

A Primer for the Primary ANZCA examination

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2018

(updated 2020+)

<https://tinyurl.com/primer4primary>

Many people have unknowingly contributed to this work, especially other members of the Primary Exam Subcommittee as well as most of the Panel of Examiners. The information is current as at the start of 2018. The views expressed below are entirely my own, especially with regard to textbooks and the relative importance of some of the topics. There are bound to be errors, also entirely my own, especially as the document links to about 50 workbooks and over 300 googlesheets. Please feel free to point out the shortcomings: primerfortheprimary@gmail.com

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Introduction

The Primary Exam is almost certainly the most ambitious and demanding thing that you will undertake in your academic life. Failure is not only financially expensive (if it impedes your progress through the training scheme it is very costly), but it is also psychologically traumatic. For many unsuccessful candidates, it is the first exam they have ever failed. It is never worth “just having a go” as there is almost no element of chance involved and most people are no more likely to pass than they are to be able to deal with their subsequent failure.

It is by no means a perfect assessment of your knowledge, understanding, or fitness to continue specialist training, but a lot of effort does go into making it as fair and unbiased as possible. Not all areas of the curriculum seem reasonable or relevant to know about, and the examiners may agree with you, so some LO's are only superficially, or rarely, examined. The hardest thing is to gauge how wide and how deep to study each area. What follows is a synthesis of the attitudes of some examiners on the relevance and importance of various learning objectives within the curriculum, organised by topic. This syllabus is hoped to help guide your study. In addition there are links to true/false statements compiled by examiners for many of the learning outcomes so that you can test your knowledge.

When I sat the Primary (over 20 years ago) I was given only one piece of advice that I can recall. It has become the unofficial motto of the Primary Examination Panel:

There is no substitute for knowledge

The quote actually comes from the economist and quality improvement guru W. Edwards Deming. In full, it is:

Knowledge is theory. We should be thankful if action of management is based on theory. Knowledge has temporal spread. Information is not knowledge. The world is drowning in information but is slow in acquisition of knowledge. There is no substitute for knowledge.

And this does have relevance for the Primary. To pass, at some point you will need to display understanding (knowledge) rather than just regurgitate facts (information)—especially in the vivas.

A deeper understanding often comes from approaching the same topic from different angles. In the same spirit, it may be easier to explain how to pass the primary by advising how to fail it.

How to fail

About 400 people sit the Primary each year, and for those who sit the first time, the pass rate is about 70%. There is endless advice for those planning to sit about study techniques, study groups, and resources. I suspect that there is a group of people who will pass whatever strategy they choose, there is another group that will pass only if they choose the right strategy and there is, sadly, a small group who will not succeed whatever they try.

I have encountered a lot of trainees struggling with the Primary, some through my own hospital and many through feedback and remediation interviews. The latter is a compulsory process after the third and fourth failed attempts. So, whilst I cannot give great guidance on how to infallibly pass the exam, over the years I have noticed some factors common amongst that group of people who sit more than once. So here are my tips for anyone determined to fail - you only need to try a few of them!

Tips to fail:

- Don't distinguish between the things you ought to know in great detail and the things where a superficial knowledge is sufficient
- Don't identify where the "one thousand hours" of study is going to come from
- Don't use several resources
- Don't ask questions when you don't know the answers
- Don't practise SAQs
- Don't practise vivas until after you get an invitation
- Don't seek out a past or current primary examiner in your region
- Don't have a plan or, if you do, don't stick to it
- Don't decide on the purpose of a study group before embarking on it
- Don't think about how any of what you study might influence your clinical practice
- Don't cultivate any curiosity you might have about your chosen specialty
- Don't buy any books
- Buy lots of books but don't read them
- Leave gaps in the curriculum
- Mistake familiarity for knowledge
- Accept other people's answers for MCQs
- Only ask "nice" people for assessments

Format of the exam

The exam consists of a written component (MCQ and SAQ) and an oral exam (vivas). Invitation to the vivas is dependent on achieving a minimum standard in the writtens. The MCQ must be passed, but the actual score achieved does not contribute to the final tally which is comprised of SAQ (50%) and viva (50%). The overall mark required to pass is 50%. The invitation mark for the SAQ is 40%, in which case a candidate only just on that threshold would require 60% in the vivas to pass the exam.

The use of a 50% threshold may seem, externally, to be a low bar. However, the exam is pitched at a specific level at which there is a lot of assumed knowledge and so the passing score is set at 50 and the questions and marking are calibrated around this.

MCQ

There are 150 questions of the “Single Best Answer” type. The entire breadth of the curriculum is examined in this paper. Some questions are easy, some hard. Some questions are highly relevant to practice, some seem more obscure. Some are repeats, some are new. Each MCQ exam is “sat” by more than 10 examiners, who also rate the difficulty and relevance on each question. These ratings are entered into an Ebel matrix for standard-setting and a passing score derived. The passing score varies from exam to exam but usually sits in the high 80’s out of 150 (high 50’s in % terms).

Generally, questions that have been published elsewhere are not repeated, so although resources such as the “Black Bank” are useful for testing your knowledge and widening your reading, rote learning answers is unlikely to be of benefit.

SAQ

The SAQ paper consists of 15 short answer questions. There is usually a balance between pure physiology, pure pharmacology, integrated questions, anatomy, safety and equipment. Some questions are repeated, especially those that are deemed important that have been answered poorly in the past. Dangerously, some questions appear on a quick scan to be repeats but are not, so, above all - READ THE QUESTION. How many SAQs should you practise? Certainly you should practise writing answers in 8-9 minutes (you have 10 in the exam) and be prepared to write 15 of them in a row. Practice SAQs are a good way of assessing your recall and knowledge but you should not waste time constructing “ideal answers” to rote-learn in case they should come up. The Panel has

recently elected to start using a holistic marking scheme to grade answers. Rubrics are developed for every question and each question is marked out of 5. The scale is not linear as the important distinction is between 2 (not a pass answer but adequate to be assessed at a viva) and 3 (solid pass answer). You need to score at least 40% (30 out of 75) to get a viva, but that leaves you needing an above-pass performance in those vivas to pass overall.

The examiner reports are a useful resource for deciphering what might have been required for a “pass” answer and what the common pitfalls were. However, they often reflect the views of the person who marked the question, despite the fact that the grids are determined and approved by a group of examiners, and that a random selection of papers are double-marked by senior examiners for calibration. Some reports apparently (and actually) conflict with other reports, inaccuracies still creep in, biases occur, errors are still made; so do not overinterpret and overthink them.

VIVAS

Certainly the most terrifying part of the exam, but most candidates do just fine once they warm up (more than 80% of people who attend the vivas will pass the exam). You get 12 distinct topics of 5 minutes each from a total of six examiners. The lead-up is painfully slow but the hour goes very quickly. The examiners aim to assess the depth of your understanding of each topic (which is marked individually by two examiners) so you will always be taken to a point where you have nothing more to offer unless you are extraordinarily knowledgeable. **Don't panic.** The range of vivas is considered very carefully and agreed in advance for each group of candidates to minimise overlap with the SAQ and to ensure a good sampling of the curriculum, especially from “core” areas. Each 5-minute viva is separate and examiners try hard not to let your performance, good or bad, influence their assessment of any subsequent viva. They do not have access to your marks, so they do not know how you did in any other section of the exam.

Should you buy any books?

This depends on how you study. All the resources you need to pass the exam are available on the ANZCA library site as ebooks.

I used to recommend splashing out your hard-earned on a copy of Miller's 8e 2-volume set - good for both Primary and Final Fellowship exams. Now it's into its 9th edition and the rumblings around the Panel of Examiners are that it is not nearly as good as previous editions for the Primary. Therefore any Miller recommendations refer to the 8e as I can't attest to the current one.

Finally as of December 2018, the incomplete (but excellent and purpose-built for FANZCA) textbook on equipment [Anaesthetic Equipment - Safety, Physics and Measurement \(notes for FANZCA\)](#) by Fred Rosewarne is available.

