anaesthesia for Trauma and Acute Burns

COMPETENCES	DA	FCA I	FCA II	MetComp
Provide safe perioperative care for acutely injured and burnt patients (adults, paediatrics, obstetrics and geriatric)				All
Apply principles of resuscitation, stabilisation and crisis management				All
Manage complex high-risk injured patients, and those with coexisting medical conditions relevant to anaesthesia				All
KNOWLEDGE				
Applied basic sciences – anatomy, physiology and pharmacology relating to trauma surgery and acute burns				ME/Sc/Pr/CA
Appropriate initial stabilisation assessment and optimisation of patients presenting with traumatic injuries and acute burns				ME/Sc/Pr/CA
Safe anaesthesia principles for patients presenting for trauma and acute burns surgery and management				ME/Sc/Pr/CA
Appropriate postoperative care, placement or referral of patients for trauma and acute burns emergency surgery				ME/Sc/Pr/CA
Anticipation, recognition and management of intra- and postoperative complications				

DRAFT FOR

DA

Knowledge

7.3.1 Basic sciences

7.3.1.1 Anatomy

- Applied knowledge of multisystem anatomy to enable identification of life- and limb-threatening injuries, severity assessment and performing local and regional anaesthesia through clinical examination and interpretation of imaging.

7.3.1.2 Physiology:

- Multisystem applied physiology and pathophysiology to enable rapid recognition and anticipation of life-threatening derangements in injured patients, for example:
    - Shock pathophysiology, diagnosis, mechanisms and causes
    - Pathophysiology of blood loss and massive blood transfusion; trauma-induced coagulopathy
    - Pathophysiology of head injury, including changes in cerebral blood flow, cerebral metabolism and intracranial pressure (see Domain 7.7)
    - Reperfusion pathophysiology
    - Crush syndrome and compartment syndromes
    - Inflammatory response to trauma and burns
    - Endocrine response to trauma and burns
    - Abnormal organ function
    - Pain pathophysiology
    - Principles of thermoregulation and management of temperature abnormalities

7.3.1.3 Pharmacology:

- Intravenous, inhalational anaesthetics, muscle relaxants – tailored use in trauma (see Domain 1)
- Rational fluid use (crystalloids and colloids) in trauma and burns resuscitation
- Patient blood management principles
- Vasoactive drugs
- Analgesics for intra- and postoperative use
- Medications that alter coagulation
- Principles of antimicrobial use

7.3.2 Physics and clinical measurement

- Relevant equipment and monitoring in trauma and acute burns, including:
    - Basic and advanced haemodynamic monitoring, including ultrasound, echo, pulse contour analysis and cardiac output monitoring
    - Ultrasound application in general trauma assessment
    - Coagulation monitoring (e.g. viscoelastic and other relevant point-of-care monitoring)
    - Appropriate theatre equipment preparation (e.g. cell salvage, rapid infusers, hypothermia prevention techniques)

7.3.3 Provision of safe anaesthetic and perioperative care for patients undergoing trauma and acute burns surgery

7.3.3.1 General Management Principles

- Pre-operative evaluation and resuscitation
- Application of the American Society of Anesthesiologists (ASA) grading system and other appropriate scoring systems in triage, risk stratification and outcome prediction
- Principles of general anaesthesia and sedation
- Regional techniques for injury pain management and procedures

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- Management of blood loss and coagulopathies, including blood conservation techniques
- Appropriate postoperative care
- Thromboembolism prophylaxis
- Perioperative and prophylactic antibiotics
- Management of postoperative pain, phantom limb pain and pain from injury
- Safe transfer of critically injured and burned patients, including mobile ventilation and monitoring, outside and inside the hospital environment

7.3.3.2 Perioperative management for trauma surgery**:**

- Principles of triage, patient assessment and immediate care, including the primary and secondary surveys, resuscitation and stabilisation
- Emergency management of the injured airway
- Principles of intravenous access for resuscitation
- Volume replacement principles
- Management of chest and abdominal injuries
- Damage control surgery – role and implementation
- Management of facial, head, cervical and other vertebral column injuries
- Immobilisation and protection of patients with spinal injuries during transport, transfer and intubation
- Pelvic and long bone fractures – managing complications and supporting techniques
- Initial assessment and management of a patient who has experienced electrocution, drowning and near drowning, envenomation and severe hypothermia
- Trauma severity scores, Glasgow Coma Scale (GCS) and other scores relevant to the assessment of the injured patient
- Safe sedation and prehospital emergency anaesthesia
- Principles of clinical management of the entrapped patient and interagency teams working to support patient extrication
- Principles of emergency preparedness for chemical, biological and radiological hazard exposure and initial decontamination and management
- Initial management principles of trauma patients under investigation (PUI) for suspected SARS-CoV-2 infection or other contagion

7.3.3.3 Perioperative management of acute burns**:**

- Initial assessment of the patient with severe burns and associated trauma
- The severity of burns using recognised methods such as Lund-Browder charts and the Rule of Nines to decide if major/minor burns
- Recognition of airway and facial burns, circumferential burns and carbon monoxide poisoning
- Burn classification based on depth/extent (e.g. partial thickness, full thickness – first, second and third degree)
- Differentiating the pathophysiology of thermal, electrical and chemical burns
- Management of acute burns, including:
    - Resuscitation using current ATLS and ACLS guidelines
    - Fluid management – fluid type, pros and cons of different formulas guiding fluid requirements in different phases
    - Patient blood management principles
- Anaesthesia for debridement, skin grafting and dressing change
- Anaesthetic agents used and contraindicated in burns
- Theatre special requirements (e.g. temperature management, infection control, difficult IV access, monitoring, hyperkalaemia management)
- Complications of repeated anaesthesia for burns patients
- Sedation for the dressing change
- Postoperative concerns – analgesia, nutritional support, temperature, systemic complications, sepsis prevention and management

DRAFT FOR COMMENT

- Reconstructive surgery (flaps and skin grafting) and management of contractures and chronic pain
- Burn outcomes and complications (early vs. late)
- Epidemiology of burns in adult and paediatric patients

Skills

7.3.4 Technical skills: Clinical

- Preoperative assessment, including detection and stabilisation of life-threatening injuries while planning the safest anaesthetic technique
- Securing an airway and performing a rapid sequence induction with the appropriate immobilisation and care of cervical spine injuries
- Cricothyroidotomy and percutaneous tracheostomy
- Awake fibreoptic intubation and other advanced airway techniques
- Management of the hypoxic patient and the patient with trachea-bronchial injury/flail chest
- Intercostal drain insertion and management
- Diagnosis and management of life-threatening haemorrhage in the polytrauma patient; particularly haemorrhage due to chest trauma, abdominal trauma, pelvic trauma and major vascular injury
- Cannulation of major vessels for volume resuscitation
- Initial assessment and management of acute traumatic brain injury, unstable spinal injury (including clearing the cervical spine), acute spinal cord injury and neurogenic shock
- Management of raised intracranial pressure and multidisciplinary planning for prioritisation of surgical interventions
- Use and interpretation of central vascular monitoring, including the cardiac output monitor
- Rapid transfusion and fluid warming devices
- Blood salvage and conservation

7.3.5 Technical skills: Organisational

- The organisation of personnel, equipment and medications for normal requirements and during a multi-person disaster using resources in and outside the theatre complex
- Activate major bleeding protocol early in the context of surgical haemorrhage
- Early referral to appropriate centres if unable to provide definitive care for patients requiring major trauma surgery or acute burn care
- Priority setting concerning resuscitation, investigations and surgical procedures
- The organisation of trauma and retrieval services
- Importance of early ICU referral and consultation and knowledge of local ICU admission criteria
- The organisation of trauma team clinical drills and algorithms designed for crisis management, including trauma emergencies and intraoperative crises

7.3.6 Technical skills: Administrative

- Document patient safety events related to anaesthetic management and preoperative counselling of the patient/next-of-kin, particularly relating to high-risk procedures with poor predicted outcomes
- Ensure appropriate medico-legal documentation of injuries on appropriate forms
- In the event of procedure-related death, follow and complete appropriate post-mortem procedures and documents (see Domain 6)

DRAFT FOR COMMENT

7.3.7 Non-technical skills: Leadership

- Triage processes for emergencies
- Intraoperative leadership in situations of patient clinical instability (e.g. switch to damage control surgery, staging of procedures, setting limits early of allowable blood loss, transfusion triggers, lowest acceptable temperature)

FCA

Knowledge

7.3.1 Basic sciences

7.3.1.3 Anatomy

- Applied knowledge of multisystem anatomy to enable identification of life- and limb-threatening injuries, severity assessment and performing local and regional anaesthesia through clinical examination and interpretation of imaging.

7.3.1.4 Physiology:

- Multisystem applied physiology and pathophysiology to enable rapid recognition and anticipation of life-threatening derangements in injured patients, for example:
    - Shock pathophysiology, diagnosis, mechanisms and causes
    - Pathophysiology of blood loss and massive blood transfusion; trauma-induced coagulopathy
    - Pathophysiology of head injury, including changes in cerebral blood flow, cerebral metabolism and intracranial pressure (see Domain 7.7)
    - Reperfusion pathophysiology
    - Crush syndrome and compartment syndromes
    - Inflammatory response to trauma and burns
    - Endocrine response to trauma and burns
    - Abnormal organ function
    - Pain pathophysiology
    - Principles of thermoregulation and management of temperature abnormalities

7.3.1.3 Pharmacology:

- Intravenous, inhalational anaesthetics, muscle relaxants – tailored use in trauma (see Domain 1)
- Rational fluid use (crystalloids and colloids) in trauma and burns resuscitation
- Patient blood management principles
- Vasoactive drugs
- Analgesics for intra- and postoperative use
- Medications that alter coagulation
- Principles of antimicrobial use

7.3.2 Physics and clinical measurement

- Relevant equipment and monitoring in trauma and acute burns, including:
    - Basic and advanced haemodynamic monitoring, including ultrasound, echo, pulse contour analysis and cardiac output monitoring
    - Ultrasound application in general trauma assessment
    - Coagulation monitoring (e.g. viscoelastic and other relevant point-of-care monitoring)
    - Appropriate theatre equipment preparation (e.g. cell salvage, rapid infusers, hypothermia prevention techniques)

DRAFT FOR COMMENT

7.3.3 Provision of safe anaesthetic and perioperative care for patients undergoing trauma and acute burns surgery

7.3.3.1 General Management Principles:

Understand relevant principles relating to the anaesthetic management of patients for major (high risk and emergencies) and trauma surgery and acute burns as follows:

- Preoperative evaluation and resuscitation.
- Application of the American Society of Anesthesiologists (ASA) grading system and other appropriate scoring systems in triage, risk stratification and outcome prediction
- Principles of general anaesthesia and sedation
- Regional techniques for injury pain management and procedures abdominal, vascular, and imaging procedures including anatomy, and physiological and pharmacological aspects.
- Management of blood loss and coagulopathies, including blood conservation techniques
- Appropriate postoperative care
- Thromboembolism prophylaxis
- Perioperative and prophylactic antibiotics
- Management of postoperative pain, phantom limb pain and pain from injury
- Safe transfer of critically injured and burned patients, including mobile ventilation and monitoring, outside and inside the hospital environment
- Knowledge of the various scoring systems used to predict patient outcomes and mortality.

7.3.3.2 Perioperative management for trauma surgery**:**

- Principles of triage, patient assessment and immediate care, including the primary and secondary surveys, resuscitation and stabilisation
- Emergency management of the injured airway
- Principles of intravenous access for resuscitation
- Volume replacement principles
- Management of chest and abdominal injuries
- Damage control surgery – role and implementation
- Management of facial, head, cervical and other vertebral column injuries
- Immobilisation and protection of patients with spinal injuries during transport, transfer and intubation
- Pelvic and long bone fractures – managing complications and supporting techniques
- Initial assessment and management of a patient who has experienced electrocution, drowning and near drowning, envenomation and severe hypothermia
- Trauma severity scores, Glasgow Coma Scale (GCS) and other scores relevant to the assessment of the injured patient
- Safe sedation and prehospital emergency anaesthesia
- Principles of clinical management of the entrapped patient and interagency teams working to support patient extrication
- Principles of emergency preparedness for chemical, biological and radiological hazard exposure and initial decontamination and management
- Initial management principles of trauma patients under investigation (PUI) for suspected SARS-CoV-2 infection or other contagion

7.3.3.3 Perioperative management of acute burns**:**

- Initial assessment of the patient with severe burns and associated trauma
- The severity of burns using recognised methods such as Lund-Browder charts and the Rule of Nines to decide if major/minor burns
- Recognition of airway and facial burns, circumferential burns and carbon monoxide poisoning
- Burn classification based on depth/extent (e.g. partial thickness, full thickness – first, second and third degree)
- Differentiating the pathophysiology of thermal, electrical and chemical burns

DRAFT FOR COMMENT

- Management of acute burns, including:
    - Resuscitation using current ATLS and ACLS guidelines
    - Fluid management – fluid type, pros and cons of different formulas guiding fluid requirements in different phases
    - Patient blood management principles
- Anaesthesia for debridement, skin grafting and dressing change
- Anaesthetic agents used and contraindicated in burns
- Theatre special requirements (e.g. temperature management, infection control, difficult IV access, monitoring, hyperkalaemia management)
- Complications of repeated anaesthesia for burns patients
- Sedation for the dressing change
- Postoperative concerns – analgesia, nutritional support, temperature, systemic complications, sepsis prevention and management
- Reconstructive surgery (flaps and skin grafting) and management of contractures and chronic pain
- Burn outcomes and complications (early vs. late)
- Epidemiology of burns in adult and paediatric patients

Skills

7.3.4 Technical skills: Clinical

- Preoperative assessment, including detection and stabilisation of life-threatening injuries while planning the safest anaesthetic technique
- Securing an airway and performing a rapid sequence induction with the appropriate immobilisation and care of cervical spine injuries
- Cricothyroidotomy and percutaneous tracheostomy
- Awake fibreoptic intubation and other advanced airway techniques
- Management of the hypoxic patient and the patient with trachea-bronchial injury/flail chest
- Intercostal drain insertion and management
- Diagnosis and management of life-threatening haemorrhage in the polytrauma patient; particularly haemorrhage due to chest trauma, abdominal trauma, pelvic trauma and major vascular injury
- Cannulation of major vessels for volume resuscitation
- Initial assessment and management of acute traumatic brain injury, unstable spinal injury (including clearing the cervical spine), acute spinal cord injury and neurogenic shock
- Management of raised intracranial pressure and multidisciplinary planning for prioritisation of surgical interventions
- Use and interpretation of central vascular monitoring, including the cardiac output monitor
- Rapid transfusion and fluid warming devices
- Blood salvage and conservation
- Role and controversies of Regional and Neuraxial techniques in trauma Airway emergencies, difficult and failed airway emergencies.
- Hypoxia, abnormal end- tidal CO_2 levels, and abnormal airway pressures.
- Major intraoperative events including bronchospasm, thromboembolic events, arrhythmias, tension pneumothorax, cardiac tamponade, respiratory and cardiac arrest, hypovolaemia, distributive, cardiogenic, and obstructive shock, acute myocardial ischaemia, acute pulmonary oedema, aortic dissection, aspiration of gastric contents, massive haemoptysis, coma, prolonged seizures, anaphylaxis, and fat and air embolism.

DRAFT FOR COMMENT

7.3.5 Technical skills: Organisational

- The organisation of personnel, equipment and medications for normal requirements and during a multi-person disaster using resources in and outside the theatre complex
- Activate major bleeding protocol early in the context of surgical haemorrhage
- Early referral to appropriate centres if unable to provide definitive care for patients requiring major trauma surgery or acute burn care
- Priority setting concerning resuscitation, investigations and surgical procedures
- The organisation of trauma and retrieval services
- Importance of early ICU referral and consultation and knowledge of local ICU admission criteria
- The organisation of trauma team clinical drills and algorithms designed for crisis management, including trauma emergencies and intraoperative crises

7.3.6 Technical skills: Administrative

- Document patient safety events related to anaesthetic management and preoperative counselling of the patient/next-of-kin, particularly relating to high-risk procedures with poor predicted outcomes
- Ensure appropriate medico-legal documentation of injuries on appropriate forms
- In the event of procedure-related death, follow and complete appropriate post-mortem procedures and documents (see Domain 6)

7.3.7 Non-technical skills:

Leadership

- Prioritisation of emergency cases especially if there are paediatric patients involved.
- Triage processes for emergencies
- Intraoperative leadership in situations of patient clinical instability (e.g. switch to damage control surgery, staging of procedures, setting limits early of allowable blood loss, transfusion triggers, lowest acceptable temperature)

Context Awareness

- Sensitivity to and recognition of patient anxiety, and anxiety of family member/ next-of-kin regarding anaesthesia and surgical risks in emergency or high-risk patients or in paediatric patients.
- Awareness of the ethical considerations specifically associated with triage and anaesthesia related deaths in high risk/major surgery.
- Awareness of limitations of pre-operative testing and optimization in situations of clinical instability and emergency.
- Awareness of the limitation of institutional resources in being able to provide holistic support for high risk, major or trauma surgery and acute burns, and take steps to mitigate risk.

Communication

- Communicate appropriately with the healthcare providers responsible for postoperative care of the patient, including information regarding intra-operative events, and notification of transfer from theatre, paying particular attention to unstable patients.
- Effective communication to next of kin or to patient with respect to potential poor outcomes relating to high risk, trauma surgery or acute burns.

DRAFT FOR COMMENT

Health Advocate

- Psychological/emotional, physio- and occupational therapy of severely burnt patient with depression, post-traumatic stress disorder (PTSD) and disabilities.
- Identification of need for psychological support required for vulnerable patients or those having difficulty in making decisions relating to perioperative risk and poor outcomes.

DRAFT FOR COMMENT

7.4 Orthopaedics and Rheumatology

	DA	FCA I	FCA II	MetComp
COMPETENCES				
Integrate knowledge of perioperative medicine to provide safe anaesthesia for musculoskeletal, limb, spinal procedures and rheumatological conditions				ALL
KNOWLEDGE				
Physiology, anatomy, pharmacology, physics and pathophysiology related to orthopaedics and rheumatology				ME/Sc/Pr/CA
Assessment, examination and appropriate investigation and optimisation of patients preoperatively				ME/CA/HA/Le/Cm/Pr/Hu
Perioperative anaesthesia care for health, diseased and polytrauma patients, adults and children				ME/Sc/HA/Le/Cm/Cl/Pr/Hu
Advanced orthopaedic pain treatment				ME/Sc/HA/Le/Cm/Cl/Pr/Hu

DA

7.4.1 Aim/s

- To have a thorough understanding of musculoskeletal diseases, limb and spinal trauma and elective limb and spinal surgery
- To be able to integrate knowledge of perioperative medicine and provide safe anaesthesia in the context of limb and spinal procedures

7.4.2 Knowledge

Core and additional knowledge to enable patient management for limb and spinal surgery and anaesthesia; covering relevant aspects of basic science principles.

