

Illawarra Shoalhaven Local Health District Emergency Medicine Fellowship Program



Trial Written Exam 2020.1

Candidate Instructions

- Duration = 3hrs
- The examination is divided into 3 booklets, each consisting of 9 questions
- Props are included within the examination booklets
- Allocated marks for each question are shown
- Each mark is of equal weight
- There is no negative marking
- Write answers CLEARLY, and cross out any errors
- Answer within space provided
- Do not begin until instructed
- No examination paper or material is to leave the examination room



Good Luck!

Candidate Name: _____

Book 1

Candidate Name: _____

Question 1 (10 marks)

You are working for a prehospital and retrieval medicine service and fly 150km in a rotary wing aircraft to attend an 18 year old man who has been involved in a motor vehicle accident

On your arrival his observations are:

T 36.3

P110

BP 158/63

RR 22

SaO2 98%

No stridor but a mild degree of respiratory distress



Referring to the above clinical photograph and Xray, describe the main findings (2 marks) as well as the main potential acute complications (2 marks)

Metallic FB, entering submandibular
Penetrating floor of mouth but not hard palate
Left hand side, displacing tongue to right
No obvious bony or airway injury

You decide to transport the patient without securing the airway as the tertiary receiving hospital has access to definitive surgical care as well as advanced airway equipment. The retrieval coordinator asks you whether you would like to transport the patient back via road or air. Outline 1 pro and 1 con to each mode of transport relevant to this case. (4 marks)

	Pro	Con
Rotary wing	Shorter transport time	Difficult to manage deteriorating airway (ideally requires landing site)

Candidate Name: _____

Road Transfer	Easier to manage deteriorating airway, facilitate better airway access	Longer transport time
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You elect to transfer the patient back by air and inflight the patient develops increasing respiratory distress then has a respiratory arrest. The pilot states you are unable to land for 18 minutes. You are unable to establish effective bag-valve mask ventilation despite adjuncts. Explain two management options you would institute whilst in flight (4 marks)

LMA insertion

- Reduce size 3/4 (given reduced space)
- Likely to allow ventilation / oxygenation
- Not definitive airway

Surgical airway

- If LMA fails (or reasonable as primary technique)
- FB position won't effect success
- Secure airway, will be able to perform in flight but more challenging

Endotracheal intubation

Unlikely to be achievable given FB and patient position in rotary wing aircraft. No marks allocated.

Question 2 (10 marks)

A 27 year old man with 3 days of abdominal pain, vomiting and diarrhoea has been admitted to the Emergency Department Short Stay Unit for intravenous fluid therapy and supportive care. He is still feeling unwell the next morning and isn't suitable for discharge. He has bloods taken which are below.

pH	7.19	7.35-7.45
pCO ₂	30	35-45mmHg
pO ₂	42	80-100mmHg
HCO ₃	15	22-26mmol/L
Na	143	135-145mmol/L
K	2.8	3.5-5mmol/L
Cl	114	96-106mmol/L
Lactate	1.8	< 2 mmol/L

Please interpret the above venous blood gas (4 marks)

pH = 7.19 = low = acidaemia

pO₂ = 42 = low = venous sample, unreliable (no mark allocated)

HCO₃ = 15 = low = metabolic acidosis

CO₂ = 30 = low = compensatory (expected CO₂ = 8 + 1.5 x 15 = ~31)

Anion Gap = 143 - (15 + 114) = 143 - 129 = 14 = high

Na normal (no mark allocated)

K = 2.8 = low (expected given pH, K ~6, thus critically low)

Delta ratio = (14 - 12) / (24 - 15) = 2/9 = isolated NAGMA

Summary: Isolated NAGMA with critical hypokalaemia

Name the two most likely contributors to this acid-base disturbance (1 mark)

Hyperchloraemia (likely secondary to saline administration)

Diarrhoea causing HCO₃ loss

Name 3 other causes of the predominant disturbance (3 marks)

Adrenal insufficiency

Renal tubular acidosis (Type 1,2,4)

Renal insufficiency (mild-moderate)