The syllabus

And so to the meat of this Primer. The syllabus is arranged by Learning Outcome groups, and these are broadly arranged into physiology, pharmacology, anatomy, safety and equipment, and miscellaneous. This taxonomy is by no means perfect, but it is how they are presented within ANZCA's Exams Management System (actually presented alphabetically in there). Each group has one or more Learning Outcomes associated with it. Each Learning Outcome is presented as its summary (also in EMS).

Each group gets its own page, but links from the list below. I have included the usual number of MCQs from our template. This gives a vague guide to the distribution of your study as well. If you multiply the usual number of MCQs by 5 hours (about 150 x 5 hrs = 750 hours) you have an approximation of the amount of time you should consider devoting to each topic.

Each group has the LOs ordered by the importance that I think it merits during your study. Please remember that some LOs may be ho-hum but will have a few really essential things you should know, so it's difficult to generalise too much.

Importance	High	Moderate	Low
Depth of knowledge required	High	Moderate	Low
Sources used to acquire knowledge	Several	Few	One
SAQ likelihood	High	Moderate	Low
Viva likelihood	High	High	Moderate
Recall requirement	Immediate and familiar	With a bit of thought	Dredged up

Each of the LOs links to a googlesheet where you can test yourself on your knowledge of an area with some True/False statements (similar to the ones that appear on PLOOTD (Primary Learning Outcome of The Day), accessed [here](#)).

These statements form part of the LO curation project undertaken by Primary Exam Panel members who have tried to generate some statements for each LO. Some of the links will have no statements yet, but plenty do. Each statement is (meant to be) referenced and rated by the statement author for difficulty and relevance. The answer column is hidden; it's useful to find your own answers. Besides, some of our answers might be wrong. Knowledge changes. The sheets cannot be edited, downloaded, printed, or shared at this stage (mostly because if you copy and paste the T/F column becomes visible!)

There is a lot of regional variation (and country variation) in the availability of certain drugs which can make studying difficult, especially from textbooks written from an overseas perspective. The only truly local pharmacology text is Petkov's "Essential Pharmacology for the ANZCA Primary Examination". I have added a table of drugs that are examinable in each page of the pharmacology sections. The importance of each drug may relate to frequency of use by us; the relevance of the drug when a patient is already taking it; specific adverse effects, interactions, etc.

Red	High level of detailed knowledge required
Yellow	Moderate level of knowledge; may be detail about specific aspects
Green	Some familiarity expected; possibly some specific fact about the drug is relevant, like an important interaction with anaesthetic drugs

Whilst other examiners have shared their views on the relative importance on some of these, it is mostly my point of view. Fashions change and drugs that you might only read about now might be commonplace in a couple of years, so these lists will be frequently updated.

I haven't made suggestions for the illicit drugs and herbal remedies in the [integrated and miscellaneous](#) section. These change much quicker, not requiring TGA approval! Ironically more patients are on alcohol, nicotine and/or cannabinoids than on any prescribed medications. Cannabinoids may yet become mainstream. You should know a bit about these, as well as amphetamines, as they intersect with our work frequently.

Please note that although the topic area of Statistics was removed from the Primary Exam in the 2013 Curriculum, one LO still remains (BT_PO 1.2). All the rest was removed to make room for Anatomy and Equipment / Safety!

"In one hand bread, in the other a stone."

Learning Outcome Groups

Acid base physiology

Regulation of acid/base balance	High	BT_PO 1.78
Acid-base chemistry	High	BT_PO 1.79
Blood gas analysis	High	BT_PO 1.79a

Usual number of MCQs - 4

Examiners love this stuff! BT_PO1.79a was added to the syllabus quite recently at the request of the Examiner Panel and has high clinical relevance, so it is likely to come up somewhere. You absolutely need a good understanding of acid-base chemistry, including the Stewart approach. Kerry Brandis's comprehensive [acid base website](#) has an excellent [description of this](#). PLOOTD has some other T/F statements on both [acid base regulation](#) and 3 days of acid base chemistry ([1](#), [2](#), [3](#)).

No more links to PLOOTD after this! You can search the site yourself by putting the LO number into the search bar.

Frankly, the best resource for [acid base / blood gas interpretation](#) is the excellent Deranged Physiology website written and maintained for CICM trainees by Alex Yartsev. More detail than you need for the Primary, but elegantly done; and you may well find yourself heading back to the site for other topics with ICU crossover.

Body fluids and electrolytes

Physiology of Na, K, Mg, Ca and PO ₄ ions	High	BT_PO 1.72
Maintenance of fluid and electrolyte balance	High	BT_PO 1.73
Constituents and functions of plasma	High	BT_PO 1.74
Osmotic pressure	High	BT_PO 1.75
Regulation of osmolality	High	BT_PO 1.76
Oncotic pressure	High	BT_PO 1.77

Usual number of MCQs - 3

Kerry Brandis: Fluid and electrolyte physiology. In “the Physiology Viva”
Miller 8ed Ch 59
Hemmings and Egan 2e Ch 41 (especially good on IV fluid kinetics)

Cardiovascular physiology

Cardiac electromechanical physiology	High	BT_PO 1.43
Cardiac muscle physiology	High	BT_PO 1.44
Cardiac output and pressure volume relationships	High	BT_PO 1.45
Myocardial oxygen supply and demand	High	BT_PO 1.46
Control of blood pressure and regional blood flow	High	BT_PO 1.47
Shock	High	BT_RT 1.1
Classification of shock	High	BT_RT 1.2
Describe the physiological consequences of shock	High	BT_RT 1.3
Cardiovascular responses to posture, exercise, IPPV, pneumoperitoneum and other stressors	High*	BT_PO 1.48
Cardiovascular changes that occur with ageing	Mod	BT_PO 1.49
Cardiovascular changes that occur with morbid obesity	Mod	BT_PO 1.50
Clinical signs of shock in ageing	Mod	BT_RT 1.30

* IPPV High, others Mod

Usual number of MCQs - 12

You can start with Miller 8e Ch20, and Hemmings and Egan 2e Ch 23 and 24, but you will eventually need to progress to Pappano and Wier Cardiovascular Physiology 10e. You don't need to memorise it all, but you need to get to a level of conceptual understanding such that you can debate topics such as mean systemic filling pressure without getting into a dreadful muddle in a viva. There's a lot to be said for reading about Guyton curves in Guyton and Hall 13e Ch 20, and the chapter on vascular distensibility (15) is enlightening. However, if you want to avoid an exasperated look when you confidently assert that "a reduced venous return leads to a reduced cardiac output", please invest some time in reading Ch 10 in Pappano and Wier: *Control of Cardiac Output: Coupling of Heart and Blood Vessels*. No-one is going to get you to construct a Wiggers diagram in a viva (wastes too much time), but cardiac PV loops are popular. Stoelting 5e has a good chapter (46) on the physiologic and pharmacologic impacts of ageing.

Cellular physiology

Cellular physiology

Low

[BT_PO 1.82a](#)

Usual number of MCQs - 2

Any physiology text will give you the basic information you require. Most of it can be read and understood rather than memorised, but you need to be able to describe the generation and maintenance of transmembrane potentials.

Clinical monitoring

Depth of anaesthesia	High	BT_GS 1.51
Prevention of awareness	High	BT_GS 1.51a
Monitoring depth of anaesthesia	High	BT_GS 1.52
Blood gas analysis in respiratory failure	High	BT_RT 1.39
Temperature monitoring	Mod	BT_GS 1.69a

Usual number of MCQs - 3

Much of what you need to know is in Physics, Clinical Measurement and Equipment of Anaesthetic Practice 2e by Magee and Tooley, finally available as an ebook in the ANZCA library. You still need to supplement this, especially for “depth of anaesthesia” monitoring, where the 10th edition has a totally new and comprehensive chapter (Miller 10e Ch 36) which covers nearly everything. Beware however that some equipment mentioned does not conform to AS/NZS Standards. More on that in Equipment and Safety.