7.4.2.1 Physiology:

- Central and peripheral neural systems – motor, sensory, reflex and pain pathways
- Skeletal muscle and bone physiology
- Skin and connective tissue

7.4.2.2 Anatomy:

- A better understanding of surgical diagnosis and treatment plans
- Clinical application in regional and neuraxial anaesthesia
- Spinal cord and major nerve and vascular supply to the upper and lower limbs

7.4.2.3 Pharmacology:

- General anaesthesia and local anaesthesia, toxic reactions and treatment
- Antibiotic choices and timing:
    - Prevention of surgical site infection
    - Therapeutic antibiotics
- Anticoagulants and antiplatelet agents:
    - Antiplatelet therapy
    - Implications and management of these agents when planning neuraxial and deep blocks

DRAFT FOR CONSULTATION

    - Therapeutic anticoagulants
    - Thromboprophylaxis
- Chemotherapy and immunosuppressants:
    - Orthopaedic tumour and sepsis
    - Chemotherapy and radiation
- Rheumatology:
    - Disease-modifying antirheumatic medications (DMARDs) – conventional and biological
    - Steroids in the perioperative period

7.4.2.4 Physics:

- Nerve stimulators, tourniquet, ultrasound, evoked potential monitoring, near-infrared spectroscopy monitoring:
    - The physics principles of these monitors
    - Practical application in clinical medicine

7.4.3 Pathophysiology and complications of concurrent diseases and their implications for anaesthesia practice

- Pathophysiology for the various conditions
- Concurrent and comorbid conditions
- Medication and drug interactions
- Anaesthetic considerations, including but not limited to, IV access, need for additional and invasive monitoring, airway management, selection of neuraxial and regional anaesthesia

7.4.3.1 Rheumatology and musculoskeletal:

- Including articular affectation (such as airway and cervical spine) and systemic affectation (particularly CVS, respiratory, renal, CNS, and haematology):
    - Achondroplasia
    - Ankylosing spondylitis
    - Inflammatory myopathies
    - Musculoskeletal malignancies
    - Rheumatoid arthritis
    - Scleroderma
    - SLE
    - Sarcoidosis
    - Ulcerative colitis / Crohn's disease
    - Marfan and Ehlers Danlos

7.4.3.2 Spine surgery:

- Acute traumatic spinal cord injuries
- Cervical spine (acute and other)
- Chronic spinal patients

7.4.3.3 Upper limb:

- Shoulder and shoulder girdle
- Upper arm
- Elbow
- Wrists and hands
- Tumour and sepsis

7.4.3.4 Lower limb:

- Pelvis
- Hip
- Knee
- Ankle and foot
- Tumour and sepsis

7.4.3.5 Paediatric orthopaedics, in particular:

- Cerebral palsy

DRAFT FOR COMMENT

- Non-accidental injuries
- Club feet

7.4.4 Assessment, examination and appropriate investigation of patients preoperatively

7.4.4.1 Patient/family education, counselling and consent
7.4.4.2 Polytrauma management
7.4.4.3 Emergency orthopaedic cases
7.4.4.4 General elective orthopaedics
7.4.4.5 Comorbid diseases, such as:

- Rheumatological diseases and associated systemic affectation
- Orthogeriatrics and the neck of femur fractures
- Cardiac for non-cardiac cases
- Respiratory complications
- Other

7.4.4.6 Psychosocial assessment and considerations

7.4.5 Preoperative optimisation

7.4.5.1 Polytrauma resuscitation and management:

- Airway and cervical spine protection
- Primary and secondary surveys
- Resuscitation principles
- Severe haemorrhage:
  - Pelvic fractures
  - Other systems (e.g. chest and abdomen)
- Spinal shock

7.4.5.2 Emergency orthopaedics:

- Emergency cases:
  - Joint dislocations and fractures causing threatening limbs
  - Open fractures
  - Pelvic fractures
- Multiple urgent procedures
- Upper limb
- Lower limb
- Paediatric orthopaedics

7.4.5.3 General elective orthopaedics:

- Upper limb
- Lower limb
- Paediatric orthopaedics

7.4.5.4 Comorbid diseases, such as:

- Rheumatological diseases and associated systemic affectation
- Orthogeriatrics
- Cardiac for non-cardiac cases
- Respiratory complications
- Other

7.4.5.5 Appropriate knowledge of pharmacology in the perioperative period (see Domain 5)

7.4.6 Perioperative care

7.4.6.1 Up-to-date perioperative care, including:

- Regional anaesthesia
- Neuraxial anaesthesia
- General anaesthesia
- Anaesthetic concern for rheumatological diseases

DRAFT FOR COMMENT

7.4.6.2 Intraoperative positioning:

- Other special requirements regarding various common orthopaedic positioning
- Pressure care
- Nerve injuries
- Physiological effects of various positions

7.4.6.3 Perioperative complications:

- Autonomic dysreflexia
- Compartment syndrome
- Crush injuries
- Embolic phenomena (venous thromboembolism, fat embolism, air embolism, cement implantation syndrome)
- Major haemorrhage in the orthopaedic setting and transfusion principles
- Safe tourniquet uses and complications

7.4.6.4 Ambulatory surgery principles in the setting of orthopaedic surgery

7.4.7 Knowledge of critical care principles at a level to manage the postoperative surgical patient and to assist the specialist intensivist

7.4.7.1 Complex patient factors
7.4.7.2 Complicated perioperative period
7.4.7.3 Anaesthesia-related complications

7.4.8 Advanced, tailored pain management principles: Diagnosis, pharmacological and non-pharmacological treatment

7.4.8.1 Acute pain management:

- Preoperative:
  - As part of resuscitation and before theatre triage
  - Premedication
- Intraoperative:
  - Holistic approach considering the patient, surgery and anaesthesia options
- Postoperative:
  - Effective and safe acute pain management in different scenarios

7.4.8.2 Early recovery after surgery principles:

- Drink, eat and mobilise
- Effective pain management with the least side effects
- Avoid postoperative cognitive dysfunction

7.4.8.3 Chronic pain:

- Prevention of chronic pain in the future

Skills

7.4.9 Technical

7.4.9.1 Clinical:

- Clinically assess, diagnose, investigate, manage, monitor and care for orthopaedic patients and patients with musculoskeletal diseases
- Perioperative planning and providing anaesthesia for elective and emergency orthopaedic surgery, as well as paediatric orthopaedic surgery
- Perioperative planning and providing anaesthesia for elective and emergency surgery for rheumatology patients presenting for orthopaedic and other surgical procedures
- Postoperative care of orthopaedic and patients with musculoskeletal diseases, including critical care, acute and chronic pain management

7.4.9.2 Organisational:

- Organise regional anaesthesia block rooms

DRAFT FOR COMMENT

7.4.10 Non-technical Skills

All general NTS (See Background).

Attributes, Attitudes and behaviour:

- Understand need for multidisciplinary teamwork, communication and collaboration with all role-players
- Commit to, and believe in, a culture of safe and ethical, high-quality care
- Accept that medical knowledge and skills are not the only requirements of specialist practice
- Be aware of medico-legal obligations relating to medical practice
- Have insight into one's own limitations, abilities and areas of expertise
- Commit to lifelong continuing professional development
- Manage patients and their kin honestly, empathetically, with honour, respect and kindness
- Acknowledge, understand and be tolerant to patient diversities
- Maintain accountability to self, patients, society and the profession
- Behave, commit to, and believe in a manner that embraces ethical and professional principles

FCA

7.4.1 Aim/s

- To have a thorough understanding of musculoskeletal diseases, limb and spinal trauma and elective limb and spinal surgery
- To be able to integrate knowledge of perioperative medicine and provide safe anaesthesia in the context of limb and spinal procedures

7.4.2 Knowledge

Core and additional knowledge to enable patient management for limb and spinal surgery and anaesthesia; covering relevant aspects of basic science principles.

7.4.5.6 Physiology:

- Central and peripheral neural systems – motor, sensory, reflex and pain pathways
- Skeletal muscle and bone physiology
- Skin and connective tissue

7.4.5.7 Anatomy:

- A better understanding of surgical diagnosis and treatment plans
- Clinical application in regional and neuraxial anaesthesia
- Spinal cord and major nerve and vascular supply to the upper and lower limbs

7.4.5.8 Pharmacology:

- General anaesthesia and local anaesthesia, toxic reactions and treatment
- Antibiotic choices and timing:
    - Prevention of surgical site infection
    - Therapeutic antibiotics
- Anticoagulants and antiplatelet agents:
    - Antiplatelet therapy
    - Implications and management of these agents when planning neuraxial and deep blocks
    - Therapeutic anticoagulants
    - Thromboprophylaxis

DRAFT FOR COMMENT

- Chemotherapy and immunosuppressants:
    - Orthopaedic tumour and sepsis
    - Chemotherapy and radiation
- Rheumatology:
    - Disease-modifying antirheumatic medications (DMARDs) – conventional and biological
    - Steroids in the perioperative period

7.4.2.4 Physics:

- Nerve stimulators, tourniquet, ultrasound, evoked potential monitoring, near-infrared spectroscopy monitoring:
    - The physics principles of these monitors
    - Practical application in clinical medicine

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- Concurrent and comorbid conditions
- Medication and drug interactions
- Anaesthetic considerations, including but not limited to, IV access, need for additional and invasive monitoring, airway management, selection of neuraxial and regional anaesthesia

7.4.3.1 Rheumatology and musculoskeletal:

- Including articular affectation (such as airway and cervical spine) and systemic affectation (particularly CVS, respiratory, renal, CNS, and haematology):
    - Achondroplasia
    - Ankylosing spondylitis
    - Inflammatory myopathies
    - Musculoskeletal malignancies
    - Rheumatoid arthritis
    - Scleroderma
    - SLE
    - Sarcoidosis
    - Ulcerative colitis / Crohn's disease
    - Marfan and Ehlers Danlos

7.4.3.2 Spine surgery:

- Acute traumatic spinal cord injuries
- Cervical spine (acute and other)
- Chronic spinal patients
- Congenital disease
- Degenerative disease
- Neuromuscular disease
- Scoliosis
- Spinal infections (such as TB spine)
- Spinal tumours

7.4.3.3 Upper limb:

- Shoulder and shoulder girdle
- Upper arm
- Elbow
- Wrists and hands
- Tumour and sepsis

7.4.3.4 Lower limb:

- Pelvis
- Hip
- Knee

DRAFT FOR COMMENT

- Ankle and foot
- Tumour and sepsis

7.4.3.5 Paediatric orthopaedics, in particular:

- Cerebral palsy
- Osteogenesis imperfecta
- Non-accidental injuries
- Club feet

7.4.4 Assessment, examination and appropriate investigation of patients preoperatively

7.4.4.1 Patient/family education, counselling and consent
7.4.4.2 Polytrauma management
7.4.4.3 Emergency orthopaedic cases
7.4.4.4 General elective orthopaedics
7.4.4.5 Major cases

- Shoulder surgery
- Revision arthroplasty surgery
- Complex spine surgery

7.4.4.6 Comorbid diseases, such as:

- Rheumatological diseases and associated systemic affectation
- Orthogeriatrics and the neck of femur fractures
- Cardiac for non-cardiac cases
- Respiratory complications
- Other

7.4.4.7 Psychosocial assessment and considerations

7.4.5 Preoperative optimisation

7.4.5.1 Polytrauma resuscitation and management:

- Airway and cervical spine protection
- Primary and secondary surveys
- Resuscitation principles
- Severe haemorrhage:
  - Pelvic fractures
  - Other systems (e.g. chest and abdomen)
- Spinal shock

7.4.5.2 Emergency orthopaedics:

- Emergency cases:
  - Joint dislocations and fractures causing threatening limbs
  - Open fractures
  - Pelvic fractures
- Multiple urgent procedures
- Upper limb
- Lower limb
- Spines
- Paediatric orthopaedics

7.4.5.3 General elective orthopaedics:

- Upper limb
- Lower limb
- Spine
- Paediatric orthopaedics

7.4.5.4 Major cases:

- Complex paediatric cases
- Shoulder, hip and knee replacement surgery

DRAFT FOR COMMENT

- Revision arthroplasty surgery
- Complex spine surgery (e.g. scoliosis correction)

7.4.5.5 Comorbid diseases, such as:

- Rheumatological diseases and associated systemic affectation
- Orthogeriatrics
- Cardiac for non-cardiac cases
- Respiratory complications
- Other

7.4.5.6 Appropriate knowledge of pharmacology in the perioperative period (see Domain 5)

7.4.6 Perioperative care

7.4.6.1 Up-to-date perioperative care, including:

- Regional anaesthesia
- Neuraxial anaesthesia
- General anaesthesia
- Anaesthetic concern for rheumatological diseases

7.4.6.2 Intraoperative positioning:

- Prone and beach chair surgery
- Other special requirements regarding various common orthopaedic positioning
- Pressure care
- Nerve injuries
- Physiological effects of various positions

7.4.6.3 Perioperative complications:

- Autonomic dysreflexia
- Compartment syndrome
- Crush injuries
- Embolic phenomena (venous thromboembolism, fat embolism, air embolism, cement implantation syndrome)
- Major haemorrhage in the orthopaedic setting and transfusion principles
- Safe tourniquet uses and complications

7.4.6.4 Ambulatory surgery principles in the setting of orthopaedic surgery

7.4.7 Knowledge of critical care principles at a level to manage the postoperative surgical patient and to assist the specialist intensivist

7.4.7.1 Complex surgery
7.4.7.2 Complex patient factors
7.4.7.3 Complicated perioperative period
7.4.7.4 Anaesthesia-related complications

7.4.8 Advanced, tailored pain management principles: Diagnosis, pharmacological and non-pharmacological treatment

7.4.8.1 Acute pain management:

- Preoperative:
  - As part of resuscitation and before theatre triage
  - Premedication
- Intraoperative:
  - Holistic approach considering the patient, surgery and anaesthesia options
- Postoperative:
  - Effective and safe acute pain management in different scenarios

7.4.8.2 Early recovery after surgery principles:

- Drink, eat and mobilise
- Effective pain management with the least side effects
- Avoid postoperative cognitive dysfunction

7.4.8.3 Chronic pain:

DRAFT FOR COMMENT

- Manage patients with existing chronic pain perioperatively
- Prevention of chronic pain in the future

Skills

7.4.9 Technical

7.4.9.1 Clinical:

- Clinically assess, diagnose, investigate, manage, monitor and care for orthopaedic patients and patients with musculoskeletal diseases
- Perioperative planning and providing anaesthesia for elective and emergency orthopaedic surgery, as well as paediatric orthopaedic surgery
- Perioperative planning and providing anaesthesia for elective and emergency surgery for rheumatology patients presenting for orthopaedic and other surgical procedures
- Postoperative care of orthopaedic and patients with musculoskeletal diseases, including critical care, acute and chronic pain management

7.4.9.2 Organisational:

- Organise regional anaesthesia block rooms
- Organising and planning for the routine and the unforeseen eventualities in theatre and peri-operatively.
- Managing a pre-operative service and referral of difficult cases
- Post-operative pain service
- Integrated and multi-disciplinary team player in the holistic management of orthopaedic patients with:
    - Simple and complex background diseases,
    - ERAS pathways
    - Geriatric care
    - Paediatric care
- Managing theatre efficiency
- Managing high care, intensive care and PACU areas
- Managing acute and chronic pain services

7.4.9.3 Administrative:

- Ensuring documentation of the patients and processes in the operating theatres and ICU is well archived (and POPIA compliant)
- Meticulous completion of anaesthetic and ICU records
- Monitoring and evaluation for audit purposes
- Management of medicolegal documentation e.g. consent, living wills
- Theatre efficiency and effective usage of operating theatre spaces and time

7.4.10 Non-technical Skills

7.4.10.1 Team leader or team player:

- Form part of teams (as leader or player) in perioperative space, ICU and pain management that will optimise patient outcomes and increase productivity.
- Identify the specific roles to be played within every team.
- Be aware of team dynamics and demands and changing roles.

7.4.10.2 Context and Situational Awareness:

- Awareness and responsiveness to clinical surroundings: (incl. but not exclusive) patient, staff, environment and equipment.
- Dangers in theatre environments and remote sites where procedures are done
- Effective theatre usage and managing theatre operationally
- Recognition and timeous intervention to prevent and treat complications.
- Risk assessment of patients and planning accordingly
- Awareness and acknowledgement of patient's living environment and pre-operative function, expectations for postoperative period.

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7.4.10.3 Decision making/Insight:
- Integration of knowledge, skill and having certain attributes to make the correct clinical and organizational decisions within the context of each situation.

7.4.10.4 Communication:
- Ensure appropriate patient counselling and disclosures, effective consultations, safe handover, and optimal peri-operative care in these specific areas of practice, including the pre-operative setting, ward care, intensive care unit and the acute and chronic pain clinics
- Effective communication and collaboration with colleagues in the clinic, wards and theatre environment.
- Communication with patients and next-of kin, whilst being cognisant of confidentiality
- Discussions of risk assessment and peri-operative planning
- Specific scenario's: frail and/or elderly and demented patients

7.4.10.5 Professionalism:
- Appropriate interactions with all members of peri-operative team.
- Actions and communication according to ethical code and medical oath.