Drugs: Acetazolamide, Spironolactone

GI fistulas etc

Outline two important aspects of correcting this disturbance (2 marks)

Correction/Replacement of K⁺ (likely also MgSO₄) is main priority prior to correcting HCO₃

Isotonic bicarbonate solution: 150mmol NaHCO₃ in 850mL 5% Dextrose to replace HCO₃

Candidate Name: _____

Question 3 (8 marks)

You are working as the consultant in a tertiary hospital and your intern has just seen a 23 year old woman who is 6 days following a vaginal delivery, assisted with obstetric forceps. She was discharged day 2 with a healthy girl and has returned to the emergency department with fevers.

Her vital signs are:

T 39.2
P 133
BP 85/50
RR 24
SaO2 99% RA

You suspect endometritis, name 2 organisms from different categories (2 marks)

Gram Positive: Staphylococcus / Streptococcus

Gram Negative: E. Coli / Proteus / Enterobacter

Anaerobic: Bacteroides / Peptostreptococcus / Clostridium

Name 3 other causes of post-partum fever to consider in this case (3 marks)

Perineal tear / episiotomy infection +/- collection

Mastitis

Urinary Tract Infection

A transvaginal ultrasound is performed (below) and shows a distended endometrial cavity with heterogenous material without internal vascularity.



Treatment (3 marks)

Intravenous broad spectrum antibiotics: Ceftriaxone 1g IV, Metronidazole 500mg IV

Penicillin = 0/3 for sub-section

Intravenous fluid resuscitation / Hartmanns / Aim to maintain MAP >65

Source control: Suction evacuation (some controversy within 24hrs, doesn't need to be addressed)

No marks for disposition

Candidate Name: _____

Question 4 (10 marks)

You are working on shift in a rural emergency department with a single junior medical officer. The nearest major referral hospital is 400km away. You receive a 20 year old man who has been shot in the mid-thigh, with a shotgun and has brisk haemorrhage from the entry site.

His vital signs on arrival are:

T 36.2

P 172

BP 58/27

GCS 8 (E2V2M4)

RR 24

SaO2 no trace recordable

Outline your immediate management (3 marks)

Apply tourniquet (e.g. combat application tourniquet)

Immediate blood transfusion O Neg (these hospitals usually have 2-4 units)

Titrate to cerebral perfusion / Systolic BP ~80 initially

TXA 1g

The patient clinically improves, but due to weather and other factors the retrieval coordination service advises you the patient won't be able to reach the referral hospital for ~4 hours.

Name 3 complications associated with tourniquet use (3 marks)

Limb loss (incidence likely <1%)

Compartment syndrome (2-4%)

Myonecrosis, Rhabdomyolysis, Acute kidney injury (2-4%)

Nerve injury (2-4%)

Venous thromboembolism (2-4%)

Explain the concept 'tourniquet conversion' (2 marks)

Tourniquet conversion is an important concept which refers to the aim of removing a tourniquet and replacing it with a haemostatic agent and/or pressure dressing. The goal of this is to reduce the potential for significant complications but again the 'life over limb principle' applies and this should only be done if clinically appropriate.

List 2 possible indications for tourniquet conversion (2 marks)

Bleeding controlled

Haemostatic agent / pressure dressing effective

Prolonged transport – e.g. >2hrs (not low risk)

Candidate Name: _____

Question 5 (12 marks)

You are working in an urban district emergency department and have just received a 73 year old man with a long history of smoking, hypertension and COPD who has presented with extreme dyspnoea and hypoxia.

His vital signs are:

T 36.3

P 122

BP 177/98

RR 42

SaO₂ 82% on 10L/min via Hudson mask

You perform point of care ultrasound (PoCUS) and obtain the following pattern globally throughout the lungs in association with bilateral lung sliding.