Endocrine physiology

Role of the hypothalamus	Low	BT_PO 1.86
Control of secretion and the functions of various hormones	Low	BT_PO 1.87
Regulation of plasma calcium and related hormones	Low	BT_PO 1.88
Role of prostaglandins and other autacoids	Low	BT_PO 1.89

Usual number of MCQs - 1

Any standard physiology text, but adequately covered in Hemmings and Egan 2e Ch 35

Foetal and neonatal

Neonatal airway anatomy	High	SS_PA 1.1
Foetal circulation	High	SS_PA 1.21
Circulatory and respiratory changes that occur at birth	Mod	SS_PA 1.22
Body fluid composition in the neonate	Mod	SS_PA 1.25
Pharmacodynamics of drugs used in anaesthesia in neonates and children	Mod	SS_PA 1.53
Pharmacology of agents used for premedication in children	Mod	SS_PA 1.54
Physiological changes during growth and development of the neonate	Low	SS_PA 1.24
Glucose homeostasis in the neonate	Low	SS_PA 1.26
Vital signs for children of different ages	Low	SS_PA 1.27
Pharmacokinetics of drugs used in anaesthesia in neonates and children	Low	SS_PA 1.52

Usual number of MCQs - 1

This is not a core topic for PEx but this and obstetrics are the only two SSUs that have some of their LO's in PEx. It's hard to recommend a text that will give you what you need without side-tracking you with a load of information that will be important in FEx but not examined here. Power and Kam 3e Ch 14 is fairly comprehensive for the neonatal material, as is Stoelting 5e 44 and 45. Another good source is Spoors and Kiff: *Training in Anaesthesia, the essential curriculum* (Oxford Specialty Training). This is available as an [ebook in the ANZCA library](#). It is a superb introduction to anaesthesia training and provides excellent revision on just about everything in Basic Training, including much of what is examined in PEx. OST does an Advanced Training one too.

Gastrointestinal physiology

Nausea & Vomiting - Physiology

Low [BT_GS 1.43](#)

Physiology of swallowing, the oesophagus and stomach

Low [BT_PO 1.107](#)

Usual number of MCQs - 1

Most physiology texts will have the necessary information, however it is neatly covered (with an anaesthetic flavour) in Spoors and Kiff Ch 17.

Haematology

Physiology of haemostasis	High	BT_PO 1.112
Blood products	High	BT_PO 1.116
Changes in stored blood	High	BT_PO 1.117
Changes in stored blood	High	BT_RT 1.8
Physiological consequences of acute and chronic anaemia	Mod	BT_PO 1.110
Physiological mechanisms of limiting and preventing thrombosis	Mod	BT_PO 1.113
Methods for assessing coagulation, platelet function and fibrinolysis	Mod	BT_PO 1.114
Blood groups and transfusion reactions	Mod	BT_RT 1.7
Massive transfusion	Mod	BT_RT 1.9
Haemoglobinopathies	Low	BT_PO 1.111
Blood groups and cross matching	Low	BT_PO 1.115

Usual number of MCQs - 2

Hemmings and Egan 2e Ch 43 and 44 covers much of the material, as does Power and Kam 3e Ch 9.

Needless to say, many of our patients are either on anticoagulant drugs or have profound abnormalities of haemostasis. In the middle of the night, the only person in theatre who is likely to have any understanding of what the issues are will be the one standing next to the anaesthetic machine.

Immunology

Hypersensitivity	Mod	BT_PO 1.128
Systemic inflammatory response	Mod	BT_RT 1.5
Anaphylactic and anaphylactoid reactions	Mod	BT_RT 1.6
Body defences against infection	Low	BT_PO 1.126
Effects of anaesthesia and surgery on immune function	Low	BT_PO 1.127
Tissue/organ transplantation and rejection	Low	BT_PO 1.129

Usual number of MCQs - 2

Power and Kam 3e Ch 10

Liver physiology

Hepatic blood flow and effect of anaesthesia	Mod	BT_PO 1.104
Laboratory assessment of liver function and hepatic failure	Mod	BT_PO 1.106
Functions of the liver and consequences of hepatic disease	Low	BT_PO 1.103
Portal circulation	Low	BT_PO 1.105

Usual number of MCQs - 1

Hemmings and Egan 2e Ch 31

Maternal physiology

Physiological changes in pregnancy	High	SS_OB 1.1
Transition from foetal to neonatal circulation and ventilation	Mod	SS_OB 1.3
Reference ranges for physiological and biochemical variables in pregnancy		
	Low	SS_OB 1.2
Placental physiology	Low	SS_OB 1.4
Aortocaval compression	Low	SS_OB 1.5

Power and Kam 3e Ch 14 covers it better than most, so does Stoelting 5e Ch 45. The new edition of Hemmings and Egan (2e 2019) has a chapter on obstetric physiology and pharmacology - Ch 37. Here is a link to a useful BJA article on [placental function](#)

Muscle physiology

Skeletal muscle physiology

Mod

[BT_PO 1.98a](#)

Usual number of MCQs - 2

This is an area that, beyond the neuromuscular junction, is not really core anaesthesia. In many ways cardiac and smooth muscle are far more relevant to our working lives. However, skeletal muscle physiology is well-understood as well as being quite interesting. Hence it tends to get examined. All you need to know is contained in a few pages of Ch 1 in Power and Kam 3e.

Nervous system physiology

Basic electrophysiology of nerve conduction	High	BT_PO 1.92
Physiology of nerve conduction	High	BT_RA 1.1
Determinants and regulation of intracranial pressure	High	BT_RT 1.12
Autonomic nervous system	Mod	BT_PO 1.51
Physiology of spinal cord perfusion, intracranial pressure, cerebral blood flow	Mod	BT_PO 1.95
Cerebrospinal fluid	Mod	BT_PO 1.97
Cerebral circulation and autoregulation	Mod	BT_RT 1.13
Cerebral perfusion pressure	Mod	BT_RT 1.14
Physiology of sleep	Low	BT_PO 1.93
Basis of the electroencephalogram	Low	BT_PO 1.94
Blood brain barrier	Low	BT_PO 1.96
Cerebral and spinal cord metabolism, cell damage and death	Low	BT_PO 1.98
Spinal cord blood supply and blood flow	Low	BT_RT 1.15
Spinal cord perfusion pressure	Low	BT_RT 1.16

Usual number of MCQs - 5

It's difficult to assign importance level to some of these LO's. Many of them overlap. Some of them have some elements of high importance (e.g. some components of the ANS) in a morass of less important features. Equally I don't consider that the composition, generation and absorption of CSF is very important for most anaesthetists, but it is easy to examine, so beware. The physiology of sleep should be really important to an anaesthetist but is actually quite difficult to examine; the same goes for the basis of the EEG given the current fad for processed frontal EEG devices, despite little understanding of how they relate to cognitive state. So don't spend lots of precious time on the details, but know some core facts well so that you can avoid a blank SAQ answer book or an unpleasant, lengthy silence in a viva.

Hemmings and Egan (2e Ch 8 & 9) is a great place to start, so is Power and Kam 3e Ch 2

Miller's Anesthesia (10e Ch36) "Monitoring the Brain's Response to Anesthesia and Surgery" is highly recommended.

Nutrition and metabolism

Control of blood glucose	High	BT_PO 1.85
Physiological consequences of starvation	Low	BT_PO 1.83
Factors that influence metabolic rate	Low	BT_PO 1.84

Usual number of MCQs - 2

Obviously the effects of fasting are important, but starvation less so. Knowledge of blood glucose control and lactate metabolism are very pertinent. Many of our sicker patients have been effectively starved for days due to their illness, or from a prolonged stay in Intensive Care.