7.4.10.6 Collaboration:
- Collaborate with other clinicians, nursing teams and patient and patient's kin to ensure that the patient is managed appropriately during the peri-operative period.
- Professional disputes in decision making regarding frail/ elderly with significant co-morbid disease

7.4.10.7 Health advocacy
- Health advocacy and education
- Using "teachable" moments to promote lifestyle modifications
- Putting patient safety as a high priority

7.4.10.8 Humaneness:
- Effective pain management during all periods peri-operatively
- Respect for end-of-life decisions
- Palliative care
- Kindness and care of patients
- Kindness and care fellow colleagues of all levels

Attributes, Attitudes and behaviour:

- Understand need for multidisciplinary teamwork, communication and collaboration with all role-players
- Commit to, and believe in, a culture of safe and ethical, high-quality care
- Accept that medical knowledge and skills are not the only requirements of specialist practice
- Be aware of medico-legal obligations relating to medical practice
- Have insight into one's own limitations, abilities and areas of expertise
- Commit to lifelong continuing professional development
- Manage patients and their kin honestly, empathetically, with honour, respect and kindness
- Acknowledge, understand and be tolerant to patient diversities
- Maintain accountability to self, patients, society and the profession
- Behave, commit to, and believe in a manner that embraces ethical and professional principles

DRAFT FOR COMMENT

7.5 Anaesthesia for Obstetrics and Gynaecology

COMPETENCES	DA	FCA I	FCA II	MetComp
To provide contextualised, holistic perioperative anaesthesia and analgesia for all aspects of obstetric practice, including labour ward and surgical management, with special emphasis on optimising maternal and neonatal outcomes and medicolegal concerns				All
KNOWLEDGE				
Relevant basic sciences: i. Anatomy and physiology of the parturient ii. Pharmacology for the parturient and neonate iii. Foetal, neonatal and placental physiology				ME/Sc
Preoperative workup and optimisation for the obstetric patient				ME/Cm/Cl /Le/Sc/HA/ Pr/CA/Hu
Relevant medical conditions during pregnancy, specific obstetric-related pathology, and their perioperative management				ME/Cm/Cl /Sc/HA/CA
Obstetric and non-obstetric surgery during pregnancy, early pregnancy conditions and caesarean section				ME/Sc
Regional and general anaesthesia – conduct, complications and concerns in the obstetric setting				ME/Sc
Labour ward management – safe, contextualised and effective pain management options Risk/benefit analysis and the management of potential complications				ME/Sc
Critical care management of the pregnant patient, including maternal resuscitation				ME/Sc
Foetal and neonatal considerations in obstetric practice				ME/Le/Sc/ CA
Specific professional practice and ethical considerations – consent, maternal mortality, termination of pregnancy and clinical governance				Cm/Le/HA /Pr/Hu

Summary

7.5.1 Anatomy and physiology
7.5.2 Pharmacology
7.5.3 Labour ward pain management
7.5.4 Principles of obstetric preoperative care, including holistic patient workup, risk assessment, referral and counselling
7.5.5 Obstetric related medical conditions and their perioperative management (*Emergency management only in DA)
7.5.6 Anaesthetic management of problems that may arise during labour and delivery
7.5.7 The pathophysiology and anaesthetic management of conditions particular to pregnancy
7.5.8 Detailed knowledge of obstetric surgical procedures, including early pregnancy conditions
7.5.9 Regional and general anaesthesia in the obstetric setting

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7.5.10 Multimodal analgesic techniques used after caesarean or vaginal delivery in differing contexts
7.5.11 Anaesthesia for non-obstetric surgery during pregnancy
7.5.12 Emergency and critical care management for the pregnant patient, including maternal resuscitation
7.5.13 Foetal and neonatal considerations
7.5.14 Specific professional practice and ethical considerations
7.5.15 Technical skills
7.5.16 Non-technical competencies

DA

7.5.1 Anatomy and physiology

7.5.1.1 Physiological changes and their implications for anaesthesia during pregnancy, labour and delivery; respiratory, cardiovascular, haematological, neurological, renal and gastrointestinal changes
7.5.1.2 Reference ranges for physiological and biochemical variables in pregnancy
7.5.1.3 Changes in the anatomy of the maternal airway and the impact on airway management during anaesthesia
7.5.1.4 Mechanism and consequences of aortocaval compression in pregnancy
7.5.1.5 Uteroplacental circulation and the principles of placental physiology as related to the development, structure and regulation of placental flow, placental gas exchange, nutrient transport and drug transfer
7.5.1.6 Changes in the anatomy of the maternal vertebral column, the spinal cord and meninges relevant to the performance of a central neuraxial block
7.5.1.7 Anatomy and physiology of pain in labour and childbirth, including the pain pathways for stages of labour
7.5.1.8 Effect of uterine contractions on placental exchange and foetal oxygenation
7.5.1.9 Implications of antenatal foetal gestation, growth, fluid, position and abnormalities, foetal adaptations to hypoxia, abnormal cardiotocography (CTG), foetal heart rate patterns implications during labour and their response to hypoxia or asphyxia; the impact on foetus of a drop in maternal cardiac output

7.5.2 Pharmacology

7.5.2.1 Pharmacology of oxytocic agents with special reference to oxytocin derivatives (including carbetocin), ergot derivatives and prostaglandins
7.5.2.2 Pharmacology of tocolytic agents, with specific reference to beta-2 agonists, calcium antagonists, magnesium, inhalational anaesthetics, nitrates and non-steroidal anti-inflammatory medications (NSAIDs)
7.5.2.3 Pharmacology of agents used for the treatment of preeclampsia, including nifedipine, magnesium, hydralazine, labetalol and other antihypertensives
7.5.2.4 Factors that influence the transfer of medications across the placenta and into breast milk
7.5.2.5 Potential effects on the foetus and neonate of medications administered during pregnancy
7.5.2.6 Minimum alveolar concentration (MAC) and local anaesthetic adjustments during pregnancy
7.5.2.7 Medications for hypotension management, including neuraxial-induced hypotension

7.5.3 Labour ward pain management

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7.5.4.1 Safe, contextualised and effective options, including non-pharmacological methods, oral and systemic analgesia, neuraxial and blocks
7.5.4.2 Risk/benefit analysis and management of potential complications
7.5.4.3 Patient education
7.5.4.4 Informed consent
7.5.4.5 Indications
7.5.4.6 Contraindications
7.5.4.7 Mechanism of action
7.5.4.8 Relevant pharmacokinetics/pharmacodynamics
7.5.4.9 Maternal side effects
7.5.4.10 Foetal effects
7.5.4.11 Effects on uterine blood flow
7.5.4.12 Complications and management thereof
7.5.4.13 Effect on labour and delivery
7.5.4.14 Opioid analgesia – IV, IM, SC, IV PCA
7.5.4.15 Anatomy of spinal and epidural space (wrong section)
7.5.4.16 PCEA
7.5.4.17 Neuraxial opioids (intrathecal and epidural)
7.5.4.18 Neuraxial local anaesthetics
7.5.4.19 Spinal analgesia – single shot
7.5.4.20 Continuous epidural catheter versus intermittent bolus
7.5.4.21 Dosing regimens for epidural analgesia
7.5.4.22 The "walking epidural"
7.5.4.23 Dural puncture epidural (DPE)
7.5.4.24 Implications of vertebral column abnormalities and intracranial pathology on the provision of neuraxial blockade in pregnancy
7.5.4.25 Implications of medications modifying haemostasis on the provision of neuraxial blockade in pregnancy

7.5.4 Principles of obstetric preoperative care, including holistic patient workup, risk assessment, referral and counselling
7.5.4.1 Pre-anaesthetic assessment of a pregnant woman
7.5.4.2 Recognition and planning for a difficult airway
7.5.4.3 Aspiration prophylaxis
7.5.4.4 Deep venous thrombosis (DVT) prophylaxis and perioperative implications
7.5.4.5 Indications for referral of the high-risk pregnant woman to more specialised centres of obstetric care

7.5.5 Obstetric related medical conditions and their perioperative management
Emergency management only in DA
Look at the medical conditions in terms of:
- How the disease impacts pregnancy
- How pregnancy impacts the disease
- The implications and management of the disease during parturition

7.5.5.1 Morbid obesity (sort out sequence and grouping)
7.5.5.2 Thromboembolic disease
7.5.5.3 Bleeding disorders
7.5.5.4 Hypertension
7.5.5.5 Sepsis (including highly infectious diseases and COVID)
7.5.5.6 Respiratory disease
7.5.5.7 Endocrine disease (e.g. diabetes and thyroid disease)
7.5.5.8 Intracranial pathology

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7.5.5.9 Cardiac disease
7.5.5.10 Coagulation abnormalities
7.5.5.11 Renal disease
7.5.5.12 Neuromuscular disease
7.5.5.13 HIV and AIDS
7.5.5.14 Tuberculosis
7.5.5.15 Substance abuse
7.5.5.16 Psychiatric conditions

7.5.6 Anaesthetic management of problems that may arise during labour and delivery
7.5.6.1 Abnormal placental implantation
7.5.6.2 Antepartum haemorrhage
7.5.6.3 Postpartum haemorrhage
7.5.6.4 Cord prolapse
7.5.6.5 Shoulder dystocia
7.5.6.6 Foetal death in utero
7.5.6.7 Conditions with complication potential – vaginal birth after caesarean section (VBAC), breech
7.5.6.8 Assisted vaginal birth
7.5.6.9 Premature labour

7.5.7 The pathophysiology and anaesthetic management of conditions particular to pregnancy
7.5.7.1 Hypertensive disorders of pregnancy, including preeclampsia, HELLP (haemolysis, elevated liver enzymes, low platelet count) syndrome, eclampsia
7.5.7.2 Peripartum cardiomyopathy
7.5.7.3 Gestational diabetes
7.5.7.4 Puerperal sepsis

7.5.8 Detailed knowledge of obstetric surgical procedures, including early pregnancy conditions
7.5.9.1 Anaesthetic management of early pregnancy conditions, such as molar pregnancy, termination, ectopic pregnancy, miscarriage and septic abortion
7.5.9.2 Emergency delivery regarding the threat to maternal or foetal wellbeing, per established guidelines
7.5.9.3 Anaesthesia for in vitro fertilisation (IVF) procedures

7.5.9 Regional and general anaesthesia in the obstetric setting
7.5.9.1 The rationale of epidural, spinal and combined spinal epidural techniques for caesarean birth, including advantages and disadvantages
7.5.9.2 Methods to treat hypotension associated with neuraxial blockade for caesarean birth, including positioning, non-pharmacological and pharmacological
7.5.9.3 The role of different vasopressors (including ephedrine, phenylephrine and noradrenaline in a South African context) and methods of delivery (bolus vs. infusion, reactive vs. prophylactic)
7.5.9.4 Management of high spinal anaesthesia, including total spinal anaesthesia
7.5.9.5 Management of failed or suboptimal block
7.5.9.6 Holistic management of pain during caesarean section, including intraoperative and postoperative measures
7.5.9.7 Diagnosis and management of complications of neuraxial anaesthesia, including neurological deficits, postdural puncture headache (PDPH) and back pain

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7.5.9.8 Implications of medications modifying haemostasis on the provision of neuraxial blockade in pregnancy
7.5.9.9 Indications for general anaesthesia with endotracheal intubation de novo and post-regional anaesthesia
7.5.9.10 Risks for morbidity and mortality associated with general anaesthetic in the parturient
7.5.9.11 Ventilatory requirements of parturients
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7.5.9.13 Impact on the foetus of the induction-to-delivery and uterine-incision-to-delivery time intervals
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7.5.9.15 The role of video laryngoscopy in obstetric airway management
7.5.9.16 Outline a failed intubation plan, with emphasis on the use of supraglottic airway devices
7.5.9.17 Recognise pulmonary aspiration of gastric contents and outline the postoperative care of a patient who has aspirated
7.5.9.18 Outline a plan for postoperative management of patients following general anaesthesia
7.5.9.19 Surgical and anaesthetic management of bleeding during delivery, including drug therapy, surgical manoeuvres and transfusion therapy
7.5.9.20 Anaesthesia for other obstetric surgery, including retained placenta, postpartum tubal ligation and insertion/removal of suture for cervical incompetence

7.5.10 Multimodal analgesic techniques used after caesarean or vaginal delivery in differing contexts
7.5.10.1 Neuraxial opioids
7.5.10.2 Parenteral opioids
7.5.10.3 NSAIDs
7.5.10.4 Adjunctive drugs
7.5.10.5 Local anaesthetics
7.5.10.6 Peripheral nerve blocks (e.g. TAP block)

7.5.11 Anaesthesia for non-obstetric surgery during pregnancy
7.5.11.1 Discuss the potential teratogenicity of medications
7.5.11.2 Considerations for trauma or emergency surgery during pregnancy
7.5.11.3 Understand when foetal monitoring is needed during maternal surgery
7.5.11.4 Discuss risks of elective surgery with patients and colleagues

7.5.12 Emergency and critical care management for the pregnant patient, including maternal resuscitation
7.5.12.1 Understand the differences in basic and advanced life support in the pregnant woman (shorter ideas)
7.5.12.2 ESMOE guidelines – diagnosis and management of maternal collapse, including:
- Embolic complications – thromboembolism, amniotic fluid, air embolism
- Anaphylaxis
- Local anaesthetic toxicity
- High spinal
- Massive haemorrhage
- Eclampsia
- Optimal positioning to avoid aortocaval compression

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7.5.12.3 Altered maternal physiological responses
7.5.12.4 Maternal resuscitation as the priority, representing best care of both the woman and foetus
7.5.12.5 The need for early obstetric involvement and foetal monitoring
7.5.12.6 High possibility of placental abruption and uterine rupture
7.5.12.7 The place of perimortem caesarean birth
7.5.12.8 Clinical indicators and subsequent management implications of non-accidental injury in pregnancy (belongs elsewhere)
7.5.12.9 Resuscitation in traumatic injury of the pregnant patient

7.5.13 Foetal and neonatal considerations
7.5.13.1 Knowledge of recent neonatal resuscitation guidelines, including prioritisation of maternal wellbeing
7.5.13.2 Risk/benefit of the use of oxygen in neonatal resuscitation

7.5.14 Specific professional practice and ethical considerations
7.5.14.1 Ethical arguments relating to consent for epidural analgesia, including risk/benefit analysis
7.5.14.2 Consent for delivery and anaesthetic in pregnant patients with severe mental health issues
7.5.14.3 Legal age of consent and responsibilities of caregivers, as outlined in the Children's Act No. 38 of 2005, section 129 (2) and (3) and the Choice on Termination of Pregnancy Act
7.5.14.4 Potential for maternal-foetal conflicts of interest
7.5.14.5 General anaesthesia for emergency caesarean delivery in the face of perceived foetal jeopardy
7.5.14.6 Respect for all moral and religious points of view
7.5.14.7 Obstetric care for the Jehovah's Witness patient
7.5.14.8 Differentiating own ethical attitudes versus the patient's legal rights
7.5.14.9 Safeguarding issues in obstetric patients with learning difficulties, mental health issues or underage pregnancy
7.5.14.10 Requirements for notification of maternal mortality
7.5.14.11 Participation in relevant institutional meetings, including completion of the maternal death notification form (MDNF)
7.5.14.12 Discussion of maternal mortalities and near misses at the department's morbidity and mortality meetings
7.5.14.13 Ethical and legal considerations relating to termination of pregnancy (including the provisions of the Choice on Termination of Pregnancy Act 92 of 1996 and subsequent amendments)
7.5.14.14 Arrange for transfer to a higher level of care, if necessary

Skills

7.5.15 Technical skills
7.5.15.1 Clinical:
- History taking and examination of a pregnant patient
- General anaesthesia and airway management
- Convert epidural analgesia to anaesthesia for CS
- Perform and manage the complications of regional anaesthesia
- Resuscitation in obstetric haemorrhage and complicated preeclampsia
- Resuscitation in all causes of maternal cardiovascular collapse

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- Maternal and neonatal resuscitation

7.5.15.2 Organisational:

- Implement epidural, spinal and combined spinal/epidural anaesthesia and analgesia service

7.5.15.3 Administrative:

- Involvement in MDNF meetings following maternal mortalities
- Obtaining informed consent in labour for anaesthesia interventions, appreciating the dynamic nature of consent and consumer expectations

7.5.16 Non-technical skills

7.5.16.1 Leadership

7.5.16.2 Collaborator:

- With other clinicians and nurses, especially in the setting of obstetric emergencies
- Perform team drills for obstetric emergencies, including ESMOE training
- Failure to oxygenate algorithm in obstetrics
- Advanced life support in the obstetric patient
- Resuscitation of the neonate
- Management of pulmonary aspiration
- Multidisciplinary planning with the patient and other clinicians to provide safe obstetric care, especially in high-risk obstetrics

7.5.16.3 Communicator:

- Communicating with women and couples experiencing disappointment and grief

7.5.16.4 Context awareness

7.5.16.5 Health advocate:

- Attending health promotion and disease prevention information sessions regarding antenatal care, diet and smoking cessation
- Becoming involved in antenatal education, teaching of medical students and midwives

7.5.16.6 Professionalism:

- Recognising and respecting the role and responsibility of midwives
- Discussing complex ethical situations that may occur in obstetric anaesthesia

7.5.16.7 Humaneness

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FCA

7.5.1 Anatomy and physiology

7.5.1.1 Physiological changes and their implications for anaesthesia during pregnancy, labour and delivery; respiratory, cardiovascular, haematological, neurological, renal and gastrointestinal changes

7.5.1.2 Reference ranges for physiological and biochemical variables in pregnancy

7.5.1.3 Changes in the anatomy of the maternal airway and the impact on airway management during anaesthesia

7.5.1.4 Mechanism and consequences of aortocaval compression in pregnancy

7.5.1.5 Uteroplacental circulation and the principles of placental physiology as related to the development, structure and regulation of placental flow, placental gas exchange, nutrient transport and drug transfer

7.5.1.6 Changes in the anatomy of the maternal vertebral column, the spinal cord and meninges relevant to the performance of a central neuraxial block

7.5.1.7 Anatomy and physiology of pain in labour and childbirth, including the pain pathways for stages of labour
7.5.1.8 Effect of uterine contractions on placental exchange and foetal oxygenation
7.5.1.9 Implications of antenatal foetal gestation, growth, fluid, position and abnormalities, foetal adaptations to hypoxia, abnormal cardiotocography (CTG), foetal heart rate patterns implications during labour and their response to hypoxia or asphyxia; the impact on foetus of a drop in maternal cardiac output
7.5.1.10 Transition from foetal to neonatal circulation and the establishment of ventilation.