What is the likely diagnosis? (1 mark)

Acute Pulmonary Oedema

What is the main feature on this image suggestive of this diagnosis (1 mark)

Widespread B lines

Outline the two main aspects of your initial care of this man (4 marks)

GTN Infusion / High dose initially (400mcg/min or sublingual loading)

NIV: CPAP or BiPAP reasonable if appropriate detailed settings given

CPAP 5-10cmH₂O initially, fiO₂ 100% initially with target SaO₂ 88-92% given COPD Hx

BiPAP 10-15/5-10cmH₂O initially, fiO₂ 100% as above, titrate up EPAP/PEEP

Please provide 2 findings on PoCUS for the following lung conditions (6 marks)

- Pneumonia
Irregular pleural line

Candidate Name: _____

- Localised B line profile
Hepatinisation of lung tissue
- COPD
A line profile
Lung sliding
- Pneumothorax
Absent lung sliding
Lung point 100% specific

Question 6 (8 marks)

A 58 year old man has been referred from his GP with a painful skin rash that initially started as oral mucosa lesions several weeks prior. He has a background of hypertension and smoking but is otherwise slim and doesn't have any other comorbidities. He is in significant discomfort but his vital signs are normal.

A clinical photograph is below



Describe the photograph above (3 marks)

Widespread erythematous lesions
Thin-walled blisters, mostly ruptured
Involving shoulders and most of central back

What is the most likely diagnosis? (1 mark)

Pemphigus vulgaris

Name 2 differential diagnoses and a clinical feature that may distinguish them from your provisional diagnosis (4 marks)

Bullous Pemphigoid: Tense bullae (not flaccid),
SJS-TEN: Usually new drug as trigger

How is the diagnosis confirmed? (1 mark)

Biopsy

Immunofluorescence - IgG or compliment on surfaces of keratinocytes

Outline the management priorities for this condition (3 marks)

Candidate Name: _____

Specific Mx: Corticosteroids are mainstay (reduce mortality 99% -> 5-15%)

Supportive Mx:

Analgesia

Wound care

Seek and treat underlying infection

Candidate Name: _____

Question 7 (7 marks)

A 21 year old man is brought into the ED with palpitations that came on 2 hours prior and were unprovoked. His ECG is shown below. He has been recently diagnosed with Wolf-Parkinson-White syndrome but has had no treatment to date.

His vital signs are:

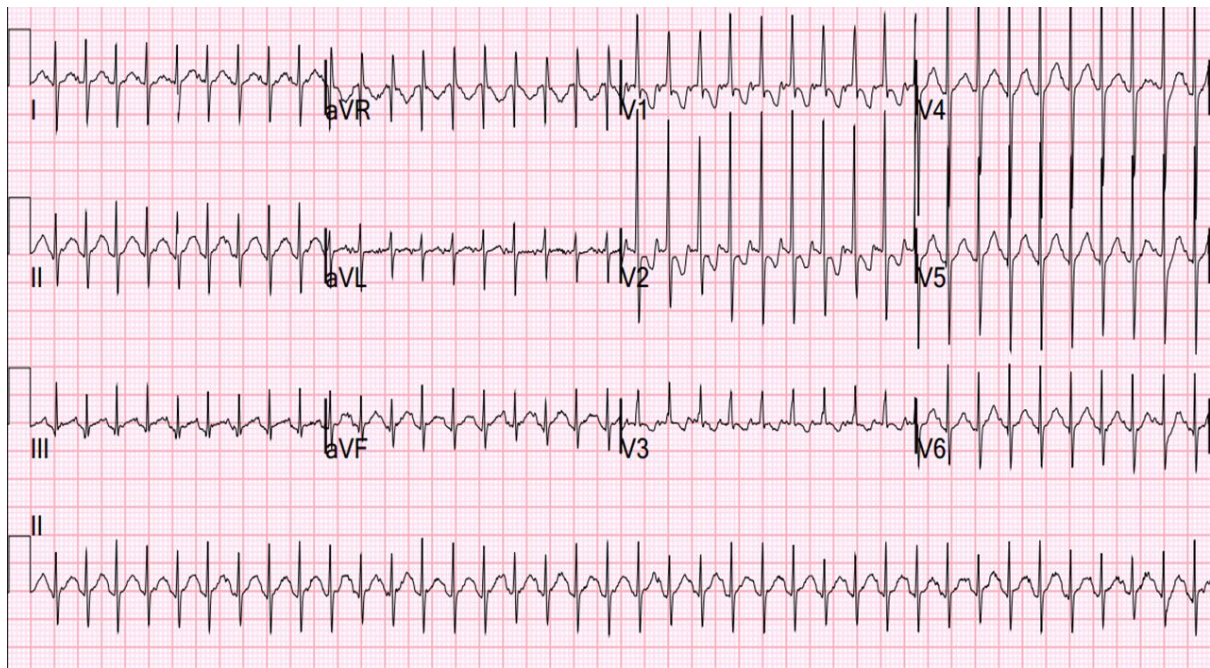
T 36.7

BP 132/87

RR 22

SaO2 99% RA

GCS 15



What is the diagnosis? (1 mark)

SVT with orthodromic conduction (both required for full mark)

What ECG features suggest this diagnosis? (3 marks)

Regular rhythm

No P Waves

Narrow complex suggests orthodromic conduction (as opposed to antidromic)

How does this man's history of WPW alter his emergency treatment? (1 mark)

It doesn't in this case

In WPW atrial fibrillation, AV nodal blockers are contraindicated

Outline two management options for this man (2 marks)

Vagal manoeuvres – e.g. augmented Valsalva

AV nodal blocker: Adenosine / Verapamil with correct dose

DC cardioversion NOT appropriate as initial Mx (suspect some may use this)

Candidate Name: _____

Question 8 (14 marks)

You receive a pre-hospital notification that your department will be receiving an 18 year old man who has been struck repeatedly with an aluminium baseball bat across the face. He has an altered level of consciousness is bleeding profusely from the nose and mouth and has an obviously deformed / depressed face.

List your main priorities for the initial treatment of this man (3 marks)

Secure airway

Haemorrhage control

Volume resuscitation as required

How does midface trauma complicate laryngoscopy? (1 mark)

Haemorrhage obscuring view / rendering

The actual geometry of the airway is rarely altered/worsened (no mark for this)

Describe how you would plan to modify a standard rapid sequence induction for this patient (4 marks)

Positioning: If awake: Sit up

Given reduced GCS, ideally supine, but may require left lateral position if pooling blood

Pre-oxygenation: May not be possible if pooling blood

Laryngoscopy: Likely to require active suctioning (+/- SALAD)

Medications: If shocked, will require dose-reduction induction agent (ketamine ideal agent)

Following successful intubation, outline your technique for minimising ongoing haemorrhage from the midface (6 marks)

Principle

Patients with uncontrolled haemorrhage from the facial skeleton should undergo tamponade with bilateral epistats and dental bridging. These adjuncts should only be applied after the patient is anaesthetised and has a definitive airway secured. A cervical collar will also be required.

Process (Actual Answer)

Candidate Name: _____

The order of adjunct application is important in order to prevent further disruption to anatomy and exacerbation of blood loss.

1. Secure a tracheal tube in the standard manner.
2. Insert the dental blocks in either side of the tracheal tube and position between the molars. [Point of wedge toward the back of the mouth]. Tie the chain on the dental blocks together or tape them to the side of the cheek.
3. Secure the cervical collar (to brace the mandible).
4. Insert the epistats along the floor of the nose with the same technique as insertion of a nasopharyngeal airway. Ensure they are fully inserted but do not force them against resistance.
5. Fill 4 x 20 ml syringes with normal saline.
6. Try to inflate both epistats alternately (a little at a time) to avoid causing deviation of fractures.
7. Inflate the balloon in the posterior nasal space (white valve) with approximately 10ml of fluid, enough to prevent the epistat being pulled out with light traction.
8. Next, inflate the middle balloon (green valve) with 20 - 30mls of fluid until haemorrhage is controlled.