Miller 8e Ch 106; Power and Kam 3e Ch 12; Hemmings and Egan 2e Ch 33

Principles of measurement

Basic physics applicable to anaesthesia	High	BT_SQ 1.5
Methods of measurement applicable to anaesthesia	High	BT_SQ 1.6

Usual number of MCQs - 2

SQ 1.6 is HUGE.

Our profession is very equipment-heavy; that and the modern drugs are probably what has really improved the safety of anaesthesia, rather than an improved knowledge of physiology. You are almost certain to get some of this in the viva, and probably at least one SAQ. I recommend Magee and Tooley, but there are other dedicated equipment books in the reading list you can use. Miller has excellent sections. You can also try <https://www.howequipmentworks.com> which is a great site and quite entertaining. There is also some good material in [Anaesthetic Equipment - Safety, Physics and Measurement \(notes for FANZCA\)](#) by Fred Rosewarne.

One key thing to bear in mind is to identify the circumstances in which equipment may give misleading results. It is just as important to know when a device may be misleading as it is to know what it means when it is accurate.

Renal physiology

Renal responses to hypovolaemia	High	BT_PO 1.70
Physiology of renal blood flow	Mod	BT_PO 1.62
Glomerular filtration and tubular function	Mod	BT_PO 1.63
Counter-current mechanisms in the kidney	Mod	BT_PO 1.64
Regulation of renal function	Mod	BT_PO 1.65
Physiological effects and clinical assessment of renal dysfunction	Mod	BT_PO 1.69
Functional anatomy of the kidneys and urinary tract	Low	BT_PO 1.61
Effects of anaesthesia on renal function	Mod	BT_PO 1.71
Endocrine functions of the kidney	Low	BT_PO 1.66
Role of the kidney in the handling of glucose, nitrogenous products and drugs	Low	BT_PO 1.67
Principles of measurement of glomerular filtration rate and renal blood flow	Low	BT_PO 1.68

Usual number of MCQs - 6

Whilst Vander is a good and very readable book, you probably do not need to read it all to get through the Primary. It's covered pretty well in Power and Kam 3e Ch 7 and Hemmings and Egan 2e Ch 40.

Respiratory physiology

Preoxygenation	High	IT_AM 1.9
Artificial ventilation and physiological consequences	High	BT_AM 1.19
Control of ventilation	High	BT_PO 1.9
Surfactant	High	BT_PO 1.10
Compliance	High	BT_PO 1.11
Fast and slow alveoli / time constants	High	BT_PO 1.12
Elastic properties of the chest wall	High	BT_PO 1.13
Pleural pressure gradient	High	BT_PO 1.14
Physics of gas flow	High	BT_PO 1.15
Airway resistance	High	BT_PO 1.16
Closing capacity	High	BT_PO 1.17
Work of breathing	High	BT_PO 1.18
Altered lung mechanics	High	BT_PO 1.19
Lung volumes	High	BT_PO 1.20
Dead space	High	BT_PO 1.21
Ideal alveolar and mixed expired gases	High	BT_PO 1.22
Oxygen cascade	High	BT_PO 1.23
Alveolar exchange of oxygen and carbon dioxide	High	BT_PO 1.24
Diffusion capacity	High	BT_PO 1.25
V/Q matching	High	BT_PO 1.26
West's zones	High	BT_PO 1.27
Shunt	High	BT_PO 1.28
V/Q mismatch - oxygenation and carbon dioxide elimination	High	BT_PO 1.29
Carriage of oxygen in the blood	High	BT_PO 1.31
Carriage of carbon dioxide in the blood	High	BT_PO 1.32
Pulmonary v systemic circulation	High	BT_PO 1.33
Pulmonary vascular resistance	High	BT_PO 1.34
IPPV and PEEP - Physiological effects	High	BT_PO 1.35
Effects of hypoxaemia, hyper and hypocapnia, and carbon monoxide	High	BT_PO 1.36
Causes of hypoxaemia	High	BT_RT 1.10
Consequences of hypoxaemia	High	BT_RT 1.11
Respiratory failure	High	BT_RT 1.38

Physiology of the airway	Mod	BT_AM 1.2
Anatomy - chest wall and diaphragm	Mod	BT_PO 1.6
Anatomy - lower airways	Mod	BT_PO 1.7
Anatomy - pulmonary and bronchial circulations	Mod	BT_PO 1.8
V/Q mismatch - measurement	Mod	BT_PO 1.30
Ventilatory effects of posture, exercise, altitude, anaesthesia, ageing, morbid obesity	Mod	BT_PO 1.37
Humidity	Mod	BT_PO 1.38
Non-ventilatory functions of the lungs	Mod	BT_PO 1.39

Usual number of MCQs - 14

Depressing isn't it? A lot of the material is succinctly covered in Power and Kam 3e Ch 3 and Miller 3e Ch 19, however there is no getting away from the fact that the Primary Exam tome for respiratory physiology is Nunn's 8e, and the *vade mecum* is West 9e.

In the old days, we were advised to read through Nunn and revise from West. That is perhaps a bit extreme as Nunn has expanded somewhat with the addition of interesting, but not so relevant, chapters. However, you need to know nearly everything in West and it helps to dip into Nunn to clarify some of the conceptual material and fill in a few gaps. The various effects of trekking at high altitude, or even to the top of Everest will be of practical use to very few trainees, but it is fair to say that you will not be able to adequately explain the effects of altitude without a solid understanding of the basic physiology, which is why this topic is of such enduring interest to examiners.

Thermoregulation

Maintenance of temperature during anaesthesia	High	BT_GS 1.69
Heat	Mod	BT_GS 1.65
Hypo/hyperthermia	Mod	BT_GS 1.66
Environmental temperature changes and anaesthesia	Mod	BT_GS 1.68
Thermoneutral zone, neonatal thermoregulation	Mod	SS_PA 1.23
Energy requirements and body temperature	Low	BT_GS 1.67

Usual number of MCQs - 2

Power and Kam 3e Ch 12;
Spoors and Kiff 18.11;
Hemmings and Egan 2e Ch 15.

Miller 8e Ch 54 - written by Sessler, who wrote half the papers!

Miller 10e doesn't seem to have anything by Sessler...

Antiarrhythmics

Physiology and pharmacology basis of antiarrhythmic therapy
Pharmacology of antiarrhythmic agents

Mod [BT_PO 1.56](#)

Mod [BT_PO 1.57](#)

Usual number of MCQs - 2

At last some pharmacology LO's!

Hemmings and Egan 2e has a good chapter on this topic (27), but lacks some detail on digoxin and amiodarone - two antiarrhythmics that you will encounter frequently in clinical practice. Stoelting 5e Ch 21 is better, but even that is weak on digoxin. Goodman and Gilman 13e Ch 30 is probably the best for that detail. There was a PLOOTD post recently (12/2/19) that referenced an article in [Circulation](#) for the truly interested. In all of them remember to ignore drugs not available in Australia and New Zealand.

Drug	Depth required	Comments
Digoxin		
Amiodarone		
Adenosine		
Esmolol		
Verapamil		
Flecainide		
Sotalol		
Lignocaine		
Magnesium		

Adrenoreceptor blocking agents

Pharmacology of alpha and beta blockers

Mod

[BT_PO 1.54](#)

Usual number of MCQs - 2

Any standard pharmacology text should do, but remember to ignore those drugs that are not available in Australia and New Zealand. Focus on the agents commonly encountered in clinical practice. Hemmings and Egan 2e Ch 26 covers all the drugs, but you may want to get more detail on some specific agents from Goodman and Gilman 13e.

Drug	Depth required	Comments
Metoprolol		
Atenolol		
Prazosin		Patients commonly on it (often for other reasons)
Esmolol		
Carvedilol		
Labetalol		First-line treatment in pregnancy
Phentolamine		

Antiemetics

Management of PONV

Mod

[BT_GS 1.62](#)

Usual number of MCQs - 2

Hemmings and Egan 2e Ch 34, Miller 8e Ch 97. Both chapters are authored by Christian Apfel.