7.5.2 Pharmacology

7.5.2.1 Pharmacology of oxytocic agents with special reference to oxytocin derivatives (including carbetocin), ergot derivatives and prostaglandins
7.5.2.2 Pharmacology of tocolytic agents, with specific reference to beta-2 agonists, calcium antagonists, magnesium, inhalational anaesthetics, nitrates and non-steroidal anti-inflammatory medications (NSAIDs)
7.5.2.3 Pharmacology of agents used for the treatment of preeclampsia, including nifedipine, magnesium, hydralazine, labetalol and other antihypertensives
7.5.2.4 Factors that influence the transfer of medications across the placenta and into breast milk
7.5.2.5 Potential effects on the foetus and neonate of medications administered during pregnancy
7.5.2.6 Minimum alveolar concentration (MAC) and local anaesthetic adjustments during pregnancy
7.5.2.7 Medications for hypotension management, including neuraxial-induced hypotension

7.5.3 Labour ward pain management

7.5.5.17 Safe, contextualised and effective options, including non-pharmacological methods, oral and systemic analgesia, neuraxial and blocks
7.5.5.18 Risk/benefit analysis and management of potential complications
7.5.5.19 Patient education
7.5.5.20 Informed consent
7.5.5.21 Indications
7.5.5.22 Contraindications
7.5.5.23 Mechanism of action
7.5.5.24 Relevant pharmacokinetics/pharmacodynamics
7.5.5.25 Maternal side effects
7.5.5.26 Foetal effects
7.5.5.27 Effects on uterine blood flow
7.5.5.28 Complications and management thereof
7.5.5.29 Effect on labour and delivery
7.5.5.30 Working knowledge of the benefits and evidence for non-pharmacological analgesia, including techniques such as TENS, acupuncture, music therapy, touch and massage and water immersion
7.5.5.31 Opioid analgesia – IV, IM, SC, IV PCA
7.5.5.32 PCA (check PCEA) in labour with remifentanil or other opioid – risks and benefits
7.5.5.33 Inhaled Entonox
7.5.5.34 Anatomy of spinal and epidural space (wrong section)
7.5.5.35 Patient-controlled techniques
7.5.5.36 PCEA
7.5.5.37 Neuraxial opioids (intrathecal and epidural)
7.5.5.38 Neuraxial local anaesthetics

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7.5.5.39 Spinal analgesia – single shot
7.5.5.40 Continuous spinal catheter
7.5.5.41 Combined spinal epidural (CSE)
7.5.5.42 Continuous epidural catheter versus intermittent bolus
7.5.5.43 Dosing regimens for epidural analgesia
7.5.5.44 The "walking epidural"
7.5.5.45 Dural puncture epidural (DPE)
7.5.5.46 *Pudendal and paracervical blocks
7.5.5.47 Implications of vertebral column abnormalities and intracranial pathology on the provision of neuraxial blockade in pregnancy
7.5.5.48 Implications of medications modifying haemostasis on the provision of neuraxial blockade in pregnancy

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7.5.7.2 Peripartum cardiomyopathy
7.5.7.3 Gestational diabetes
7.5.7.4 Acute fatty liver of pregnancy
7.5.7.5 Cholestasis associated with pregnancy
7.5.7.6 Rhesus isoimmunisation
7.5.7.7 Puerperal sepsis

7.5.8 Detailed knowledge of obstetric surgical procedures, including early pregnancy conditions

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7.5.9.14 Rapid sequence induction, including the role of " ventilation", as outlined in the DAS (Difficult Airway Society) guidelines
7.5.9.15 The role of video laryngoscopy in obstetric airway management

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7.5.9.16 Outline a failed intubation plan, with emphasis on the use of supraglottic airway devices
7.5.9.17 Recognise pulmonary aspiration of gastric contents and outline the postoperative care of a patient who has aspirated
7.5.9.18 Outline a plan for postoperative management of patients following general anaesthesia
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7.5.9.20 Anaesthesia for other obstetric surgery, including retained placenta, postpartum tubal ligation and insertion/removal of suture for cervical incompetence

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7.5.10.3 NSAIDs
7.5.10.4 Adjunctive drugs
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7.5.10.6 Peripheral nerve blocks (e.g. TAP block)

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7.5.11.4 Discuss risks of elective surgery with patients and colleagues

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7.5.12.11 ESMOE guidelines – diagnosis and management of maternal collapse, including:
- Embolic complications – thromboembolism, amniotic fluid, air embolism
- Anaphylaxis
- Local anaesthetic toxicity
- High spinal
- Massive haemorrhage
- Eclampsia
- Optimal positioning to avoid aortocaval compression

7.5.12.12 Altered maternal physiological responses
7.5.12.13 Maternal resuscitation as the priority, representing best care of both the woman and foetus
7.5.12.14 The need for early obstetric involvement and foetal monitoring
7.5.12.15 High possibility of placental abruption and uterine rupture
7.5.12.16 The need to give Rh immunoglobulin therapy to all Rhesus-negative mothers
7.5.12.17 The place of perimortem caesarean birth
7.5.12.18 Clinical indicators and subsequent management implications of non-accidental injury in pregnancy (belongs elsewhere)
7.5.12.19 Resuscitation in traumatic injury of the pregnant patient

7.5.13 Foetal and neonatal considerations

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7.5.13.1 Knowledge of recent neonatal resuscitation guidelines, including prioritisation of maternal wellbeing
7.5.13.2 Risk/benefit of the use of oxygen in neonatal resuscitation
7.5.13.3 Assessment of the outcome of resuscitation, including the utility of Apgar and HIE scores
7.5.13.4 Intrauterine and neonatal surgery, including exit procedures

7.5.14 Specific professional practice and ethical considerations
7.5.14.1 Ethical arguments relating to consent for epidural analgesia, including risk/benefit analysis
7.5.14.2 Consent for delivery and anaesthetic in pregnant patients with severe mental health issues
7.5.14.3 Legal age of consent and responsibilities of caregivers, as outlined in the Children's Act No. 38 of 2005, section 129 (2) and (3) and the Choice on Termination of Pregnancy Act
7.5.14.4 Prevention of mother-to-child transmission and antiretroviral protocols
7.5.14.5 Potential for maternal-foetal conflicts of interest
7.5.14.6 General anaesthesia for emergency caesarean delivery in the face of perceived foetal jeopardy
7.5.14.7 Respect for all moral and religious points of view
7.5.14.8 Obstetric care for the Jehovah's Witness patient
7.5.14.9 Foetal development and current limits of viability
7.5.14.10 Differentiating own ethical attitudes versus the patient's legal rights
7.5.14.11 Safeguarding issues in obstetric patients with learning difficulties, mental health issues or underage pregnancy
7.5.14.12 Requirements for notification of maternal mortality
7.5.14.13 Participation in relevant institutional meetings, including completion of the maternal death notification form (MDNF)
7.5.14.14 Discussion of maternal mortalities and near misses at the department's morbidity and mortality meetings
7.5.14.15 Clinical governance issues about quality assurance assessment of labour and delivery units
7.5.14.16 Ethical and legal considerations relating to termination of pregnancy (including the provisions of the Choice on Termination of Pregnancy Act 92 of 1996 and subsequent amendments)
7.5.14.17 Arrange for transfer to a higher level of care, if necessary

Skills

7.5.15 Technical skills
7.5.15.1 Clinical:

- History taking and examination of a pregnant patient
- General anaesthesia and airway management
- Evaluate and triage the daily obstetric anaesthesia workload for the labour ward and obstetric theatre to maximise patient and service benefit
- Convert epidural analgesia to anaesthesia for CS
- Perform and manage the complications of regional anaesthesia
- Resuscitation in obstetric haemorrhage and complicated preeclampsia
- Resuscitation in all causes of maternal cardiovascular collapse
- Maternal and neonatal resuscitation
- Ultrasound and ECHO as relevant to obstetric anaesthesia:

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- Physics of ultrasound used in medical practice
- Relevant ultrasound anatomy of the neuraxis
- Ultrasound examination of the neuraxis for regional techniques
- Perform regional techniques under ultrasound guidance
- Understand the role of ECHO, particularly in the setting of preeclampsia and eclampsia

7.5.15.2 Organisational:

- Implement epidural, spinal and combined spinal/epidural anaesthesia and analgesia service

7.5.15.3 Administrative:

- Involvement in MDNF meetings following maternal mortalities
- Obtaining informed consent in labour for anaesthesia interventions, appreciating the dynamic nature of consent and consumer expectations

7.5.16 Non-technical skills

7.5.16.1 Leadership:

- To motivate for appropriate equipment for the obstetrics theatre unit

7.5.16.2 Collaborator:

- With other clinicians and nurses, especially in the setting of obstetric emergencies
- Perform team drills for obstetric emergencies, including ESMOE training
- Failure to oxygenate algorithm in obstetrics
- Advanced life support in the obstetric patient
- Resuscitation of the neonate
- Management of pulmonary aspiration
- Multidisciplinary planning with the patient and other clinicians to provide safe obstetric care, especially in high-risk obstetrics

7.5.16.3 Communicator:

- Communicating with women and couples experiencing disappointment and grief

7.5.16.4 Context awareness

7.5.16.5 Health advocate:

- Attending health promotion and disease prevention information sessions regarding antenatal care, diet and smoking cessation
- Becoming involved in antenatal education, teaching of medical students and midwives

7.5.16.6 Professionalism:

- Recognising and respecting the role and responsibility of midwives
- Discussing complex ethical situations that may occur in obstetric anaesthesia
- Assist in decisions involving maternal/foetal conflict, termination of pregnancy and describe avenues to address such issues

7.5.16.7 Humaneness

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7.6 Paediatric Anaesthesia

COMPETENCES	DA	FCA I	FCA II	MetComp
Understand and integrate basic sciences in the anaesthetic management of paediatric patients				All
Provide perioperative care of patients undergoing paediatric anaesthesia,				All
KNOWLEDGE				
Understanding and application of developmental and age-relevant concerns in the provision of perioperative care to paediatric patients				ME/Sc/HA
Challenges of perioperative care in high-risk populations, such as neonates and premature infants and paediatric syndromic children				ME/Sc/HA
Safe paediatric sedation and anaesthesia for remote or out-of-theatre procedures				ME/Sc/HA/CA
Managing risks and complications in paediatric anaesthesia				ME/Sc/HA/CA
Ethical, legal principles and mental health considerations of care for children and adolescents				ME/Sc/HA/CA/Hu

SUB-DOMAINS

7.6.1 Diploma in anaesthesia

All DA relevant topics are marked by an asterisk for this Sub-domain.

7.6.2 FCA Part 1

Basic sciences section of FCA 2

7.6.3 FCA Part 2: Basic sciences: Anatomy/physiology

7.6.3.1 Airway and respiratory system:

- Anatomical features of and differences between the premature, neonatal, infant, paediatric and adolescent airway and implications on equipment used for airway management, e.g.:
  - Estimate ETT size based on age, issues related to cuffed versus uncuffed tubes
  - Rapid sequence intubation (RSI) versus controlled RSI techniques
- *The physiology and maturation over time regarding control of respiration, compliance, lung volumes, oxygen consumption/metabolic rate:
  - The implications of these on breathing circuits used and respiratory support/mechanical ventilation

7.6.3.2 Cardiovascular system:

- *The anatomy and physiology relevant to foetal, transitional circulation and maladaptation
- *Maturation of the myocardium and the autonomic nervous system
- *The developmental changes in heart rate, blood pressure, cardiac output and the electrocardiogram
- Estimated blood volume and implications for blood loss and fluid management

7.6.3.3 Central and peripheral nervous system:

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- *Basic neurophysiology
- *Differences in central and peripheral nervous systems between paediatric patients and adults and development aspects
- *An awareness of neurological growth/development and cognitive development issues and the implication of age-appropriate function (e.g. basic motor, language and personal-social milestones)
- Paediatric pain physiology
    - Developmental aspects of pain perception from the neonatal period through adolescence
    - Neurobiological consequences of untreated pain in neonates and children
    - Differences between acute, recurrent, and chronic pain in paediatric patients

7.6.3.4 Genitourinary system:

- *Renal maturation
- Fluid, electrolyte and acid-base management
- Fluid distribution, hydration and assessment thereof

7.6.3.5 Gastrointestinal/hepatic system:

- *Maturation of hepatic function
- Glucose and metabolic control
- Feeding and fasting guidelines

7.6.3.6 Haematopoietic and immunologic system:

- Haemoglobin (HbF vs. HbA)
- Estimated blood volume and implications of blood loss
- *Effects of age on leucocytes and immunology

7.6.3.7 Thermoregulation:

- Body surface area, mechanisms of thermoregulation and heat loss

7.6.4 Pharmacology

7.6.4.1 Pharmacogenomics

Demonstrate knowledge of the genetic variations that may affect the pharmacokinetic processing and pharmacodynamic effects of certain drugs, in particular:

- Pain and analgesic agents (e.g. opioids, NSAIDs, paracetamol)
- Other anaesthetic agents (e.g. inhalational anaesthetics, propofol, nitrous oxide, benzodiazepines, succinylcholine/mivacurium – scoline apnoea and malignant hyperthermia)

7.6.4.2 Pharmacokinetics/pharmacodynamics:

- Variations in pharmacokinetics/pharmacodynamics in infants and children in comparison to adults
- *Neurotoxicity and the developing brain
- Pharmacological pain management
    - Pharmacokinetics and pharmacodynamics of analgesic drugs in:
        - Neonates and premature infants
        - Infants and young children
        - Older children and adolescents
    - Safe use of:
        - Paracetamol
        - NSAIDs

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    - Opioids (including recognition and management of opioid-related adverse effects)
    - Adjunctive analgesics (e.g. ketamine, alpha-2 agonists, neuropathic agents)
  - Principles of opioid stewardship in children

7.6.4.3 *TIVA/TCI in children:
- *Monitoring during TIVA/TCI (e.g. depth of anaesthesia monitoring)

7.6.4.4 Fluid and blood product management:
- Body water, electrolyte distribution and estimated circulating blood volume
- Intraoperative fluid and blood management
- Composition of various intravenous fluids
- Pathophysiological states and their management (e.g. dehydration, shock, hyper- and hyponatremia, hypochloraemic metabolic alkalosis)

7.6.4.5 Off-label use of medications (Domain 1)
- Mixing drug policies (Domain 6)
- *Ethical and legal requirements

7.6.5 Coexisting diseases in paediatric patients

7.6.5.1 Syndromes or congenital anomalies associated with a difficult airway:
- *Pierre Robin sequence
- *Treacher Collins syndrome
- *Goldenhar syndrome
- *Mucopolysaccharidoses and inborn errors of metabolism
- *Cleft lip and palate

* DA to recognise the syndrome and not manage it.

7.6.5.2 Other airway emergencies:
- Acute infections (e.g. epiglottitis)
- Approach to the child with stridor

7.6.5.3 Respiratory disease:
- Respiratory tract infections (upper and lower)
- ENT disorders
- Asthma and other chronic lung disease, including cystic fibrosis
- Tuberculosis
- Children with sleep disorders

7.6.5.4 *Congenital or acquired cardiovascular disease:

*DA to diagnose and refer.
- Approach to the child with a murmur and child with cyanosis
- Cardiac lesions (e.g. atrial septal defect, ventricular septal defect, patent ductus arteriosus, Tetralogy of Fallot)
- Acquired cardiac disease (e.g. cardiomyopathy, pulmonary hypertension, rheumatic fever-associated valve lesions)
- Congenital heart disease presenting for non-cardiac surgery

7.6.5.5 *Neurological and Neuromuscular diseases:

*DA to diagnose and refer.
- Seizure disorders
- Developmental delay
- Hydrocephalus and other intracranial pathologies
- Spinal abnormalities (e.g. spina bifida)
- Children with muscle disorders, including muscular dystrophy (e.g. Duchenne), congenital myopathies and mitochondrial myopathies
- Approach to a child with low tone “floppy child”

7.6.5.6 *Gastrointestinal conditions:

DRAFT FOR COMMENT

*DA to diagnose and refer.

- Gastrointestinal reflux
- Biliary atresia and other hepatobiliary disease

7.6.5.7 *Renal disease:

*DA to diagnose and refer.

- Acute renal failure
- End-stage renal disease
- A child's post-renal transplantation

7.6.5.8 Infectious disease:

- Sepsis and management of the child in septic shock
- HIV disease
- Common childhood infections and topical infections (e.g. COVID)
- Management of the child with recent vaccination

7.6.5.9 Haematological disease/malignancies and chemotherapeutic agents:

*DA to diagnose and refer.

- Solid organ tumours, including nephroblastoma and neuroblastoma
- Mediastinal mass
- Chemotherapeutics and tumour lysis syndrome

7.6.5.10 Children with common syndromes: –DA to diagnose and refer.

- Down syndrome
- Autism spectrum disorders

7.6.5.11 Conditions associated with prematurity:

*DA to diagnose and refer.

- Retinopathy of prematurity
- Bronchopulmonary dysplasia
- Postoperative apnoea

7.6.6 Anaesthesia for paediatric surgical procedures

7.6.6.1 General paediatric surgery:

- *Removal of foreign body from the oesophagus
- *Kasai procedure
- RLD liver transplants
- *Surgical intervention for general surgical operations (e.g. intussusception)
- Laparotomy for the septic child (e.g. appendicectomy – older child)
- *Nissen fundoplication
- Laparoscopic surgery
- Pain assessment in children
    - Use of age-appropriate pain assessment tools, including:
    - Neonatal pain scales
    - Observational and behavioural pain scores
    - Self-report tools for older children and adolescents
    - Limitations of pain scoring in critically ill, sedated, or neurologically impaired children

7.6.6.15 *Neonatal surgery:

The trainee is not expected to provide solo anaesthetic care for neonates.