Question 9 (14 marks)

A 12 year old girl is brought in to emergency by her mother, who appears intoxicated and leaves the department without notice soon after and is unable to be contacted. The girl has abdominal pain and you suspect acute appendicitis. Current observations are

GCS 15
BP 105/77
HR 95
Sat 100% RA
T37.8

List 4 ultrasound findings that increase the suspicion of appendicitis (4 marks)

Appendiceal diameter > 6 mm
Target sign with 5 concentric layers
Distension or obstruction of the appendiceal lumen
High echogenicity surrounding the appendix
Appendicolith
Pericecal or perivesical free fluid
Muscular wall thickness > 2 mm
Absence of appendiceal peristalsis

List two factors on history that would make you suspect a perforated appendix in this patient (2 marks)

Pain > 36 hours duration
Pain free interval
Diffuse pain (less likely isolated to RIF)
Vomiting
Fever/s
Alteration of bowel habit
Not accepted – sepsis, systemically unwell, HD unstable etc as this is given to you in the stem

She is reviewed by the surgical registrar who decides she is best managed operatively. List 5 reasons why a patient may be unable to give informed consent? (5 marks)

- Not voluntary (coerced)
- Lack capacity
- Are a minor
- Not informed properly (eg consent obtained by someone not familiar with procedure/risks not explained)
- Under the mental health act
- Cannot comprehend information presented to them
- Others accepted as long as sensible and no overlap with other answers

You assess the girl as competent and mature. She refuses surgery on the grounds her grandmother died in your hospital. Explain the concept of a mature minor in this case (3 marks)

3 factors for 3 marks

- <18 (no lower age limit)
- Reasonable thought process and insight (any description long these lines)
- Can consent to treatment but cannot withhold consent or refuse life-saving treatment

Candidate Name: _____

Book 2

Candidate Name: _____

Question 10 (13 marks)

You are the trauma team leader in a tertiary emergency department and you are receiving an unstable blunt trauma patient who has been struck by a truck whilst riding a motor cycle. The prehospital team has performed an RSI, bilateral finger thoracostomies, placed a pelvic binder and commenced a blood transfusion with 4 units of O negative blood. The patient dies in the emergency department. During review of the case, it is suggested that the patient may have benefited from resuscitative endovascular balloon occlusion of the aorta (REBOA).

What is the main indication for REBOA? (1 mark)

Exsanguinating subdiaphragmatic haemorrhage

Complete the following table regarding REBOA catheter placement (4 marks)

	Location of placement	Location of haemorrhage
Zone 1	Supra-coeliac	Abdominopelvic
Zone 3	Terminal aorta	Pelvic

Name one alternative to REBOA in this setting (1 mark)

Thoracotomy and aortic occlusion (manually is preferable, or cross clamp)

Describe the surface anatomy of the common femoral artery (2 marks)

Mid inguinal point

Artery is lateral to vein

You are asked by your director to gather information towards developing a business case to institute REBOA into your department. State 5 aspects to your research (5 marks)

Current literature on REBOA

Availability of equipment in the hospital, area health service or nationally

Benchmarking (use in other centres of similar size, epidemiology)

Cost analysis (lifetime + consumables)

Risk Management (potential problems / risk mitigation strategies)

Candidate Name: _____

Question 11 (16 marks)

A 12 month old girl is brought in by her parents after they found her playing with an open bottle of her mothers antiepileptic medication. This occurred around an hour before arrival in the ED and upon counting remaining tablets it is suspected she may have taken 5 tablets



Discuss the main features of toxicity in this ingestion (4 marks)

Anticholinergic toxicity

ALOC -> Coma

Cardiotoxicity:

Na⁺ channel blockade and arrhythmias

Hypotension

What is the expected weight for this child? (1 mark)

10kg

Outline your dose-related risk assessment for this child (1 mark)

5x 200mg = 1000mg

~100mg/kg

?50mg/kg can cause significant life-threatening toxicity

The child develops significant toxicity and is intubated. Both multiple dose activated charcoal (MDAC) and haemodialysis can be used as enhanced elimination techniques.