Drug	Depth required	Comments
Dexamethasone		
'Trons		
Metoclopramide		
Droperidol		
Aprepitant		

Antihypertensives

Pharmacology of antihypertensive agents

Mod

[BT_PO 1.58](#)

Usual number of MCQs - 2

Same advice as for [adrenoceptor blockers](#). Alpha-2 agonists are particularly popular. Focus on those that are used clinically in anaesthesia care rather than those for the treatment of chronic hypertension.

Drug	Depth required	Comments
Calcium channel antagonists		
Clonidine		
Prazosin		
Beta blockers		
Hydralazine		
Methyldopa		
ACEI		
ARB		
Thiazides		
SNP		Rarely used in OR but interesting
GTN		

Cardiac arrest, ischaemia and failure

Drugs for management of shock	High	BT_RT 1.17
Drugs for cardiopulmonary resuscitation	High	BT_RT 1.18
Pharmacology of drugs to manage myocardial ischaemia	Mod	BT_PO 1.59
Pharmacology of drugs to manage cardiac failure	Low	BT_PO 1.60
Oxygen delivery and indicators of tissue oxygenation in resuscitation	High	BT_RT 1.4

Usual number of MCQs - 2

No single text seems to have all the information you need. The chapter on CPR in Oh's Intensive Care Manual 7e Ch 21 is very good. Other chapters in there are good too but don't have a lot of detailed pharmacology. The new edition of Hemmings and Egan (2e 2019) has a chapter devoted to cardiopulmonary resuscitation - Ch 28. I haven't read it yet.

I'm not convinced that the LO's are really up to date in this section as lignocaine is still in the BT_RT 1.18 and there is less appetite for measuring mixed venous oxygen saturation (requires a PA catheter) than in former times (BT_RT 1.4).

Drug	Depth required	Comments
Adrenaline		
Digoxin		
Vasopressin		
Levosimendan		
Carvedilol		
Milrinone		
Sacubitril		
Spirolactone		
Furosemide		
Bosentan		Pulmonary hypertension
Nitrates		Especially GTN
ACEI/ARB		
Dobutamine		Rarely seen these days

Anticholinesterase drugs

Neuromuscular blocking agents - reversal agents
Anticholinesterases

High

[BT_GS 1.39](#)

High

[BT_GS 1.40](#)

Usual number of MCQs - 1

There's some good information in most anaesthetic pharmacology texts but it's worth reading through Ch 35 in Miller 8e at least once.

Drug	Depth required	Comments
Neostigmine		
Sugammadex		Not an anticholinesterase but has to go somewhere
Pyridostigmine		
Physostigmine		
Edrophonium		Not available but need to know some basics
Organophosphates		Some basic toxicology

Drugs and the coagulation system

Pharmacology of heparin	Mod	BT_PO 1.118
Warfarin and other anticoagulants	Mod	BT_PO 1.120
Reversal of warfarin	Mod	BT_PO 1.121
Anti-platelet agents	Mod	BT_PO 1.122
Protamine	Low	BT_PO 1.119
Thrombolytic agents	Low	BT_PO 1.123
Antifibrinolytic agents	Low	BT_PO 1.124

Usual number of MCQs - 2

The first four are popular viva topics, and given that nearly every inpatient will get a LMWH and every other patient seems to be on some antiplatelet therapy, perhaps these should be rated as “High”. Even though I have yet to read reports of patients dying from haemorrhage caused by anaesthesia, perioperative management of these medicines frequently falls to the anaesthetist. It’s all well-covered in Hemmings and Egan 2e Ch 45. As for the other three LO’s I would stick to knowing something about protamine and tranexamic acid (aminocaproic acid and aprotinin are no longer available in Australia and will not be examined). I’ve not seen anyone quizzed on thrombolytic agents in my 12 years of examining.

Drug	Depth required	Comments
Heparin		
Warfarin		
LMWH		
Aspirin		
P2Y ₁₂ antagonists		clopidogrel / ticlodipine / ticagrelor
Dipyridamole		
Dabigatran		
Oral Xa inhibitors		rivaroxaban / apixaban
Fondaparinux		
GpIIb/111a inhibitors		tirofiban / abciximab
Tranexamic acid		
Beriplex		Prothrombin Complex Concentrates (replaced Prothrombinex)
Desmopressin		

Diuretics

Physiological basis for classification of diuretics related to their site of action

Mod [BT_PO 1.81](#)

Pharmacology of diuretics

Mod [BT_PO 1.82](#)

Usual number of MCQs - 1

A topic that lends itself to the integrated exam, although pretty mind-numbing and something an anaesthetist would rarely prescribe (at least, not for their diuretic action). Hemmings and Egan 2e Ch 42 canters through it pretty well without too much excruciating detail.

Drug	Depth required	Comments
Furosemide		
Spirolactone		
Mannitol		
Thiazides		
Amiloride		

Endocrine pharmacology

Pharmacology of insulin, oral hypoglycaemics, corticosteroid drugs

High [BT_PO 1.90](#)

Pharmacology of thyroid hormone, anti-thyroid drugs, glucagon, vasopressin and analogues

Low [BT_PO 1.91](#)

Usual number of MCQs - 1

A lot of patients get steroids, a great many are diabetic. Again, it often falls to the anaesthetist to manage these perioperatively. Hemmings and Egan 2e Ch 36 covers it nicely. There is an overlap here with the physiology of metabolism of fat and glucose, which was covered in a [previous topic](#).

Drug	Depth required	Comments
Thyroxine		
Carbimazole		
Insulin		all preparations
Metformin		
Other oral hypoglycaemics		e.g. glifozins, sulphonylureas, exenatide
Glucagon		
Corticosteroids		

Gastrointestinal pharmacology

Nausea & Vomiting - Treatment

High [BT_GS 1.44](#)

Pharmacological treatment of peptic ulcer disease and reflux

Low [BT_PO 1.109](#)

Usual number of MCQs - 1

The first of these is really the same material as in [ANTIEMETICS](#). Acid suppression is covered in most dedicated pharmacology texts.

Drug	Depth required	Comments
Proton pump inhibitors		
Ranitidine		
Antacids		
Loperamide		
Bowel prep		

Pharmaceutical aspects and drug development

Drug additives

Mod

BT_GS 1.22

Usual number of MCQs - 1

The best single resource remains Ross McPherson's article from 2001. It's on the recommended reading list and can be downloaded through the ANZCA library. You can also view it [here](#). It is unlikely that you will ever get a mark for pointing out that a drug is presented as a "clear, colourless solution".

Pharmacodynamics

Mechanisms of drug action	High	BT_GS 1.1
Receptors	High	BT_GS 1.2
Dose-effect relationships	High	BT_GS 1.3
Efficacy and potency	High	BT_GS 1.4
Law of mass action	High	BT_GS 1.5
Mechanisms of adverse drug effects	High	BT_GS 1.6
Mechanisms of anaesthesia	High	BT_GS 1.49

Usual number of MCQs - 5

Hemmings and Egan 2e Ch 1, 2, 5 & 7 covers most of these, and Ch 10 & 11 have plenty of detail on mechanisms. This and pharmacokinetics are the main conceptually difficult topics in Pharmacology, so it is worth reading it several times and from several sources and perspectives to get a good understanding. Examiners care far more about this than the rote learning of pharmacokinetic parameters of various drugs.

Pharmacokinetics

Pharmacokinetic modelling	High	BT_GS 1.7
Drugs absorption	High	BT_GS 1.8
Drug distribution	High	BT_GS 1.9
Drug clearance	High	BT_GS 1.10
Drug metabolism	High	BT_GS 1.11
Drug infusion kinetics	High	BT_GS 1.12
Drug monitoring	High	BT_GS 1.13
Target controlled infusions	High	BT_GS 1.59

Usual number of MCQs - 4

Hemmings and Egan 2e Ch 2, 3, & 4 packs it in but, as with pharmacodynamics, read widely. Evers and Maze 3-5, 8 also covers the ground well.