- Trachea-oesophageal fistula repair
- Congenital diaphragmatic hernia
- Laparotomy for neonatal emergencies, including but not limited to:
    - Abdominal wall defects (e.g. gastroschisis/omphalocele)

DRAFT FOR COMMENT

- Necrotising enterocolitis
- Intestinal atresia
- Pyloric stenosis
- Anorectal malformation
- Hernias
- Intestinal atresia

- Neonatal pain management
    - Recognition that neonates experience pain
    - Analgesia for common neonatal procedures
    - Balancing effective analgesia with respiratory and haemodynamic stability

7.6.6.16 ENT:

- Adenotonsillectomy (including the emergency bleeding tonsil – older child)
- *Removal of foreign body from the airway (unless lifesaving)
- *Rigid/flexible bronchoscopy
- *Debulking laryngeal papillomas
- Tracheostomy
- *Sinus surgery
- Gromets
- *Choanal atresia
- *Infective airway lesions (unless lifesaving)
- *Management of subglottic stenosis
- *Tubeless surgery techniques in children

7.6.6.17 Neurosurgery:

- *Ventriculoperitoneal shunt, external ventricular drain insertion
- * Myelomeningocele repair
- *Craniotomy for tumour excision
- Surgery for emergency drainage of intracranial haemorrhage

7.6.6.18 Orthopaedic surgery:

- *Surgical procedures for club feet
- *Scoliosis repair
- Fractures
- Soft tissue release

7.6.6.19 *Plastic and reconstructive surgery:

- *Cleft lip and palate repair
- Craniofacial surgery

7.6.6.20 Urology:

- Circumcision
- Orchidopexy
- *Hypospadias repair
- Cystoscopy
- *Nephrectomy
- *Renal transplantation

7.6.6.21 Ophthalmology:

- Strabismus repair (older child)
- Surgery for traumatic eye injuries
- *Laser for retinopathy of prematurity
- Examination under anaesthesia of the eye

7.6.6.22 Dental and maxillofacial surgery:

- Dental extractions/restorations (unless CP or MR)
- *Reconstruction of 210axilla-facial lesions, including traumatic injuries

7.6.6.23 Trauma and burns:

DRAFT FOR COMMENT

- Burn debridement and skin graft (older kids, not acute burns)
- *Surgery for the child with polytrauma (unless lifesaving)

7.6.6.24 Procedures in remote locations:

- *MRI
- CT scans
- *Interventional radiology (e.g. angiography suite and catheter laboratory)
- Safe analgesia and sedation for painful procedures inside and outside the operating theatre

7.6.6.25 Complex multidisciplinary procedures:

- *Procedures involving multiple cross-disciplines

7.6.6.26 Psychological issues:

- Preoperative anxiety and coping mechanisms in different age groups and their implication on premedication
- Separation and effects of hospitalisation
- Parental/caregiver anxiety
- Informed consent in the paediatric population

7.6.6.27 Adolescent care:

- Reproductive health for adolescents
- Adolescent needs in a hospital context
- Substance abuse
- Gender-affirming medication and procedures

7.6.6.28 Ethical considerations:

- *Complex multiteam procedures (e.g. conjoined twins)
- *In utero procedures (in utero surgery, refer to obstetrics section)
- *Exit procedures
- *Reporting of suspected child abuse/rape

- *Consent, assent, and involvement of caregivers (refer to Domain 6)
- Cultural, social, and health system factors influencing paediatric anaesthesia and pain care in South Africa
- Advocacy for adequate pain management as a patient right
- Safe anaesthesia and pain management in resource-limited settings

Skills

TECHNICAL

7.6.6.16 Clinical:

- Patient assessment and selection for the proposed surgical procedure and environment
- Perioperative optimisation and management of pre-existing conditions
- Decision-making and performance of safe paediatric anaesthesia under regional, general anaesthesia, sedation or awake
- Perform age-appropriate pain assessments and acute postoperative pain management

    - Planning and prescribing multimodal analgesia for common paediatric surgical procedures
    - Pain management in the postoperative ward and recovery area
    - Communication of analgesia plans to nursing staff and caregivers

DRAFT FOR COMMENT

- Recognition of inadequate analgesia and escalation of care
- Manage common complications of paediatric analgesia

- Ability to perform non-invasive and invasive vascular access and invasive monitoring
- Management of complications relating to surgery and anaesthesia
- Perform paediatric and neonatal advanced life support (skills learnt in Domain 1 & 2 to be reviewed)

7.6.6.17 Administrative patient professional requirements:

- *Develop guidelines, standards and use these to develop standard operating procedures within the work context and environment
- Comply with guidelines, standards and use these to develop standard operating procedures within the work context and environment
- Document anaesthesia and patient notes and preoperative counselling
- Document patient safety events related to anaesthetic management

7.6.6.18 Organisational:

- Acquire age-appropriate paediatric equipment and facilities, especially in adult-based hospital environments

NON-TECHNICAL

7.6.6.19 Leadership or team player:

- Coordinate theatre team for safe paediatric management

7.6.6.20 Collaborator:

- With other clinicians and nurses, especially in the case of paediatric emergencies or complex cases

7.6.6.21 Communicator:

- Informative and appropriate patient-centred information to gain patient and parent/caregiver cooperation and understanding
- Communicate with adolescents, respecting privacy and autonomy but being mindful of parent/caregiver support
- Effective information sharing, consultation planning with nurses and clinicians regarding plans

7.6.6.22 Context awareness:

- Sensitivity to and recognition of patient and parent/caregiver anxiety
- Recognition of paediatric crisis and avoidance of tunnel vision in emergency situations and personal limitations
- Recognition of child-headed households and complex social circumstances in a South African context

7.6.6.23 Health advocate:

- To motivate for appropriate paediatric equipment/facilities for the theatre

7.6.6.24 Professionalism:

- Appropriate multidisciplinary interactions with healthcare teams
- Appropriate interactions with patients or caregivers
- Calling for and accepting help or referral to more experienced colleagues – awareness of limitations

7.6.6.25 Humaneness

PREVIEW FOR COMMENT

7.7 Anaesthesia for Neurosurgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Application of basic sciences in the anaesthetic management of neurosurgery patients Perioperative care of patients undergoing neurosurgery				ME/Cm/Hu/ Cl
KNOWLEDGE				ME/Cm/Hu/ Cl
Neuroanatomy Neurophysiology and pathophysiology Neuropharmacology				ME/CA
Neuromonitoring				ME/CA
Anaesthetic management of traumatic, inflammatory, infective, vascular and neoplastic conditions of the brain and spinal cord				ME/Cm/Hu/ Cl

Knowledge

7.7.1.1 Anatomy

- Cranial vault, central nervous system (CNS), spinal cord, vertebral column and meninges
- Ventricular system and flow of cerebrospinal fluid (CSF)
- Vascular supply of the brain and spinal cord, including the circle of Willis
- Anatomy relevant to providing local anaesthesia for awake craniotomy
- Anatomical abnormalities relevant to the provision of perioperative care of patients with neurological disease

7.7.1.2 Physiology and pathophysiology

- Cerebral oedema, intracranial pressure (ICP), cerebral blood flow and perfusion pressure in patients with intracranial pathology
- Effects of fluid and electrolyte disturbances on brain function
- Management of disorders of sodium
- Pathophysiology and management of subarachnoid haemorrhage
- Secondary brain injury in traumatic brain injury, intracranial haemorrhage and other brain pathology
- Spinal cord trauma
- Intracranial tumours:
  - Space-occupying lesions
  - Pituitary tumours, including the implications of endocrine disorders, such as acromegaly, Cushing syndrome and panhypopituitarism
- Brain death
- Impact of intracranial pathology on other organ systems

7.7.1.3 Pharmacology

- Direct and indirect effects of intravenous and inhaled anaesthetic agents on cerebral and spinal cord physiology
- Total intravenous anaesthesia in neurosurgical patients
- Sedative/hypnotic and analgesic agents in patients receiving neuroanaesthesia
- Osmotic diuretics and hypertonic saline
- Fluids in neuroanaesthesia
- Agents used in the treatment of vasospasm

DRAFT FOR COMMENT

- Clinical utility of anticonvulsants and prophylactic therapy in neurosurgical patients
- Steroids
- Antifibrinolytics

7.7.1.4 Neuromonitoring

- Cerebral blood flow
- ICP and cerebral perfusion pressure monitoring
- Cerebral metabolism, including microdialysis, brain tissue oxygen monitoring and jugular bulb saturation monitoring
- Electrophysiological (electroencephalogram, sensory and motor evoked potentials) and the management of anaesthetic agents' effects on neurological monitoring
- Depth of anaesthesia

7.7.1.5 Clinical

- Administration of appropriate neuroanaesthesia for patients presenting for neurosurgical procedures
- Principles of neuroprotection
- Management of raised ICP
- Risks associated with patient positioning and methods of risk minimisation
- Acute resuscitation and management of a trauma patient with brain injury
- Acute resuscitation and management of patients with intracranial/subarachnoid haemorrhage
- Manage the complications of neurosurgical procedures, including air embolism, rapid life-threatening bleeding, cerebral ischemia and seizure management during surgery
- Perioperative failure to awaken, including postoperative management and decision-making for postoperative ventilation
- Management of fluid therapy in neurosurgical patients

7.7.1.6 CNS pathologies

- Cerebrovascular diseases, including:
    - Intracranial aneurysms
    - Arteriovenous malformations
    - Carotid artery pathology (cross-reference to Domain 7.10)
    - Cerebral hypoperfusion
    - Posterior circulation pathologies
- Common nontraumatic disorders of the spine
- Paediatric neurosurgery (not limited to adults):
    - Scoliosis (cross-reference with Domain 7.4)
    - Hydrocephalus
    - Common congenital abnormalities (myelomeningocele, encephalocele)
    - Brain tumour resection
    - Craniofacial abnormalities (cross-reference to Domains 7.6 and 7.11)

7.7.1.7 Neurosurgical procedures

- Intracranial mass resection, including:
    - Supratentorial tumour
    - Posterior fossa tumour
    - Pituitary tumour
    - Awake craniotomy
- Traumatic and atraumatic spinal procedures, including:
    - Surgery for autonomic dysreflexia
    - Lumbar (decompression, laminectomy, fusion)
    - Spinal stenosis
    - Spondylopathies, including ankylosing spondylitis

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- Laminectomy/discectomy/decompression
- Spinal cord tumour resection
- Scoliosis
- Spinal instrumentation and fusion
- Spinal cord injury, unstable cervical spine, cervical and lumbar disc herniation
- Insertion of transcutaneous electrical nerve stimulation (TENS) and other pain management devices
- Rhizotomy

- Traumatic brain injury, including:
  - Insertion of ICP monitors
  - Evacuation of subdural haematoma (acute and chronic)
  - Evacuation of epidural haematoma
  - Evacuation of intracranial haemorrhage
  - Decompressive craniectomy
- Other procedures, including:
  - Spinal drains and washouts
  - Ventriculoperitoneal, ventriculopleural, ventriculoatrial shunt placement

7.7.1.8 Interventional neuroradiology

- Intracranial aneurysm coiling
- Arteriovenous malformation embolisation
- Carotid artery stenting
- Digital subtraction angiography
- Epilepsy surgery (deep brain stimulation)
- Parkinson surgery

Skills

TECHNICAL

7.7.2.1 Clinical

- Performance of safe neuroanaesthesia under regional, general anaesthesia, sedation or awake
- Interpreting ICP
- Brain death diagnosis
- Managing challenges in anaesthesia delivery and resuscitation for patients in extraordinary positions

7.7.2.2 **Organisational**

- Appropriate equipment for neuroanaesthesia and monitoring
- Postoperative monitoring and intensive care as appropriate

7.7.2.3 Administrative

- Obtain and document informed consent with special considerations for neurologically impaired patients

NON-TECHNICAL

- Generic competencies as covered in Background
- Special competencies for Domain 7 include:
  - Leadership/teamwork
  - Communication:
    - Consent, dealing with family, patients with impaired levels of consciousness
    - End-of-life care and palliation (cross-reference with Domain 7.1)
  - Advocacy
  - Organ donation advocacy

DRAFT FOR COMMENT

7.8 Anaesthesia for Cardiac Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Conduct perioperative anaesthetic management of patients undergoing cardiac surgery and related procedures				ME/Sc/HA/Pr/Cl/Cm
Apply knowledge, including the basic sciences, to clinical cardiac anaesthetic practice				ME/Sc
KNOWLEDGE				
Anatomy, physiology, pharmacology, physics and monitoring of the heart				ME/Sc
Clinical scenarios specific to the heart and cardiac anaesthesia				ME/L/Cm/Cl
Skills specific to cardiac anaesthesia				ME/Cm/Cl/P

No DA Competency.

Knowledge

7.8.1 Anatomy and physiology

7.8.1.1 The anatomy and function of the heart pertaining to:

- The coronary circulation
- The heart valves
- The differences between the left and right ventricle

7.8.1.2 The normal anatomy of the conduction system and how it relates to cardiomyocyte contraction and relaxation

7.8.1.3 The determinants of myocardial oxygen supply and demand and the pathogenesis of myocardial ischaemia

7.8.1.4 The determinants of cardiac output, including variables that influence stroke volume

7.8.1.5 The determinants of normal diastolic function and the conditions associated with abnormal diastolic function

7.8.1.6 The neurohumoral regulation of the heart:

- The innervation of the heart and the relevant receptors and neurotransmitters
- The role of the autonomic nervous system in determining the heart rate, arteriolar and venous tone, etc.
- The major cardiac reflex systems

7.8.1.7 The normal foetal and transitional circulation

7.8.1.8 The differences between the adult, foetal and transitional circulation

7.8.1.9 Pathophysiology and clinical implications of abnormal congenital cardiac lesions

7.8.1.10 Shunts, obstructive lesions/cyanotic and acyanotic cardiac lesions

7.8.1.11 The embryology of:

- Patent ductus arteriosus
- Atrial septal defect (ASD)
- Ventricular septal defect (VSD)
- Coarctation of the aorta
- Abnormalities of the great vessels
- Major valvular abnormalities – tetralogy of Fallot, pulmonary atresia, Ebstein's anomaly

7.8.2 Pharmacology

7.8.2.1 Medications that influence:

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- Inotropy, chronotropy, lusitropy
- Conducting pathways
- Systemic vascular resistance
- Pulmonary vascular resistance
- Coagulation:
    - Heparin and non-heparin anticoagulants
    - Protamine
- Antifibrinolytic agents
- Antiplatelet agents
- Thrombolytics
- Antihypertensive agents (acute and chronic)
- Antifailure treatment

7.8.3 Physics and monitoring

7.8.3.1 Basic monitoring, such as ECG, pulse oximetry, non-invasive blood pressure

7.8.3.2 Invasive blood pressure

7.8.3.3 Central venous pressure

7.8.3.4 Neurological monitoring during cardiac surgery

7.8.3.5 Haemodynamic monitoring

7.8.3.6 Ultrasound:

- Basic transthoracic and transoesophageal views and interpretation

7.8.3.7 Laboratory tests, including POC testing:

- Blood gas
- Electrolyte analysis
- Thromboelastogram
- Activated clotting time (ACT)

7.8.3.8 The defibrillator – principles of defibrillation and cardioversion, including external and internal application

7.8.3.9 The pacemaker – indications for pacing intra- and postoperatively

7.8.3.10 The intra-aortic balloon pump (IABP)

7.8.3.11 Cardiac assist devices

7.8.3.12 Cardiopulmonary bypass:

- Physiology and physics
- Non-pulsatile circulation
- Complications
- Weaning from bypass:
    - Measures that can aid in weaning from bypass, such as IABP and ECMO

7.8.4 Clinical considerations

7.8.4.1 Poor cardiac output states

7.8.4.2 Temperature management (including deep hypothermic circulatory arrest)

7.8.4.3 The effects of cross-clamping of the aorta

7.8.4.4 Organ protection

7.8.4.5 Patient blood management

7.8.4.6 High volume resuscitation

7.8.5 Safe anaesthesia practice

7.8.5.1 The organisation of an anaesthesia service for cardiothoracic surgery

7.8.5.2 The pathophysiology, investigation, diagnosis, anaesthesia implications, risk stratification and management of cardiac pathology

7.8.5.3 Anaesthetic principles related to cardiac surgery

7.8.5.4 Surgery for congenital and acquired pathology of the heart, pericardium, coronary arteries and cardiac valves

DRAFT FOR COMMENT

7.8.5.5 Surgery on the great vessels and branches of the great vessels
7.8.5.6 Procedures requiring anaesthesia in cardiac catheterisation labs (paediatric and adult)
7.8.5.7 Cardiac transplantation and extracorporeal membrane oxygenation (working knowledge)

7.8.6 Novel therapies
7.8.6.1 Minimally invasive mitral valve surgery
7.8.6.2 Trans-aortic valve implantation (TAVI) and transcutaneous valve surgery
7.8.6.3 Off-pump procedures

7.8.7 Technical skills
Clinical
7.8.7.1 Taking a detailed and focused cardiac history and organising the relevant information in a coherent, logical way
7.8.7.2 Performing a focused physical examination of the cardiovascular system
7.8.7.3 Analysing patient data to determine cardiac risk and plan safe anaesthesia
7.8.7.4 Placement and use of monitoring lines
7.8.7.5 Transvenous pacing
7.8.7.6 Defibrillation and cardioversion
7.8.7.7 Interpretation of:
- A 12-lead ECG
- Laboratory data
- Chest X-rays, chest CT and MRI imaging films
- Transthoracic and transoesophageal echo images from basic focused exam

Organisational
- Organising a perioperative cardiac service in collaboration with the critical care team
- Promote routine equipment checks and maintenance for special equipment in the cardiac theatre

Administrative
- Communicate with patients and family to:
  - Convey information relating to the procedure and the associated risk
  - Obtain and document informed consent
- Understand socioeconomic factors and risks associated with cardiac anaesthesia

7.8.8 Non-technical skills (NTS)
Leadership/teamwork
- Providing an anaesthetic plan in collaboration with a team consisting of other specialists, including cardiologists, cardiac surgeons, nursing and allied health personnel

Context awareness
- Awareness of limitations of competency to manage complex cardiac surgery for inexperienced FCA graduates
- Sensitivity to and recognition of patient anxiety regarding anaesthesia risks, cardiopulmonary bypass and heart surgery
- Awareness of whether the patient, concurrent comorbidities and their proposed procedure are appropriately matched with the available resources

Medical expertise – decision-making/insight
- Manage the perioperative care of patients undergoing cardiac surgery including the risks relating to invasive lines, CBP and inotropic support.
- An awareness of limitations of competency to manage complex cardiac surgery for non-specialised FCA graduates
- Manage the issues relating to massive blood transfusion, post-operative patient complications secondary to cardiac surgery.

DRAFT FOR COMMENT

Communication

- The anaesthetist should be able to communicate clearly with patients and other professionals
- Provide patient-centred information regarding planned anaesthetic management, alternative options, and potential risks to gain patient co-operation and understanding.
- Effectively share information and discuss management of the patient with nurses and clinicians, especially with respect to adverse events.
- Comprehensive handover to the ICU staff

Professionalism

- The anaesthetist should be able to demonstrate
    - Appropriate multidisciplinary interactions with health care teams.
    - Informative and appropriate interactions with patients or care givers.
    - The insight to know when calling for and accepting help or referral to more experienced colleagues is necessary
    - Manage the patient environment with sensitivity when inserting invasive lines under local anaesthetic.

Collaboration

- The anaesthetist should collaborate with other clinicians and health professionals with respect to patient related issues.
- Resolve professional and interdisciplinary conflict that may arise

Humaneness

- Appreciate the anxiety surrounding invasive lines, CPB and cardiac surgery and ensure comfort when placing such lines
- Assist patients with limited cardiac reserve on to theatre table or trolley

Health advocate

- The anaesthetist should assume the role of a health advocate for the patient by embarking on the following:
    - Planning with the patient and other clinicians to provide safe anaesthesia care.
    - Providing patient centred care by involving the patient in the decision-making process.
    - Ensuring that the patient has a full understanding of their peri-operative risk before proceeding with cardiac surgery.
    - Promote relevant routine health checks for equipment including
        - transoesophageal echo machine
        - NIRS, BIS and infusion pumps.
- Ensuring appropriate transfer from theatre table to the patient's bed with careful care of lines, infusions and monitors.
- Ensuring safe transfer from theatre to ICU with intubated and ventilated patients.