You need a detailed understanding of propofol pharmacokinetics and TCI models, especially their limitations.

Memorising micro-rate constants is unhelpful although surprisingly some candidates do attempt this, while remaining unaware of much more relevant concepts such as “performance error” which Evers & Maze Ch 8 has a good summary of.

Hemming & Egan even has a section titled, "Unimportance of Individual PK-PD Model Parameters" summarised as, *"Single PK-PD parameters considered in isolation are not clinically useful; predictions from model simulations are very useful"*.

I've made a document about what I understand about ke_0 and the link between pharmacokinetics and pharmacodynamics which you can access [here](#).

It contains more than you need to know, but will hopefully save you from wasting time searching for better explanations of some of the things you read in the textbooks!

Variability in drug response

Variations in individual drug responses	High	BT_GS 1.14
Tachyphylaxis, tolerance, addiction, dependence and idiosyncrasy	High	BT_GS 1.15
Changes in drug response due to physiological change with particular reference to the elderly	High	BT_GS 1.16
Adverse drug effects	High	BT_GS 1.18
Drug interactions	High	BT_GS 1.19
Pharmacogenetics	High	BT_GS 1.20
Changes in drug response due to cardiac, respiratory, renal and hepatic disease	Mod	BT_GS 1.17
Isomerism	Mod	BT_GS 1.21
Analgesic agents and pathological disturbance	Mod	BT_PM 1.10
Alterations to drug response due to renal disease	Mod	BT_PO 1.80
Alterations to drug response due to hepatic disease	Mod	BT_PO1.108
Use of dantrolene for treating malignant hyperthermia	Mod	BT_RT 1.19
Changes in pharmacokinetics and pharmacodynamics of drugs during pregnancy	Mod	SS_OB 1.9
Inadvertent intra-arterial injection	Low*	BT_GS 1.58
Failure to wake	Low*	BT_GS 1.63
Postoperative delirium	Low*	BT_GS 1.64

Usual number of MCQs - 3

*The last three are rated “low” not because they are not important but because they really belong in the Final Exam, so whilst technically fair game it would be bad form to examine them in any detail.

You will need to cast your net wide to gather most of the material for this topic as it is quite diverse and often buried in chapters on other things. Fortunately there are a few double-ups. Hemmings and Egan 2e Ch 4, 5 & 7 is a good place to start.

Histamine and serotonin

Pharmacology of drugs acting via serotonin or serotonin receptors

Mod [BT_PO 1.101](#)

Clinical features and management of serotonin syndrome

Mod [BT_PO 1.102](#)

Pharmacology of histamine antagonists

Low [BT_PO 1.100](#)

Usual number of MCQs - 1

Drugs acting on serotonergic pathways are relevant to anaesthetic pharmacology, but obviously the detailed pharmacology of antidepressants is not required. It's hard to find a single source for all the information you might want. Katzung 13e Ch 16 has a comprehensive chapter on histamine, serotonin and the ergot alkaloids - it's more than you need for everything (except the antiemetics!) and is available directly through the Primary [library guide](#).

Drug	Depth required	Comments
Cyclizine		
Promethazine		
Ranitidine		
Ergometrine		
'Trons		

Inhalational anaesthetic agents

Inhalational agents - physical properties	High	BT_GS 1.23
Inhalational agents - pharmacokinetics	High	BT_GS 1.24
Inhalational agents - system effects	High	BT_GS 1.25
Inhalational agents - toxicity	High	BT_GS 1.26
Inhalational agents - nitrous oxide	High	BT_GS 1.27
Inhalational agents - comparative pharmacology	High	BT_GS 1.28
MAC	High	BT_GS 1.50

Usual number of MCQs - 6

It would be surprising if you didn't get an SAQ and/or a viva on inhalational agents. There is plenty of material in Hemmings and Egan 2e Ch 3 & 11, massive amounts in Miller 8e Ch 25-28, but my favourite is "The Pharmacology of Inhaled Anaesthetics" by Eger, Eisenkraft and Weiskopf, for sheer elegance, readability, authority, and brevity (250 pages but not close-written). It was written by a giant of anaesthesia, Ted Eger, who passed away in 2017. He developed the concept of MAC and produced a huge volume of research about inhalational agents. The book was available free (thanks to an Educational Foundation and Baxter) so someone in your department may well have a copy to lend you. It came with two DVDs of excellent lectures and has a bunch of MCQs at the back, some of which might make their way into our MCQ bank... One of the primary examiners has kindly put [the lectures onto Youtube](#). Apparently you can still ring the Baxter rep and get a copy. The last chapter alone is worth the price of admission.

Drug	Depth required	Comments
Nitrous oxide		
Sevoflurane		
Desflurane		
Isoflurane		
Methoxyflurane		Used by others, and interesting
Halothane		
Xenon		

Intravenous anaesthetic agents

Sedatives and hypnotics	High	BT_GS 1.29
Intravenous and sedative agents - pharmacokinetics	High	BT_GS 1.30
Intravenous and sedative agents - effects on body systems	High	BT_GS 1.31
Intravenous, sedative and premedicant agents - adverse effects	High	BT_GS 1.32
Intravenous and sedative agents - altered physiological states	High	BT_GS 1.33
Ketamine	High	BT_PM 1.27

Usual number of MCQs - 6

No excuses :) Hemmings 2e Ch 10, Miller 8e Ch 30

Drug	Depth required	Comments
Propofol		
Ketamine		
Thiopentone		
Midazolam		
Etomidate		
Remifentanyl		
Lorazepam		
Diazepam		
Dexmedetomidine		

Intravenous fluids

Colloids and crystalloids

High

[IT_GS 1.5](#)

Usual number of MCQs - 1

Hemmings and Egan 2e Ch 41

Drug	Depth required	Comments
Hartmann's		
Normal Saline		
Albumin 4%		
Dextrose 5%		
Starches		Not universally available
Gelofusine		
Packed cells		
FFP		
Cryoprecipitate		

Local anaesthetic drugs

Pharmacology of local anaesthetic agents	High	BT_RA 1.3
Maximum safe doses of local anaesthetic agents in neonates and children	High	SS_PA 1.80
Pharmacokinetics of local anaesthetic agents in neonates and children	Low	SS_PA 1.79

Usual number of MCQs - 4

Stoelting 5e Ch 10 is particularly comprehensive, even more so perhaps than Miller 8e Ch 36.

Drug	Depth required	Comments
Lignocaine		
Ropivacaine		
Bupivacaine		
ELMA		
Oxybuprocaine		
Amethocaine		
Procaine		Just because it is an ester
Prilocaine		
Cocaine		Still used by some ENT surgeons, some patients and it's interesting

Antimicrobials/chemotherapeutic agents

Antimicrobial agents	Mod	BT_PO 1.3
Pharmacology of antimicrobial drugs	Mod	BT_PO 1.130
Principles of antibiotic prophylaxis	Mod	BT_PO 1.131
Cancer chemotherapeutic agents	Low	BT_PO 1.125
Pharmacology of antiseptics and disinfectants	Low	BT_PO 1.132

Usual number of MCQs - 1

Stoelting 5e Ch 41 and 42 has it all. You may also want to skim through ANZCA's [professional document PS28](#) on infection control. There are new chapters in the 2019 edition of Hemmings and Egan - 38 and 39 which at first blush look ideal. I haven't had time to read them properly yet.