References:

Erdoses G et al. (2019). European Association of cardiothoracic anaesthesiology (EACTA) Cardiothoracic and Vascular Anesthesia Fellowship Curriculum: First Edition. Journal of Cardiothoracic and Vascular Anesthesia 1-10

Royal college of Physicians and Surgeons of Canada. Third edition Feb 2020

ANZCA anaesthesia training programme curriculum. Nov 2020

DRAFT FOR COMMENT

7.9 Anaesthesia for Thoracic Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Perform safe anaesthesia and perioperative care of patients of all ages undergoing thoracic surgical procedures, including the thoracic cage, trachea below the larynx, bronchial system, lung parenchyma, pleura, diaphragm and mediastinum, excluding procedures on the heart and great vessels				ME/Sc/Pr/Cl/Cm/HA/Le
KNOWLEDGE				
The anatomy of the thoracic cage and its contents, ventilatory and respiratory physiology and pharmacology				ME/Sc
Risk stratification for postoperative complications and application of—principles of preoperative optimisation for major thoracic procedures				ME/Sc/HA/Cl/Cm/CA
Principles of perioperative pain management specific to thoracic surgery (particularly as it relates to post-thoracotomy pain)				ME/Sc/Cm/Cl
Principles of thoracic trauma, its presentation and management				ME/Sc/Cm/Cl
Safe management of the airway, bronchial system and lung isolation				ME/Sc/Cm/Cl/CA

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Knowledge

7.9.1 Anatomy and physiology

- The thoracic cage and its innervation, including the thoracic outlet and all structures associated with it
- The oesophagus
- The mediastinum and its relationship with other structures within the thoracic cavity
- The thoracic trachea, major and minor bronchi and their anatomical relationship to other intrathoracic structures
- The lungs, pleura and diaphragm, including their blood supply and innervation (somatic and autonomic)
- The pulmonary circulation, including pathological states and responses to anaesthesia and surgery
- Control of ventilation
- V/Q mismatching and shunt
- Oxygen transport and gas exchange

7.9.2 Pharmacology

The uses, effects and interactions of anaesthetic and non-anaesthetic medications on the airways, pulmonary circulation and control of ventilation, for example:

- Anaesthetic medications– inhalational and intravenous agents
- Opiates
- Beta-2 agonists and other sympathomimetics

- Anticholinergics (e.g. ipratropium bromide and its congeners)
- Phosphodiesterases (e.g. Theophylline and similar drugs)
- Steroids (oral, parenteral and inhalational)
- Medications with a vasodilatory effect on the pulmonary circulation (oral, IV and inhalational)

7.9.3 Special equipment and monitoring

- Principles of the use of airway equipment for lung isolation (e.g. double-lumen endotracheal tubes [DLTs], bronchial blockers, etc.)
- Principles of the safe use of equipment for managing the airway in thoracics, such as rigid and fibreoptic bronchoscopes, high-pressure jet ventilators, in-line circuit nebulisers and DLT CPAP attachments during one-lung ventilation
- Principles of tube thoracostomy (with and without suction)

7.9.4 Safe anaesthesia practice, including the management of postoperative complications

- Risk stratification of patients undergoing thoracic procedures and mitigation of postoperative pulmonary and cardiac complications
- Diagnosis, management and perioperative considerations of tuberculosis and other respiratory pathologies
- Perioperative pain management using various modalities, including local, regional and neuraxial anaesthesia
- Indications, principles and techniques of lung isolation/one-lung ventilation, including double-lumen tubes and bronchial blockers, the use of fibreoptic bronchoscopy for proper placement and management of hypoxia during one-lung ventilation
- Principles governing the provision of general, regional and neuraxial anaesthesia for thoracic procedures, including the following:
    - Diagnostic bronchoscopy with or without biopsy or tumour debulking
    - Diagnostic oesophagoscopy with or without biopsy and stenting
    - Mediastinoscopy (mediastinal masses, etc.)
    - Thoracotomy for pulmonary and pleural procedures with or without lung isolation, including, but not limited to, pneumonectomy, lobectomy, pleurectomy, pleurodesis, bullectomy, empyema and lung abscess drainage, control of major pulmonary haemorrhage
    - Tracheal surgery
    - Bronchopleural fistula management
    - Video-assisted thoracoscopic surgery, including for biopsies and sympathectomies
    - Oesophageal surgery
    - Thoracic trauma, including management of flail chest and tension pneumothorax
    - Lung transplantation
- Identification and management of postoperative complications related to thoracic surgery, including post-pneumonectomy pulmonary oedema, cardiac herniation and arrhythmia's

7.9.5 Technical skills

7.9.5.1 Clinical

- Assess, evaluate and risk stratify patients undergoing major thoracic procedures aiming to mitigate postoperative pulmonary and cardiac complications
- Interpret radiological images, including plain PA chest X-rays, thoracic CT scans and MRI images
- Use ultrasound imaging appropriately for diagnostic and procedural purposes

DRAFT FOR COMMENT

- Use airway equipment commonly used in thoracic procedures, namely double-lumen endotracheal tubes (DLTs), bronchial blockers, rigid bronchoscopes, high-pressure jet
- Use ventilators, apnoeic oxygenation, in-line nebulisers and DLT CPAP attachments during one-lung ventilation
- Manage all aspects of one-lung ventilation, including insertion of double-lumen tubes and bronchial blockers and the use of fibreoptic bronchoscopy to confirm the proper placement and management of hypoxia during one-lung ventilation
- Provide general, regional or neuraxial anaesthesia for:
    - Diagnostic bronchoscopy with or without biopsy or tumour debulking
    - Diagnostic oesophagoscopy with or without biopsy and stenting
    - Mediastinoscopy (mediastinal masses, etc.)
    - Thoracotomy for pulmonary and pleural procedures with or without lung isolation, including pneumonectomy, lobectomy, pleurectomy, pleurodesis, bullectomy, empyema and lung abscess drainage, control of major pulmonary haemorrhage
    - Tracheal surgery
    - Bronchopleural fistula management
    - Video-assisted thoracoscopic surgery, including biopsies and sympathectomies
    - Oesophageal surgery
    - Thoracic trauma, including management of flail chest and tension pneumothorax
    - Lung transplantation
- Reduce airborne and aerosol infection risk, including TB, COVID-19, etc.
- Safe patient positioning
- Identify and appropriately manage perioperative complications
- Plan and execute peri- and postoperative pain management protocols involving various modalities, including local, regional and neuraxial anaesthesia (e.g. thoracic epidurals, paravertebral blocks, rib blocks, intrapleural block and erector spinae plane block)
- Identify and manage postoperative complications, including post-pneumonectomy pulmonary oedema, cardiac herniation and arrhythmia's

7.9.5.2 Organisational

General principles apply, as elaborated in Background.

7.9.5.3 Administrative

General principles apply, as elaborated in Background.

7.9.6 Non-technical skills

General principles apply, as elaborated in Background:

- Leadership/teamwork
- Communication
- Situational awareness
- Context awareness
- Collaboration
- Humaneness
- Health advocate

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7.10 Anaesthesia for Vascular Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
To assess, stratify risks, plan for and manage anaesthesia for vascular procedures.	?			ALL
Provide safe perioperative anaesthetic care for a variety of vascular procedures	?			ALL
KNOWLEDGE				
Anatomy, physiology, and pathophysiology relevant to the management of patients presenting for vascular surgery.				ME/Sc
Monitoring devices used during vascular anaesthesia.				ME/Sc/CA
Pharmacology of patient medications and the guidelines and implications for patients and vascular anaesthesia.				ME/Sc/CA
Assessment and risk stratification of patients presenting for vascular procedures.				ME/Sc/Cm/Cl/HA
Perioperative management of vascular patients.				ME/Sc/Cm/Cl/HA/Le/Pr

7.10.1 Vascular anatomy, physiology, pathophysiology

7.10.1.1 Anatomy and physiology of the arterial-venous system

7.10.1.2 Physiological consequences of aortic cross-clamping, including the impact of the level of clamping

7.10.1.3 Pathophysiology of atherosclerotic disease

7.10.1.4 Pathophysiology of chronic kidney disease

7.10.1.5 Pathophysiology of the major diseases of the carotid and aorta, including:

- Carotid stenosis
- Carotid aneurysm
- Aortic aneurysm
- Aortic dissection
- Aortic occlusive disease
- Embolic disease
- Ischemic limb
- Connective tissue disease
- Aortitis
- Trauma
- Metabolic disease

7.10.1.6 Pathophysiology of peripheral vessel disease, including:

- Varicosities
- Embolic disease
- Ischemic limb
- Metabolic disease
- Trauma

7.10.1.7 Impact of vascular disease on:

- Wound dehiscence and infection
- Positioning injury
- Perioperative myocardial ischaemia
- Perioperative stroke
- Perioperative renal failure

7.10.2 Pharmacology

Impact of the patient's pharmacotherapy on their perioperative management, including:

- β-blockers

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- Statins
- Antiplatelet agents
- Antihypertensive drugs
- Cardiac failure therapy

7.10.3 Preoperative risk assessment

7.10.3.1 Perioperatively manage comorbidities in the patient presenting for vascular surgery, including:

- Ischaemic heart disease
- Cardiac failure
- Arrhythmias
- Hypertension
- Diabetes mellitus
- Chronic obstructive airway disease (and smoking)
- Renal failure
- Autoimmune disease
- Coagulation disorders

7.10.3.2 To assess, risk stratify, plan for and manage patients for vascular anaesthesia (refer to Domain 5 for details)

7.10.3.3 Commonly used guidelines, including:

- South African cardiovascular risk stratification guideline for noncardiac surgery
- ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery
- Canadian Cardiovascular Society guidelines on perioperative cardiac risk assessment and management for patients who undergo noncardiac surgery

7.10.3.4 Communicate the incidence of complications with regards to vascular surgical procedures and the related anaesthetic

7.10.4 Perioperative care

7.10 4.1 Perioperative anaesthetic care for open and endovascular procedures:

- Carotid artery disease (e.g. carotid stenosis, carotid body tumours, trauma)
- Aortic and aortoiliac disease:
  - Thoracic aneurysm repair
  - Abdominal aneurysm repair
  - Aortic dissection surgery
  - Ruptured aortic aneurysm surgery
  - Occlusive aortic disease
- Peripheral arterial disease:
  - Major vessel occlusion
  - Acute and chronic limb ischaemia
  - Limb amputation
  - Compartment syndrome
  - Embolisation
  - Embolectomy
- Vascular access for haemodialysis
- Vascular trauma
- Venous disease
- AV malformations
- Thoracic/lumbar sympathectomy

7.10.4.2 Management of the following:

- Carotid endarterectomy and carotid stenting
- Aortic cross-clamping
- Stent deployment
- Organ protection
- Blood conservation

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- Interventional radiological procedures
- Reperfusion injury

7.10.5 Monitoring for vascular surgery

7.10.5.1 Brain function
7.10.5.2 Spinal cord
7.10.5.3 Haemodynamic monitoring
7.10.5.4 Coagulation
7.10.5.5 Biomarkers

7.10.6 Risks and complications

Diagnosis and management of postoperative complications, including:
7.10.6.1 Haemorrhage
7.10.6.2 Perioperative stroke
7.10.6.3 Myocardial ischaemia
7.10.6.4 Limb ischaemia
7.10.6.5 Rhabdomyolysis
7.10.6.6 Post-amputation pain
7.10.6.7 Contrast-induced nephropathy

7.10.7 Pain management for patients following vascular procedures

7.10.7.1 Epidural, spinal and regional analgesia in the setting of alterations in coagulation status
7.10.7.2 Phantom limb pain

7.10.8 Technical skills

7.10.8.1 Clinical:
- Assess the patient presenting for vascular surgery, including:
  - Determine functional status
  - Assess perioperative risk
  - Identify patients requiring further investigation and optimisation
- Perform monitoring procedures commonly employed in vascular procedures (e.g. cardiac output and neurological monitoring)
- Anticipate and manage complications and related morbidity that may occur during vascular surgery and anaesthesia
- Working in hybrid theatres

7.10.8.2 Organisational:
- Perioperative documentation per SASA and HPCSA guidelines

7.10.9 Non-technical skills

7.10.9.1 Leadership
7.10.9.2 Collaboration:
- Multidisciplinary case discussion and planning

7.10.9.3 Communication
7.10.9.4 Health advocacy
7.10.9.5 Context awareness:
- Awareness of resource limitations that might affect equipment or device availability and implications for patient management

7.10.9.6 Humaneness:
- Providing patient-centred information regarding planned anaesthetic management based on the surgery offered to the patient, alternative options, and potential risks to gain patient cooperation and understanding
- Counselling for limb loss

7.10.9.7 Professionalism

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7.11 Anaesthesia for All Head and Neck Surgery including Otorhinolaryngology, Dental and Maxillofacial surgery

This Domain should be cross-referenced with Domain 2 *(Airway Management)*

COMPETENCES	DA	FCA I	FCA II	MetComp
Perioperative care of patients undergoing all ENT, head and neck, dental and maxillofacial surgery, including managing the shared airway, perioperative airway obstruction in adult and paediatric patients				ME/Cm/Cl/HA/Pr/Hu
KNOWLEDGE				
Applied anatomy, physiology, pharmacology pathophysiology and physics principles				ME/Cm/Cl/HA/Pr/Hu
Principles of airway management in all head and neck procedures				ME/Cm/Cl/HA/Pr/Hu
Classification and perioperative management of maxillofacial and mandibular injuries and their complications				ME/Cm/Cl/HA/Pr/Hu
Anaesthesia for dental surgery in normal and special patient populations				ME/Cm/Cl/HA/Pr/Hu
Perioperative management of dental sepsis and its complications				ME/Cm/Cl/HA/Pr/Hu
Anaesthetic management of orthognathic surgery				ME/Cm/Cl/HA/Pr/Hu
Anaesthesia for flap surgery				ME/Cm/Cl/HA/Pr/Hu
Anaesthetic principles in ear nose and throat surgery				

All DA relevant topics are marked by an asterisk for this Sub-domain.

Knowledge

7.11.1 Applicable anatomy, physiology, pharmacology, physics and equipment

Cross reference with Domain 2, focusing on the points below.

7.11.1.1 Anatomy of the airway and head and neck structures, blood supply, innervation, intracranial and extracranial relations

7.11.1.2 Physiology and pathophysiology:

- *Reflex pathways and their effects:
  - Trigeminocardiac and airway reflexes, among others
- Swallowing, humidification, mucociliary function, vocal cord function
- Snoring/obstructive sleep apnoea syndromes*
- Inflammatory/infective/neoplastic conditions

7.11.1.3 Pharmacology:

Refer to Domain 1 with a particular focus on the points below.

- TIVA/TCI applications
- Haemostatic techniques/creating a bloodless surgical field
- Local anaesthetic agents
- Topical anaesthesia and vasoconstrictors
- Inhaled medication

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- Steroids, antihistamines and other anti-inflammatory agents

7.11.1.4 Physics, equipment and measurement:

Refer to Domain 1, specifically the points below.

- Airway equipment*
- Evoked potentials
- Humidifiers/nebulisers*
- Jet ventilation
- Laser*
- Neuromuscular monitoring*
- Ultrasound applications in head and neck procedures

7.11.2 Anaesthetic management of all head and neck procedures

7.11.2.1 Preassessment and optimisation:

- Preoperative patient concerns
- Comorbid conditions (e.g. bleeding disorders, liver disorders, malignancies)
- Drug therapy considerations (e.g. antihypertensives, anticoagulants)
- Patients at the extremes of age, paediatric to elderly

7.11.2.2 Recognition and management of the difficult airway, specifically:

See Domain 2 for further details.

- Gaseous induction
- Intubation techniques, including nasotracheal intubation, blind nasal intubation, retrograde intubation
- Awake intubation and sedation
- Cricothyrotomy and tracheostomy as emergency and elective procedures
- Airway topicalisation and airway blocks
- Difficult airway equipment – indications of use and organisational checklists
- Management of upper airway obstruction, including laryngospasm
- Safe extubation of a difficult airway

7.11.2.3 Managing disease processes impacting head and neck structures and the airway, including:

- Infections, abscesses
- Tumours and mass effect
- Postsurgical or irradiation scarring
- Congenital deformities
- Foreign bodies
- Trismus

7.11.2.4 Shared and remote airway considerations:

- Implications of limited physical and visual access during anaesthetic
- Specialised endotracheal tubes to facilitate surgical access
- A nasal versus oral versus submental approach to intubation
- Vigilance against airway disconnections and kinking during surgical manoeuvres
- Occult bleeding into the airway during surgery
- Throat packs – hazards and controversies surrounding the use of throat packs and responsibility

7.11.2.5 Postoperative considerations:

- Emergence and extubation strategies, including:
  - Criteria for extubation
  - Deep versus awake extubation
  - Use of airway exchange catheters
  - Re-examination of airway for bleeding/clots
  - Considerations for nasal packing, intermaxillary fixation
  - Considerations for postoperative reintubation

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7.11.3 Anaesthetic management of head and neck, maxillofacial and dental procedures

7.11.3.1 Special focus on the following procedures, *inter alia*:

- Neck dissection and its complications (e.g. cardiovascular*)
- Laryngectomy
- Parotid surgery
- Thyroid*
- Parathyroid surgery
- Principles of flap surgery
- Principles of cancer surgery
- Facial, maxillary and mandibular fractures (according to the Le Fort classification) and their surgical management
- Penetrating trauma (i.e. gunshot wounds and stab wounds)

7.11.3.2 Oral and maxillofacial-related injuries and hazards arising from the delivery of anaesthesia:

- Dental damage:
  - Aetiology of dental injury
  - Predisposing factors
  - Prevention of anaesthetic-related dental injuries
- Soft tissue injuries:
  - Injuries associated with throat packs
  - Injuries associated with nasal intubations
  - Epistaxis
  - Structural injuries associated with nasotracheal intubation (e.g. avulsion of nasal polyps)
  - Eye injuries
- Infective endocarditis risk identification and appropriate prophylaxis

7.11.3.3 Procedural sedation for dental procedures:

- Valid, informed consent to sedation and analgesia
- Guidelines for fasting
- Standards of monitoring
- Personnel
- Documentation required for procedural sedation and analgesia

7.11.3.4 Anaesthetic considerations for specific maxillofacial and oral surgery procedures:

- Maxillofacial, oral and dental infections:
  - Assessment of potential progression of dental sepsis and anaesthetic management of dental abscesses and Ludwig's angina
  - Pathophysiology of dental and oral infections
  - Complications of odontogenic infections, including Ludwig's angina, cavernous sinus thrombosis, mediastinitis and systemic sepsis

7.11.3.5 Oral surgery:

- Dental nomenclature
- Local anaesthetics most used by dentists
- Simple dental extractions
- Surgical extraction of impacted teeth, including third molar surgery
- Implantology

7.11.3.6 Surgical management of orofacial pain, including temporomandibular joint (TMJ) disorders:

Refer to Domain 7.16 Chronic Pain.

- Surgical treatment of trigeminal neuralgia
- TMJ surgery, including arthroscopy, arthrocentesis and TMJ replacement

7.11.3.7 Orthognathic surgery:

- Anaesthetic considerations during orthognathic surgical procedures – Le Fort I maxillary osteotomy, mandibular osteotomy and genioplasty and distraction osteogenesis

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- Hypotensive anaesthesia, including ethical considerations surrounding deliberate hypotensive anaesthetic techniques and their safe application *(not DA)*

7.11.3.8 Maxillofacial surgical pathology, oncology and reconstructive surgery:
Refer to Domain 7.13.

- Anaesthetic management of tumour resection:
  - Detect difficulty in intubation because of tumour or its treatment, coexisting medical problems and decide on suitable options for surgery
  - Reconstruction and microvascular anastomosis
  - General and regional anaesthetic options for free flap surgery
  - Factors that influence flap perfusion, including fluids, temperature and vasoactive substances

7.11.3.9 Paediatric maxillofacial surgery, including *(not DA)*:
Cross reference with Domain 7.6 Paediatrics

- Cleft lip and palate surgery
- Craniofacial procedures
- Multidisciplinary teamwork, appreciating the risks involved with long surgery and potentially difficult airways:
  - Congenital abnormalities (Crouzon's, Apert's, Pfeiffer, Craniosynostosis)
  - First arch abnormalities (Pierre Robin, Treacher Collins, hemifacial microsomia)
  - Arteriovenous malformations (Sturge-Weber)
- TMJ ankyloses – anaesthetic challenges due to minimal mouth opening

7.11.3.10 Anaesthetic management of specific patient populations requiring dental procedures:

- Intellectual impairment – special considerations in the pre-, intra- and postoperative period of special needs patients, including implications of consent for adults who lack capacity, a sympathetic and pragmatic approach to anaesthesia in partnership with the patient and carer, providing comprehensive postoperative instructions to caregivers
- Disorders of haemostasis – the implication of dental procedures on patients with bleeding disorders, including haemophilia

7.11.4 Anaesthesia for ear, nose and throat procedures

Provision of safe anaesthetic care, as specified above, focusing on the following:

- Monitoring – basic and advanced (e.g. EMG, evoked potentials for surgery requiring neuromonitoring)
- GA techniques, including TIVA/TCI, where appropriate
- Anaesthetic techniques without neuromuscular blockade, enabling neuromonitoring
- Conscious sedation
- Airway endoscopy – nasal, pharyngeal, laryngeal, tracheal
- Tracheal surgery, including tracheostomy, resection, dilatation
- Management of laser surgery and its complications, including airway fires
- Apnoeic ventilation techniques – jet ventilation, THRIVE, tubeless surgery
- Anaesthetic principles for nasal and sinus procedures
- Anaesthetic principles for ear procedures, including:
  - Middle ear disease
  - Cochlear implants
  - Postoperative vertigo, nausea and vomiting
- Pharyngeal and laryngeal procedures, including adenotonsillectomy, quinsy, Ludwig's angina, abscesses, papilloma, foreign body and management of complications

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7.11.5 Technical skills

7.11.5.1 Clinical:

- Assessment and management of the difficult airway
- Awake fibreoptic intubation
- Unanticipated difficult airway
- Front of neck access – cricothyrotomy, tracheostomy
- Postoperative management, including extubating the difficult airway
- Management of postoperative facial and airway swelling and a bleeding airway
- Endoscopy – nasal, laryngeal, bronchoscopy (rigid and flexible)
- Assessment of facial, neck and thoracic trauma for airway planning
- Management of anaesthesia for maxillofacial surgery, including:
    - Maxillofacial and oral infections
    - Oral surgery
    - Surgical management of orofacial pain, including TMJ disorders
    - Orthognathic surgery
    - Maxillofacial surgical pathology and oncology and reconstructive surgery
    - Paediatric maxillofacial surgery, including cleft lip and palate repair, craniofacial procedures and TMJ ankylosis
- Neck and airway ultrasound
- Airway regional anaesthesia (cross-reference to Domain 4)
- Head and neck regional anaesthesia (e.g. superficial cervical plexus block, deep cervical plexus block, refer to Domain 4)
- Tubeless/apnoeic ventilation techniques
- TIVA/TCI
- Conscious sedation (Domain 1)
- Sedation for out-of-hospital dental procedures
- Intraoperative nerve monitoring
- Anaesthetic techniques without muscle relaxants
- Anaesthesia for surgery that may involve prolonged anaesthesia, major blood loss, hypothermia and multiple procedures

7.11.5.2 Organisational:

Cross-reference to Background.

7.11.5.3 Administrative:

Cross-reference to Background.

7.11.6 Non-technical skills

In addition to the generic non-technical skills listed in Background*, the following apply to this domain.*

7.11.6.1 Collaborator:

- Surgeons, dentists and nurses, for shared airway management, inter alia.
- Perform team drills for difficult airway management

7.11.6.2 Context awareness:

- Recognition of emergencies in situations with personal limitations and sometimes remote locations, like dental rooms

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7.12 Anaesthesia for Ophthalmic Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Deliver safe anaesthetic and perioperative care of patients undergoing orbital, cataract or vitreoretinal surgery				All
Apply the relevant principles and knowledge in practice, to manage anaesthesia for eye surgery in patients of all ages				All
KNOWLEDGE				
Relevant anatomy and physiology of the eye and orbit				ME, Sc
Relevant pharmacology relating to ophthalmic surgery				ME, Sc
Issues related to providing safe anaesthetic care for patients undergoing ophthalmologic surgery under general and regional anaesthesia or conscious sedation				All

7.12.1 Anatomy and physiology

- Anatomy of the eye, including the orbit (and contents), the anterior and posterior chambers, lacrimal apparatus, relevant blood supply and innervation of the eye and orbit, concerning the performance of regional eye blocks and their complications
- Eye reflexes (oculocardiac reflex, oculorespiratory and oculo-emetic), including risk factors and management
- Physiological principles relating to intraocular pressure and the effects of anaesthesia on this pressure and the factors that influence it
- Pathophysiology of glaucoma
- Effects of anaesthesia on retinal perfusion and the perioperative factors that influence retinal perfusion

7.12.2 Pharmacology

Use of the following agents:

- Local anaesthetic agents for regional and topical eye blocks
- Commonly used sedative agents
- Other medications for eye surgery, including topical local anaesthetic agents and adjuncts (e.g. hyaluronidase, vasoconstrictors, mydriatics, miotics and agents used to reduce intraocular pressure)
- Significance of ketamine, nitrous oxide and succinylcholine
- Significance of concurrent anticoagulation use
- Avoidance of coughing/retching/vomiting, including agents used for postoperative nausea and vomiting

7.12.3 Safe anaesthetic practice

- Independent provision of anaesthesia for patients undergoing ophthalmic surgery
- Preoperative evaluation and identification of common medical conditions associated with patients having ocular surgery

- Safe and effective conscious sedation and general anaesthesia in appropriate patients for ophthalmic surgery, including surgery for the following procedures:
    - Examination under anaesthesia
    - Extra- and intraocular ophthalmic surgery, including:
        - Cataract surgery
        - Strabismus surgery
        - Retinal surgery
        - Plastic and orbital surgery,
        - Emergency eye surgery
        - Corneal transplant
        - Laser surgery, including safety measures required
        - Surgery for ophthalmic tumours
- Anaesthetic considerations of ophthalmologic surgery, including limited access to the airway and the importance of smooth induction and emergence
- Safe regional anaesthesia in appropriate patients, including:
    - Performance of retrobulbar, peribulbar, and sub-tenon blocks,
    - Principles informing the choice of general and regional anaesthesia
    - Principles relating to conversion from regional to general anaesthesia
    - Patient positioning considerations in patients with limited cardiorespiratory reserve
- Safe perioperative management of paediatric patients presenting for ophthalmic surgery, including a knowledge of:
    - Retinopathy of prematurity
    - Management of paediatric patients with complex congenital syndromes
- Safe perioperative management of geriatric patients presenting for ophthalmic surgery, including those with multiple comorbidities
- Specific considerations concerning ophthalmic laser procedures
- Perioperative care of patients having complex cornea surgery, including the issues relating to tissue transplant surgery
- Implications for anaesthesia of the intraocular injection of gas and silicone oils; and discuss the significance of an intravitreal gas bubble
- Recovery and discharge of patients undergoing ophthalmic surgery, including issues relating to day-case surgery, nausea and vomiting and postoperative delirium

7.12.4 Skills

In addition to the standard list in Background *above, the following need particular attention:*

7.12.4.1 Technical skills:

- Performance of retrobulbar, peribulbar and sub-tenon blocks
- Management of complications related to blocks

7.12.4.2 Non-technical skills:

- Decision-making/insight:
    - Manage the issues relating to tissue transplant
- Humaneness:
    - Appreciate the anxiety surrounding loss of vision and blindness in patients having eye surgery
    - Assistance of patients with limited/no vision concerning moving on to and off a theatre table/wheelchair/trolley
- Health advocate:
    - Promote relevant routine health checks for diabetes, glaucoma and hypertension
    - Ensuring staff safety when a laser is used for eye surgery
    - Ensure appropriate discharge support is in place for patients with limited vision

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7.13 Anaesthesia for Aesthetic and Reconstructive Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Apply knowledge in practice in the anaesthetic management of aesthetic and reconstructive surgery				ME, S, Cl, Cm, P
Provide perioperative anaesthetic management to patients of all ages undergoing aesthetic and reconstructive surgery				ME, S, HA, Cl, P, H
KNOWLEDGE				
The relevant anatomy and physiology of the proposed surgical site				ME, S, P
The relevant pharmacology relating to aesthetic and reconstructive surgery				ME, S, P
Principles of safe anaesthetic care for patients undergoing aesthetic and reconstructive surgery under general and regional anaesthesia, as well as procedural sedation and analgesia				ME, S, HA, Cl, Cm, P
Basic principles and implications of aesthetic and reconstructive surgical procedures				ME, S, Cl, Cm, P, L

*Note: Items marked * are considered not within the scope of the Diploma in Anaesthesia.*

7.13.1 Anatomy

7.13.1.1 The basic aesthetic or reconstructive surgical intention of each procedure

7.13.1.2 Associated anatomical abnormalities and implications presented by pre-existing conditions, such as craniofacial or other syndromes presenting for reconstructive surgery

7.13.1.3 Impact of preoperative radiotherapy

7.13.2 Physiology

7.13.2.1 The physiological concerns of each procedure, including the following:

- Oxygen flux
- Extrajunctional receptors

7.13.1.2 Associated physiological abnormalities and implications presented by pre-existing conditions, such as craniofacial or other syndromes presenting for reconstructive surgery

7.13.1.3 Impact of preoperative radiotherapy

7.13.3 Pharmacology

7.13.3.1 Local anaesthetic agents and local anaesthetic systemic toxicity

7.13.3.2 Tumescent technique and clysis solution

7.13.3.3 Adjuvant drugs, including:

- Adrenaline
- Hyaluronidase
- Tranexamic acid

7.13.3.4 Dermal fillers and botulinum toxin

7.13.3.5 Silicone and cosmetic implant fillers

7.13.3.6 Intravenous sedative and anxiolytic agents

7.13.3.7 Medications of abuse:

- Appearance and performance enhancing drugs
- Herbal and homeopathic supplements
- Recreational drugs

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7.13.3.8 Antidepressants, antipsychotics, mood stabilisers, oral anxiolytics and sedatives
7.13.3.9 Medications used for the optimisation of free flaps, specifically during reconstructive surgery
7.13.3.10 Medications that may compromise free flaps, specifically during reconstructive surgery
7.13.3.11 Oncology chemotherapy
7.13.3.12 How to pharmacologically mitigate microvascular bleeding/oozing
7.13.3.13 Agents used for postoperative nausea and vomiting prophylaxis
7.13.3.14 Control of blood pressure and flow to tissue

7.13.4 Safe perioperative practice

7.13.4.1 Preoperative evaluation and identification of common medical conditions
7.13.4.2 Associated psychosocial, behavioural and psychiatric concerns, including:

- Body dysmorphism
- Gender identity
- Mood disorders
- Post-traumatic stress disorder
- Substance abuse

7.13.4.3 Plan and execute procedural sedation and analgesia, regional anaesthesia and general anaesthesia
7.13.4.4 Office-based anaesthesia safety

7.13.5 Specific anaesthesia principles and requirements for the following range of procedures in adult and paediatric patients

Anaesthetic considerations of each specific surgical site and procedure, including potentially limited access to the airway, positional changes, multiple surgical sites and surgeon involvement and the management thereof, as well as the significance of the impact of anaesthesia and anaesthetic technique on recovery in the case of both aesthetic and reconstructive patients.

7.13.5.1 Aesthetic surgery, including:

- Breast surgery:
  - Augmentation, implant/ explantation/exchange and capsulectomy
  - Breast reduction
  - Mastopexy
  - Gynaecomastia correction
- Genital:
  - Gender reassignment surgery and its respective stages
  - Labiaplasty and cosmetic genital surgery
- Head and neck:
  - Blepharoplasty
  - Face and brow lift
  - Genioplasty
  - Otoplasty
  - Platysmaplasty
  - Rhinoplasty
- Skin, subcutaneous and muscle:
  - Abdominoplasty
  - Cosmetic implants for enhancement of muscle groups
  - Cosmetic skin lasers in theatre, including safety measures (e.g. CO_2 laser for skin resurfacing and laser for congenital nevi and nevus flammeus)
  - Dermal filler injection
  - Botulinum toxin injection
  - Large and small volume liposuction, liposculpture and current techniques
  - Lipofilling

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7.13.5.2 Reconstructive surgery:

- Adult and paediatric craniofacial surgery*
- Adult and paediatric maxillofacial trauma
- Adult and paediatric hand surgery
- Breast reconstruction/mammoplasty
- Burns
- Congenital abnormalities*
- Complex syndromes*
- Free flaps*
- Limb and digit reimplantation
- Major debridement in both trauma and sepsis
- Rotational/pedicle flaps
- Scar revision
- Skin grafting

7.13.6 Range of regional anaesthesia, procedural sedation and analgesia, combined regional and general anaesthesia

Refer to Domain 1 and 4
Specifically, the physical, pharmacological and procedural techniques associated with the optimisation of perfusion of the flap.

7.13.7 Skills

The requisite skills for the relevant procedures listed above are expected. Cross reference to Background. In addition, the specific areas below should be considered.
7.13.8.1 Technical

- Organisational:
  - The extended operative times (e.g. free flap surgeries need to be considered in organisational plans)

7.13.8.2 Non-technical

- Situational awareness:
  - Awareness of the regulations with respect to day-case anaesthesia and office-based procedures
  - Awareness of the ethical considerations, specifically associated with aesthetic surgery in paediatrics, patients in whom psychiatric and psychological disorders may be present and patients in whom aesthetic surgery may pose immediate or long-term risk, physically or physiologically
- Decision-making/insight:
  - In the case of gender reassignment surgery, be familiar with the regulations, ethical and legal requirements for such surgery, as well as the need to potentially consult with psychologists and other clinicians involved in the transitional process
- Collaboration:
  - Ensuring an effective multidisciplinary team approach, especially with procedures with extended operative times (e.g. free-flap surgery)
- Professionalism:
  - Especially with respect to aesthetic surgery, ensuring that patient confidentiality is maintained and that any digital images or video footage captured is with the written consent of the patient
- Humaneness:
  - Sensitivity in dealing perioperatively with patients that have disfigurement
  - Ensure the presence of support to assist in their recovery as these surgeries often affect activities of daily living and are cosmetically disfiguring during the early stages of recovery
- Health advocate:

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- Manage the perioperative care of patients planned for reconstructive and aesthetic surgery, including ensuring patient advocacy and focus on overall patient wellness and wellbeing as a priority above that of financial gain

7.14 Anaesthesia for Urology, Gynaecology and Renal Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Assess, risk stratify, plan and provide anaesthesia for patients with genitourinary or renal pathology presenting for surgery				ME/Sc/CA/Pr/HA/Le/Hu/Cl
Prevent perioperative morbidity and mortality due to renal dysfunction				ME/HA/Sc/CA
KNOWLEDGE				
Anatomy, physiology and pharmacology of the normal renal and genitourinary system				ME/Sc
Anatomical and physiological differences in renal function related to age and comorbidities and their implications for anaesthesia management				ME/Sc/CA
Acute and chronic renal failure, including planning and management of a patient on renal replacement therapy presenting for surgery				ME/Sc/CA
Assessment and risk stratification of patients with renal dysfunction or disease, including interpretation of investigations related to the renal system				ME/Sc/Cm/Cl/HA
Perioperative management of patients presenting for gynaecological, urological and renal procedures				ME/Sc
Renal protection in the perioperative setting				ME/Sc/CA/Cl
Perioperative, medical and ethical considerations of anaesthesia for renal transplants				ME/Pr/Hu

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7.14 Competences

- To assess, risk stratify, plan and provide anaesthesia for patients with genitourinary or renal pathology presenting for acute and elective surgery
- Prevention of perioperative morbidity and mortality due to renal dysfunction

Knowledge

7.14.1 Anatomy and physiology of the renal and genitourinary system
(Refer to Domain 1 FCA I **of the curriculum.)**

7.14.2 Pharmacology of the renal and genitourinary system
(Refer to Domain 1 FCA I **of the curriculum.)**

7.14.3 Renal protective strategies
Know an approach for renal protection in the perioperative and critical care settings.