It would be nice if you knew why amoxil is included in the mix of "triple antibiotics" for bowel surgery. *Hint: It's not for Staph...*

Drug	Depth required	Comments
Cephazolin		
Gentamicin		
Penicillins		Includes preparations with clavulanic acid
2nd and 3rd gen cephalosporins		
Clindamycin		
Vancomycin		
Metronidazole		
Vincristine		intrathecal neurotoxin
Methotrexate		
Chlorhexidine		
Iodophors		

Neuromuscular Blocking Agents

Neuromuscular physiology and blocking agents	High	BT_GS 1.35
Neuromuscular blocking agents - pharmacokinetics	High	BT_GS 1.36
Neuromuscular blocking agents - comparative pharmacology	High	BT_GS 1.37
Neuromuscular blocking agents - adverse effects	High	BT_GS 1.38
Neuromuscular blocking agents - reversal agents	High	BT_GS 1.39
Depth of neuromuscular blockade and neuromuscular monitoring	High	BT_GS 1.55
Inadequate reversal of neuromuscular blockade	High	BT_GS 1.56
Indication for muscle relaxation	Mod	BT_GS 1.47

Usual number of MCQs - 6

One of the few topics that truly lends itself to integrated assessment of physiology, pharmacology and equipment, and therefore popular with examiners, especially in vivas. I think it is well-covered in Hemmings and Egan 2e Ch 21 and 22*, also Miller 8e 34 and 35. The section on muscle relaxants in Lachlan Rathie's "The First Year" is by no means the only reason that you should read his book, but it is a compelling one.

Sugammadex is well-covered in Stoelting 5e Ch 12. Obviously the indications for muscle relaxation are important but there are a bit more FEX than PEX. The same argument could be mounted for inadequate reversal, but it is so important, and so tied up with the pharmacology of the agents, that you should be very familiar with it.

**although I think there is an egregious error perpetuated in Ch22 about block onset being related to time to equilibration.*

Drug	Depth required	Comments
Suxamethonium		
Rocuronium		
Cisatracurium		
Atracurium		
Mivacurium		
Vecuronium		
Pancuronium		
Dantrolene		Not elsewhere included

See also: *Anticholinesterase Drugs*

Neuropharmacology

Physiological consequences of a central neuraxial block	High	BT_RA 1.2
Dose and choice of agents for spinal anaesthesia and epidural anaesthesia/analgesia	High	BT_RA 1.14
Adjuvant drugs in neuraxial blockade	High	BT_RA 1.16
Anticonvulsants	Mod	BT_PM 1.28
Effect of baricity in spinal anaesthesia	Mod	BT_RA 1.15
Flumazenil	Low	BT_GS 1.34
Pharmacology of psychiatric drugs and other neurological disorders	Low	BT_PO 1.99

Usual number of MCQs - 4

Some odd ones lumped in together here. Hence it is impossible to find a single source of information. Miller 8e Ch 56 covers neuraxial blocks more than comprehensively. Spoors and Kiff Ch 6.11-6.15 is an excellent introduction. Hemmings and Egan 2e Ch 12 covers the rest (gabapentinoids are covered in Ch 19). My rating of the LO on flumazenil accords with my infrequent use of it. Having said that, it may have a role in reversing the midazolam pre-med in ratty children whose single dental extraction took less time than it took to read this convoluted sentence.

Drug	Depth required	Comments
Phenytoin		
Carbamazepine		
Levetiracetam		
Lamotrigine		
Sodium valproate		
Lithium		
Gabapentinoids		
Droperidol		
Levodopa		and carbidopa (affects absorption)
MAOIs		drug interactions
SSRIs		drug interactions
Tricyclics		amitriptyline prototypical
Antipsychotics		esp droperidol and olanzapine
Flumazenil		

NSAIDs

NSAIDs	High	BT_PM 1.24
Paracetamol	High	BT_PM 1.25
Prostaglandins	Low	BT_PM 1.23

Usual number of MCQs - 2

Anything you prescribe frequently, you need to know a lot about. Evers and Maze 2e Ch 34 covers NSAIDs and prostaglandins very nicely. Paracetamol is surprisingly well-covered in Spoons and Kiff Ch 7.28 and overdose on p439, and surprisingly poorly-covered in most anaesthetic pharmacology texts.

Drug	Depth required	Comments
Paracetamol		
Aspirin		
Ketorolac		
Parecoxib		
Ibuprofen		
other NSAIDs		

Obstetric pharmacology

Pharmacology of oxytocic agents	High	SS_OB 1.10
Pharmacology of tocolytic agents	Mod	SS_OB 1.11
Pharmacology of agents used for the treatment of pre-eclampsia	Mod	SS_OB 1.12
Placental drug transfer	Mod	SS_OB 1.13
Drugs and breastfeeding	Mod	SS_OB 1.15
Foetal and neonatal effect of drugs administered during pregnancy	Low	SS_OB 1.14

Usual number of MCQs - 2

Evers and Maze 2e Ch 58 has good coverage of this topic, also Miller 8e Ch 77 and now Hemmings and Egan 2e Ch 37.

Drug	Depth required	Comments
Syntocinon		
Ergometrine		
PGF2 α		
Misoprostol		
Carbetocin		
Labetalol		
Magnesium		
Hydralazine		

Opioid agonists and antagonists

Opioids - clinical application	High	BT_GS 1.41
Opioids - pharmacokinetics	High	BT_GS 1.42
Opioid receptors	High	BT_PM 1.12
Opioids - mechanisms of action	High	BT_PM 1.13
Agonists, partial agonists, mixed agonists-antagonists, antagonists	High	BT_PM 1.14
Opioids - routes of administration	High	BT_PM 1.15
Opioid conversions	High	BT_PM 1.16
Opioid pharmacokinetics	High	BT_PM 1.17
Opioids - epidural and intrathecal	High	BT_PM 1.18
Opioids - adverse effects	High	BT_PM 1.19
Opioids - drug interactions	High	BT_PM 1.20
Individual opioid pharmacodynamics	High	BT_PM 1.22
Opioid antagonists	Mod	BT_PM 1.21

Usual number of MCQs - 5

Evers and Maze 2e Ch 31-33; Hemmings and Egan 2e Ch 17 and 18; Stoelting 5e Ch 7.
Each is good in its own way. If you read all of them then you'll get plenty of reinforcement!
There is also a lot of clinical information in the [Acute Pain Management handbook](#).

Drug	Depth required	Comments
Fentanyl		
Morphine		
Oxycodone		
Codeine		
Methadone		
Naloxone		
Buprenorphine		
Pethidine		Mostly historical interest
Alfentanil		
Remifentanil		
Hydromorphone		

Pain

Physiology of pain	High	BT_PM 1.3
Response to acute pain	High	BT_PM 1.5
Pain and the elderly	High	BT_PM 1.8
Analgesic agents	High	BT_PM 1.9
Analgesic agents - modes of administration	High	BT_PM 1.11
NMDA receptors	High	BT_PM 1.26
Pain and sensory pathways	High	BT_RA 1.7
Multimodal and pre-emptive analgesia	Mod	IT_PM 1.3
Pharmacology of analgesics	Mod	IT_PM 1.4
Progression from acute to chronic pain	Mod	BT_PM 1.4
Neuropathic pain	Low	BT_PM 1.6
Pain and organ dysfunction	Low	BT_PM 1.7

Usual number of MCQs - 2

There are several double-ups here. Everything you need is probably in the [Acute Pain Management handbook](#), but it is a comprehensive survey and interpretation of the literature to be used as a guide, thus it is not as readable as the narrative style of textbooks. Pain physiology is well-covered in Hemmings and Egan 2e Ch 16, Stoeltzing 5e Ch6, Power and Kam 3e Ch 13, and even more succinctly in Spoors and Kiff 7.26 and 7.27. A lot of the pharmacology is covered elsewhere but remember to fill in any gaps (like antidepressants and methoxyflurane). The Introductory Training LOs and the more clinical ones have been rated of lower importance simply because of the timing of the Primary (after IT and before AT).

Drug	Depth required	Comments
Opioids		
Tramadol		
Tapentadol		Up and coming
Amitriptyline		
Gabapentanoids		
Paracetamol		
NSAIDs		
Ketamine		
Local anaesthetics		

Autonomic NS pharmacology

Pharmacology of sympathomimetic and anticholinergic drugs

High [BT_PO 1.52](#)

Pharmacology of adrenergic agonists

High [BT_PO 1.53](#)

Drug interactions with the autonomic nervous system

High [BT_PO 1.55](#)

Usual number of MCQs - 3

Hemmings and Egan 2e Ch 14, Evers and Maze 2e Ch 40 and 41. No-one expects you to be able to draw the drugs, however you may be asked to recognise one and be asked about structure-activity relationships (*ditto* for local anaesthetics).