7.14.4 Renal risk assessment

7.14.4.1 Evaluation of renal function tests to determine renal risk, including but not limited to:

- BUN
- Creatinine and creatinine clearance
- Glomerular filtration rate
- Renal biomarkers
- Urinalysis – sodium, osmolarity, proteinuria, haematuria, urine sediment, specific gravity

7.14.4.2 Renal failure diagnostic and prognostic scoring systems (e.g. RIFLE, KDIGO, AKIN)*

7.14.5 Anaesthesia management of the patient with renal pathology

7.14.5.1 Acute renal failure:

- Pathophysiology and prevention of acute renal failure:
  - Types (prerenal, intrinsic and postrenal)
  - Diagnostic tests
  - Management

7.14.5.2 Hepatorenal syndrome:

- Pathophysiology
- Treatment
- Response to liver transplant

7.14.5.3 Chronic renal failure:

- Clinical characteristics of the uraemic syndrome
- Dialysis treatment – indications, types, physiological effects, complications and perioperative management strategies
- Anaesthetic management of the patient with chronic renal insufficiency and chronic renal failure:
  - Preoperative evaluation and optimisation
  - Managing the risk of cardiovascular complications
  - Monitoring
  - Selection of anaesthetic agents

7.14.5.4 Assessment of common patient risk factors in urological and gynaecological surgery:

- Perioperative anaemia and blood patient management principles
- Hypertension, diabetes and other comorbidities (Domain 5)
- Sepsis

7.14.6 Anaesthesia management for genitourinary surgery

7.14.6.1 General principles:

- Principles of safe sedation, including safety considerations in office-based anaesthesia
- Regional techniques
- General anaesthesia with appropriate airway management techniques

7.14.6.2 Transurethral resection of the prostate:

- Describe the TURP syndrome and its management
- Diagnose and assess complications, including the TURP syndrome

7.14.6.3 Prostatectomy (open, laparoscopic and robotic assisted):

- Simple, radical

7.14.6.4 Therapy for renal stone disease:

- Endoureteral lithotripsy (anterograde and retrograde)
- Extracorporeal shock wave lithotripsy (ESWL)
- Percutaneous nephrolithotomy and nephrolithotripsy

7.14.6.5 Endourologic procedures:

- Bladder (e.g. cystoscopies, TURBT)
- Ureteral (e.g. stenting)
- Urethral (e.g. hypospadias repair)

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7.14.6.6 Laser and fluoroscopy procedures
7.14.6.7 Nephrectomy (open and laparoscopic):
- Simple, partial, radical

7.14.6.8 Cystectomy:
- Simple, partial, radical
- Ileal conduit and other diversion procedures

7.14.6.9 Procedures on testicles:
- Hydrocelectomy
- Gender reassignment
- Orchidectomy
- Testicular torsion or undescended testes
- Vasectomy and reversal vasectomy

7.14.6.10 Procedures on the penis:
- Circumcision
- Gender reassignment
- Hypospadias
- Penectomy
- Priapism

7.14.6.11 Adrenalectomy:
- Assessment and preparation of patients with phaeochromocytoma
- Perioperative management, including strategies for monitoring and haemodynamic control

7.14.6.12 Care of ports for renal replacement therapy:
- E.g. care of patients with Tenckhoff, Permacath, AV fistulas
- Perioperative management of patients for insertion

7.14.7 Principles of anaesthesia for gynaecological surgery – transvaginal, laparotomy or laparoscopic techniques

7.14.7.1 Ovarian cysts and tumours
7.14.7.2 Fallopian tubes, including emergency ectopic pregnancy management
7.14.7.3 Hysterectomy – abdominal and vaginal
7.14.7.4 Other uterine procedures for diagnosis and therapy (e.g. hysteroscopy, myomectomy, diagnostic dilatation and curettage)
7.14.7.5 Procedures for managing a miscarriage
7.14.7.6 Cervical procedures, including procedures for cervical incompetence
7.14.7.7 Vulvar and vaginal procedures
7.14.7.8 Procedures for the diagnosis and management of infertility
7.14.7.9 Gender reassignment procedures

7.14.8 Anaesthesia for renal transplantation

7.14.8.1 Anaesthesia management of the cadaveric organ donor
7.14.8.2 Anaesthesia management of the living donor
7.14.8.3 Anaesthesia management of the transplant recipient

SKILLS

7.14.9 Technical skills

7.14.9.1 Clinical:
- History taking and examination of the patient with renal or genitourinary pathology
- Provide anaesthesia for patients requiring minor or major open renal and genitourinary surgery
- Provide anaesthesia for patients requiring minor or major laparoscopic renal and genitourinary surgery for males and females
- Provide anaesthesia for robotic genitourinary surgery

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- Provide anaesthesia for endoscopic renal and genitourological surgery
- Perform regional anaesthesia for renal or genitourinary surgery

7.14.9.2 Organisational:

- Coordinate the timing of surgery and renal replacement therapy with the surgical and renal teams

7.14.9.3 Administrative

7.14.10 Non-technical skills

In addition to the generic NTS listed in Background:

- Collaborate with the renal transplant team
- Access to renal replacement therapy/transplant

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7.15 Anaesthesia for Transplant Surgery

COMPETENCES	DA	FCA I	FCA II	MetComp
Understand the principles of organ transplantation including the legal and ethical considerations				All
Provide safe anaesthesia for renal transplantation, applying principles of optimising graft outcome.				
Manage the perioperative care of the transplant recipient in the non-transplant clinical scenario.				
Understand the clinical diseases for which all organ transplantation is offered.				ME, S, HA
KNOWLEDGE				
Concept of brain death and the legalities, ethics and diagnosis of brain death for adult and paediatric patients				ME, S, HA
Management of the brain-dead donor including anaesthetic management of the organ procurement				ME, S, HA
Pharmacological understanding of immunosuppression regimens and their impact on perioperative care				ME, S, HA
Principles of the provision of anaesthesia services to a transplant recipient for non-transplant surgery				ME, S, HA
Ethical and technical concerns around living donation and donation after cardiac death				ME, S, HA, P
The role of the multi-disciplinary clinical team in the context of transplant surgery.				ME, S, HA, Coll, Comm
Anaesthetic principles for transplantation of organs and tissues				ME, S, HA
The perioperative care of patient undergoing renal transplant.				
The perioperative care of the living renal donor				ME, S, Comm

Summary

7.15.1 Knowledge of those conditions most associated with the need for transplantation and the implications for the anaesthesiologist

7.15.2 Immunosuppression

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7.15.3 Brain death

7.15.4 Living donorship and deceased donorship

7.15.5 The management of the transplant recipient for non-transplant surgery

7.15.6 Management of living donor

7.15.1 Knowledge of conditions most associated with the need for transplantation

7.15.1.1 Renal

- Clinical manifestations of end stage renal disease
- Basic physical and physiological principles of kidney replacement therapy techniques
- Extra-renal manifestations of end stage renal disease and kidney replacement therapy

7.15.1.2 Hepatic and intestinal

- Classification of liver disease
- Clinical features of cirrhosis including portal hypertension and associated manifestations, cirrhotic cardiomyopathy, porto-pulmonary hypertension, hepatopulmonary syndrome, coagulopathy, sepsis, encephalopathy, hepato-renal syndrome
- Clinical manifestations of acute liver failure including raised intracranial pressure, hyperammonaemia and multi-organ involvement

7.15.1.3 Cardiac

- Cardiac failure subtypes
- Available medical and device support of end-stage cardiac decompensation as a bridge to transplantation including left ventricular assist devices and extracorporeal support techniques

7.15.1.4 Pulmonary

- Disease processes associated with the need for lung transplantation including cystic fibrosis, interstitial lung diseases, pulmonary hypertensive disorders and bronchiolitis obliterans.
- Mechanical pulmonary support as a bridge to transplantation including home ventilation and extracorporeal support.

7.15.1.5 Pancreatic

- Classification and features of diabetes mellitus
- Target-organ damage associated with diabetes and the mitigation of these by transplantation
- Pharmacology of modern diabetes management

7.15.1.6. Bone marrow

- Disease processes associated with the need for bone marrow transplantation.
- Post-transplant haematological dysfunction

7.15.2 Immunosuppression

7.15.2.1 Drug classes *inter alia*:

- Glucocorticoids
- Calcineurin inhibitors
- Mycophenolate mofetil
- mTOR inhibitors

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- Anti-thymocyte globulin
- Monoclonal antibodies e.g. Basiliximab, Rituximab, Eculizumab
- Azathioprine
- Interleukin 6 inhibition e.g. tocilizumab
- Belatacept

7.15.2.2 Mechanism of action, drug interactions, impact on perioperative care and side effects

7.15.3 Brain death

7.15.3.1 The diagnosis of brain death

- The definition of brain death
- Conditions necessary for brain death diagnosis
- Mimickers of brain death
- Radiological tests for detection of brain death
- Clinical bedside testing for brain death
- The legality of the diagnosis of brain death in South Africa

7.15.3.2 The management of the brain-dead donor

- The management of the brain-dead donor prior to organ procurement
  - Clinical manifestations of brain death
  - Organ preservation in the brain-dead donor and after procurement using extracorporeal organ preservation techniques
- The management of the brain-dead donor during the organ procurement procedure

7.15.4 Living donation and donation after circulatory death (DCD)

7.15.4.1 Definitions of brain death vs circulatory death vs living donation

7.15.4.2 Living donation

- Different types of living donorship: related, non-related, altruistic
- Legality surrounding living donation in South Africa

7.15.4.3 Concept of DCD

7.15.5 The transplant recipient for non-transplant surgery

7.15.5.1 Basic concepts common to all transplant recipients

- Establishment of the urgency of the non-transplant surgery and the necessary liaison with the transplant team
- The functional status of the transplanted organ/tissue and associated complications
- The ability of the graft to respond to perioperative demands *inter alia* increased oxygen demand, medications
- The need for relevant monitoring related to graft function
- Immunosuppression
  - type, duration and dose of immunosuppression
  - cumulative immunosuppression load
  - associated complications *inter alia* infections, atherosclerosis, development of metabolic disorders and/or malignancy

7.15.5.2 Specific transplanted organ considerations

- Cardiac:
  - The denervated heart
  - Presence of ischemia and graft dysfunction
  - Implications of pacing
- Pulmonary
  - Lung protective strategy

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- Airway instrumentation
- Basic graft functional status
- Risk and prevention of nosocomial graft infections

- Renal
  - Graft function and the need for kidney replacement therapy
  - Avoidance of nephrotoxic drugs
- Hepatic
  - Baseline liver function and presence of portal hypertension and other complications of liver graft dysfunction
  - The presence of biliary disease
- Pancreatic
  - Degree of endocrine and exocrine pancreatic function
- Bone marrow
  - Haematological function

7.15.6 Management of living donor

7.15.6.1. Understanding surgical techniques to be used and their implications
7.15.6.2. Adopt strategies to enhance quality of donated organ/tissue
7.15.6.3. Appropriate management of anaesthesia
7.15.6.5. Identification and management of post-operative complications

Skills

In addition to standard list in Background above, the following need particular attention:

7.15.7 Technical skills

7.15.7.1 Clinical
- Perform brain death assessment

7.15.7.2 Administrative
- Correctly complete the documentation required to certify brain death as well as that associated with the perioperative management of the brain-dead donor
- Ensure appropriate consent especially for the living donor

7.15.8 Non-technical skills

7.15.8.1 Leadership/ Teamwork
- Co-ordinated management of the donor and the recipient transplant teams

7.15.8.2 Context awareness
- Understanding of the varied cultural and religious viewpoints regarding brain death and transplantation and demonstration of empathy and accommodation, within South African law.

7.15.8.3 Health advocate
- Should demonstrate a role as advocating for education around brain death as well as around the issue of both living and cadaveric donation

7.15.8.4 Professionalism
- Care and management of sensitive donor information
- Legalities associated with the diagnosis and management of brain death

7.15.8.5 Humaneness
- Must demonstrate empathy for patients and families at the brain death event and show an appreciation for the complexity of the human emotional and psychological state at this type of clinical scenario

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7.16 Chronic Pain Medicine

This domain should be cross-referenced with Acute Pain Medicine, Domain 3.

COMPETENCES	DA	FCA I	FCA II	MetComp
Assess chronic pain and provide and monitor a chronic pain treatment plan for patients in a holistic, multidisciplinary manner.				ALL
Assess the suitability of patients requiring interventional pain procedure(s). Manage perioperative patients with chronic pain syndromes and/or using strong analgesics.				ALL
KNOWLEDGE				
Anatomy, physiology and pathophysiology of chronic pain transmission.				ME/Sc
Pharmacology of medications used for the treatment of chronic pain and principles of treatment.				ME/Sc/CA
Assessment and diagnosis of chronic pain conditions and guiding principles of referral to chronic pain specialists.				ME/Sc/CA
Equipment requirements for assessment and management of chronic pain, including chronic pain interventions.				ME/Sc/CA
Goals of multimodal analgesic therapy and formation of treatment plans with patients.				ALL
Non-pharmacological treatment modalities.				ME/Sc/CA

Knowledge

7.16.1 Pathophysiology and anatomy of pain

7.16.1.1 Pain pathways:

- Structure of nerve fibres that contribute to the pain experience
- Afferent and efferent pathways at the peripheral, spinal, brainstem, thalamic and cortical levels that are involved in the process of nociception
- The interaction between nociceptive pathways and the limbic system
- The structure of the visceral pain pathway
- The process of referred pain

7.16.1.2 Pain modulation:

- Function of the major neuromodulators at anatomic levels
- Mechanisms of central and peripheral sensitisation
- Role and mechanism of:
  - Inflammatory mediators
  - Gene expression
  - Descending inhibitory pathways

7.16.1.3 Neuroendocrine response:

- Acute and chronic effects
- Theoretical mechanism

7.16.2 Pharmacology – analgesic agents

- The use of agents for the management of chronic pain, including topical agents and opioids
- Patients with special pharmacokinetic and dynamic characteristics
- Developing protocols and policies to govern the administration of analgesic agents in the chronic pain setting
- Anaesthetic considerations of patients on chronic analgesics or under their influence

7.16.2.1 Topical analgesics:

- Identify appropriate situations and agents for topical analgesia:
  - Describe the use of topical agents for a patient
  - Prescribe topical opioids appropriately

7.16.2.1 Opioids:

- Classification – agonists, partial agonists, antagonists
- Mechanisms to avoid/reverse opioid tolerance, including opioid rotation and use of antagonists
- Detoxification protocols
- Opioid conversions – equipotency
- Opioid dependency and global crisis

7.16.2.3 NSAID and coxibs
7.16.2.4 Paracetamol
7.16.2.5 NMDA antagonists:

- Role of excitatory amino acids in pain and sensitisation

7.16.2.6 Anticonvulsants
7.16.2.7 IV lignocaine therapy
7.16.2.8 Alpha-agonists
7.16.2.9 Antidepressants
7.16.2.10 Tramadol:

- Identify and minimise related complications and side effects

7.16.2.11 Cannabinoids:

- Mechanism of action of cannabinoids with respect to analgesia
- Indications, contraindications, advantages and disadvantages of cannabinoids, including issues specific to all relevant routes of administration
- Systemic effects of cannabinoids, including variations specific to routes of administration
- Identify and minimise related complications and side effects
- Anaesthetic considerations of patients on cannabinoids

7.16.2.12 Gabapentinoids
7.16.2.13 Antispasmodics

7.16.3 Equipment used in chronic pain management

* FCA candidates expected to have knowledge and pain subspecialists expected to have knowledge and technical skills.

- Fluoroscopy
- Nerve stimulators – central and peripheral
- Radiofrequency and thermal ablators*
- Syringe drives and other infusion devices
- Ultrasound use

7.16.4 Diagnosis and management of common pain syndromes

- Central pain
- Neuropathies
  - Chemotherapy-associated:
  - HIV-associated
  - Diabetic peripheral

- Chronic post-surgical pain
- Complex regional pain syndrome
- Chronic spinal pain
- Failed back surgery syndrome
- Phantom limb pain
- Post-herpetic neuralgia
- Temporomandibular joint pain syndrome
- Trigeminal neuralgia

7.16.5 Assessment of pain

7.16.5.1 Holistic and biopsychosocial spiritual approach

7.16.5.2 Objective and subjective assessment:

- Delineate between nociceptive, neuropathic and nociplastic pain
- Delineate and describe somatic, visceral, inflammatory and functional mechanisms of pain
- Explain the relevance of subjective patient self-reports, objective assessment relative to patient self-reports and create useful assessment plans based on these principles
- Interpret the results of multidimensional pain indices and compare the clinical utility of different instruments

7.16.5.3 Chronic pain assessment tools:

- Describe common examples of pain assessment tools and their relative advantages and disadvantages
- Use pain assessment tools to implement and monitor pain management plans

7.16.6 Analgesia, outcomes and goals of therapy

- Rehabilitative and functional outcomes
- Affective and functional aspects of the pain experience incorporated into an analgesic plan
- Initiate an appropriate plan in cooperation with the patient by setting realistic analgesic and functional goals
- Coordinate further multidisciplinary pain management, including allied health professionals and pain specialists

7.16.7 Tolerance, addiction and substance abuse

- Distinguish between tolerance, dependence and addiction
- Physiological, psychological, pharmacokinetic and pharmacodynamic issues
- Recognise addictive behaviour and warning signs of substance abuse
- Biopsychosocial aspects of substance abuse and its interaction with chronic analgesic therapy
- Anaesthetic considerations of drug users (active use, withdrawals, recovering addict)

7.16.8 Interventions for chronic pain management – pharmacological

Describe each modality, focusing on indications, contraindications, advantages and disadvantages in hospital and ambulatory patients.

7.16.8.1 Multimodal analgesia

7.16.8.2 Regional analgesia

7.16.8.3 Neuraxial pumps

7.16.9 Interventions for chronic pain management – non-pharmacological

7.16.8.1Transcutaneous electrical nerve stimulation (TENS):

- Mechanism and efficacy

7.16.9.2 Other non-pharmacological interventions, including:

- Psychotherapy

- Rehabilitation therapy
- Alternative therapies

7.16.9.3 Spinal cord and peripheral nerve stimulation:

- Indications, mechanism of action and complications
- Anaesthetic implications for patients with spinal cord stimulators

7.16.9.4 Neural ablative therapy (pulsed radiofrequency and radiofrequency ablation):

- Indications, mechanism of action and complications

7.16.10 Chronic pain management for palliative care:

- Dosing
- Safe prescription principles
- Ethical considerations

7.16.11 Technical skills

7.16.11.1 Clinical:

- Clinically assess, diagnose, investigate, manage, monitor and care for patients with common chronic pain
- Diagnose, initiate treatment and refer patients with complicated chronic pain syndromes

7.16.11.2 Organisational:

- Participate in a chronic pain service
- Educate allied health and other medical professionals about the risks and appropriate management of tolerance and addiction regarding chronic analgesic therapy

7.16.11.3 Administrative:

- Document patient-centred pain "contracts" for the use of pharmacology and interventional pain procedures

7.16.12 Non-technical skills

7.16.12.1 Leadership:

- Coordinate multidisciplinary pain teams

7.16.12.2 Collaboration:

- Interdisciplinary collaboration for optimal chronic pain management
- Advocate with other disciplines to create effective policies for multimodal therapies

7.16.12.3 Communication:

- Counsel and communicate pain plans with patients to improve compliance and outcomes

7.16.12.4 Health advocacy:

- Advocate for chronic pain programmes and resources
- Ethical practices in pain management

7.16.12.5 Context awareness:

- Understand the impact of cultural influences on pain experience
- Awareness of resource limitations for pain interventions and medication
- Awareness of public health implications of chronic pain and its management

7.16.12.6 Humaneness:

- Sensitivity to and recognition of patient anxiety and psychosocial impact of chronic pain

7.16.12.7 Professionalism:

- As per the general domain

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