Drug	Depth required	Comments
Adrenaline		
Noradrenaline		
Metaraminol		
Ephedrine		
Phenylephrine		
Vasopressin		
Clonidine		
β -agonists		
β -antagonists		
Dexmedetomidine		
α -antagonists		
Atropine		
Glycopyrrolate		

Respiratory pharmacology

Drugs and airway reflexes	High	BT_AM 1.3
Anti-asthma drugs	High	BT_PO 1.40
Oxygen therapy	High	BT_PO 1.41a
Drugs for pulmonary hypertension	Low	BT_PO 1.41

Usual number of MCQs - 1

Hemmings and Egan 2e Ch 30 covers pulmonary pharmacology. The “airway reflex” LO is just a compilation of this specific side-effect of drugs covered elsewhere. Oxygen therapy is best covered in Oh’s Intensive Care Manual 7e Ch 28.

Drug	Depth required	Comments
Oxygen		
Salbutamol		
Ipratropium		
Tiotropium		
Inhaled steroids		
Salmeterol		
Prednisolone		
Aminophylline		
Nitric oxide		
Bosentan		
Prostacyclin		

Anatomy

Upper airway and laryngeal anatomy	High	IT_AM 1.1
Anatomy of the upper airway, larynx and trachea	High	BT_AM 1.1
Anatomy relevant to central neuraxial blockade	High	BT_RA 1.4
Midline and paramedian approaches to neuraxial blockade	High	BT_RA 1.17
Anatomy of peripheral venous system	Mod	BT_GS 1.70
Anatomy of the great veins	Mod	BT_GS 1.72
Anatomy of peripheral arteries	Mod	BT_GS 1.74
Anatomy of sensory pathways	Mod	BT_PM 1.1
Anatomy of the major arteries and veins	Mod	BT_PO 1.42
Dermatomes	Mod	BT_RA 1.5
Anatomy relevant to vascular access in resuscitation	Mod	BT_RT 1.20
Anatomy relevant to drainage of the pleural space	Mod	BT_RT 1.22
Anatomy of the cerebral and spinal cord circulation	Mod	BT_RT 1.23
Airway changes in pregnancy	Mod	SS_OB 1.6
Neuraxial changes in pregnancy	Mod	SS_OB 1.7
Anatomy and physiology of pain in labour and childbirth	Mod	SS_OB 1.8
Anatomy of the autonomic nervous system	Low	BT_PM 1.2
Myotomes	Low	BT_RA 1.6
Anatomy relevant to the drainage of pericardial fluid	Low	BT_RT 1.21

Usual number of MCQs - 3

Spoors and Kiff Ch 6 pretty much covers it. For the detailed approach, and some excellent applied procedural anatomy, read Ellis's Anatomy for Anaesthetists 9e.

If you've been putting things into, through or around any of these structures, you now need to show that you know what you're NOT supposed to be hitting.

Don't leave this one to the last minute.

Equipment and safety

Equipment for airway management	High	IT_AM 1.6
Principles and safety of nerve stimulation	High	BT_RA 1.9
Mandatory safety requirements for anaesthetic machines	High	BT_SQ 1.3
Microshock and macroshock	High	BT_SQ 1.7
Scavenging and hazards of anaesthetic gas pollution	High	BT_SQ 1.9
Supply of medical gases	High	BT_SQ 1.10
Medical suction	High	BT_SQ 1.11
Vapourisers	High	BT_SQ 1.12
Breathing systems	High	BT_SQ 1.13
Systems for delivery of supplemental oxygen	High	BT_SQ 1.14
CO2 absorbers	High	BT_SQ 1.15
Safety of methods for maintaining body temperature	High	BT_SQ 1.17
Surgical diathermy	High	BT_SQ 1.18
Principles and safety of ultrasound imaging	Mod	BT_RA 1.8
Fires and explosions in the operating suite	Mod	BT_SQ 1.8
Level 1 anaesthesia machine check	Mod	BT_SQ 1.16
Cleaning and/or treatment of reusable equipment	Low	IT_SQ 1.5
Lasers	Low	BT_SQ 1.19

Usual number of MCQs - 6

Finally there is an Australian-specific (sorry NZ folks) textbook on equipment. Fred Rosewarne's book [Anaesthetic Equipment - Safety, Physics and Measurement \(notes for FANZCA\)](#) is an extension of the lectures that he gives on the Victorian Course. There are still some chapters missing as he hasn't completed them yet, but what is there should be a useful resource. As to the gaps, I think Magee and Tooley is better than the other texts available online through the library. [Equipment in Anaesthesia and Critical Care \(Aston, Rivers and Dharmadasa\)](#) is succinct and comprehensive in scope, if light on detail. It has a section at the back with MCQs, SAQs and viva questions (aimed at the FRCA) so it might be helpful for revision - it is in the ANZCA e-library but not mentioned in the PEX library guide. There's a lot in *Miller 8e* and a surprisingly large amount in *Spoors and Kiff* (mostly in Ch 2). Professional document [PS54](#) covers the mandatory safety requirements for anaesthetic machines, [PS31](#) covers the indications for a Level 1 machine check and [PS28](#) covers the standards for cleaning and disinfection.

Integrated / miscellaneous

Pneumoperitoneum	High	IT_GS 1.8
Physiology of patient positions	High	IT_GS 1.9
Respiratory effects of anaesthesia and patient positioning	High	BT_AM 1.4
Choice of agents for anaesthesia	High	BT_GS 1.46
Synergism between anaesthetic agents, opioids and regional blockade	High	BT_GS 1.53
Intravenous and inhalational induction	High	BT_GS 1.57
Respiratory effects of anaesthesia	High	BT_GS 1.60
Anaesthetic agents and regional circulation	Mod	BT_GS 1.48
Dealing with changing surgical stimulus	Mod	BT_GS 1.54
Diagnostic tests	Mod	BT_PO 1.2
Pharmacology of illicit drugs	Mod	BT_PO 1.3a
Motherhood statement	Low	AR_ME 1.3
Knowledge and understanding of procedures and technical skills	Low	AR_ME 2.2
Procedure catch-all statement	Low	AR_ME 3.2
Basic pharmacology of drugs used in anaesthesia	Low	IT_GS 1.1
Immune, haematological and endocrine effects of anaesthesia	Low	BT_GS 1.61
Outline the pharmacology of radiological contrast agents	Low	BT_SQ 1.20
Pharmacology of herbal medicines	Low	BT_PO 1.4a

Usual number of MCQs - 6

A mixed bag of stuff. The AR_ME LO's are just bureaucratic catch-all statements to obviate the need to include hundreds of LOs in the "Medical Expert role in practice" in the Training Program Curriculum. IT_GS 1.1 is covered elsewhere! *Spoors and Kiff* is good on patient positioning (4.2), pneumoperitoneum (4.17), choice of agents and inhalational induction (3.2), and diagnostic tests (p571). Respiratory effects of anaesthesia are well-covered in Nunn 8e Ch 20. Synergism is tricky. You need to know a bit about isobolograms and response surfaces, as well as the clinical implications of giving regional and general anaesthesia simultaneously. Effects of drugs on regional circulation is part of the pharmacology of those drugs. Changing surgical depth is really FEX.

Illicit drugs and herbal medicines are covered in general pharmacology books like Katzung 13e Ch 32 and 65, although their specific effects relevant to anaesthesia and

surgery are not well-covered. There is a link to anaesthetic articles on illicit drugs [here](#) and on herbal medicines [here](#). A lot of your patients will be consuming these enthusiastically but they will tend not to tell you.