Describe how you would perform MDAC in this child (3 marks)

NG/OG tube (confirm placement) ~8Fr

1g/kg activated charcoal

0.5g/kg q2hrs / reassess need at ~6hrs

Check bowel sounds and aspirate NG/OGT prior to each dose

Name 2 other agents in which MDAC may be used (2 marks)

Theophylline

Quinine

Dapsone

Phenobarbitone

List 2 indications for extracorporeal elimination in this child (2 marks)

Prolonged coma with serum levels >40mg/L (120micromol/L) after 48 hours

Haemodynamic instability

List 3 properties of drugs that make them ideal for haemodialysis (3 marks)

Small molecule

Small volume of distribution

Rapid redistribution from tissues

Candidate Name: _____

Slow endogenous elimination

Candidate Name: _____

Question 12 (7 marks)

A 34 year old man is brought to your emergency department following a work place injury. He was using a pressurised paint injector with a high-pressure hose that snapped, striking him in his hand. He washed his hand immediately and presented to the department. He is complaining of pain and has been given oral analgesics with some relief to his pain. His vital signs are normal.

A picture of his hand post injury is attached.



What is your choice of initial investigation and your rationale for it? (2marks)

Hand X-ray.

May show extent of injection of radiopaque substances.

What are your immediate management priorities? List 5. (5 marks)

Splint and Elevate

Emergent ortho/hand surgeon consult

Early surgical decompression and debridement

Increased rate of amputation if >10 hours to OR

Tetanus

Antibiotics

Analgesia

You have difficulty managing this man's pain and your resident suggests a peripheral nerve block. What is your response and what are the additional options (3 marks)

Digital blocks are contraindicated as wound already under high pressure. May mask developing compartment syndrome.

IV Morphine 5-10mg q30 mins

Low dose ketamine 10-20mg / or infusion

IV Fentanyl PCA – titrated to pain.

Candidate Name: _____

Question 13 (11 marks)

A 58yo man presents to the emergency department with nausea, vomiting, pruritis, back pain and reduced urine output over the last 2 days. He is currently being investigated for a retroperitoneal mass. His VBG shows a creatinine of 634.

What are the main causes of AKI? Include 2 examples of each (3 marks)

Prerenal: hypovolaemia, renal artery stenosis, heart failure, sepsis

Renal: renal vein thrombosis, vasculitis, drugs (NSAIDs, ACEI, ARBs)

Post renal: retroperitoneal neoplasm, renal calculus, urinary retention

Any 2 correct from each group

Outline 3 investigations you would perform in the ED for this patient. Justify each (3 marks)

CT Abdo (abdominal mass, hydronephrosis)

Better than US as known mass

VBG (metabolic acidosis, hyperkalaemia)

ECG (hyperkalaemia)

Urinalysis (infection / haematuria / proteinuria)

Others may be reasonable

List 5 indications for Continuous Renal Replacement Therapy (5 marks)

K $>$ 6.5 or rapidly rising

Na $<$ 100 or $>$ 160

Pulmonary oedema unresponsive to diuretics

Severe uncompensated metabolic acidosis with pH $<$ 7.1

Uraemic Syndrome

Overdose with dialysable toxin

Urea $>$ 35

Creatinine $>$ 400

Question 14 (10 marks)

You are accompanying a Climbing team to the Everest Base camp on the Tibetan side of the mountain. The altitude is 5150m. A 30 year old man who has suffered Nausea, vomiting and headache over the past week has been breathless at rest over last couple of days and is only talking in short sentences. His vital signs are:

T: 37.2
HR: 110
O₂sat 84%
RR 28
BP: 134/78

What is the most likely diagnosis? Outline 3 management interventions (4 marks)

High altitude pulmonary oedema

- Oxygen
- Nifedipine 30 mg BD po
- Descend

What was the most likely explanation for his preceding symptoms? What would the most appropriate management have been? (3 marks)

Acute mountain sickness

- Acetazolamide 250 mg PO BD
- Descend
- O₂

High altitude cerebral oedema can also occur in this situation. Name 2 clinical features and 1 specific medication for this condition. (3 marks)

Clinical Features

- Ataxia (early finding)
- Altered mental status

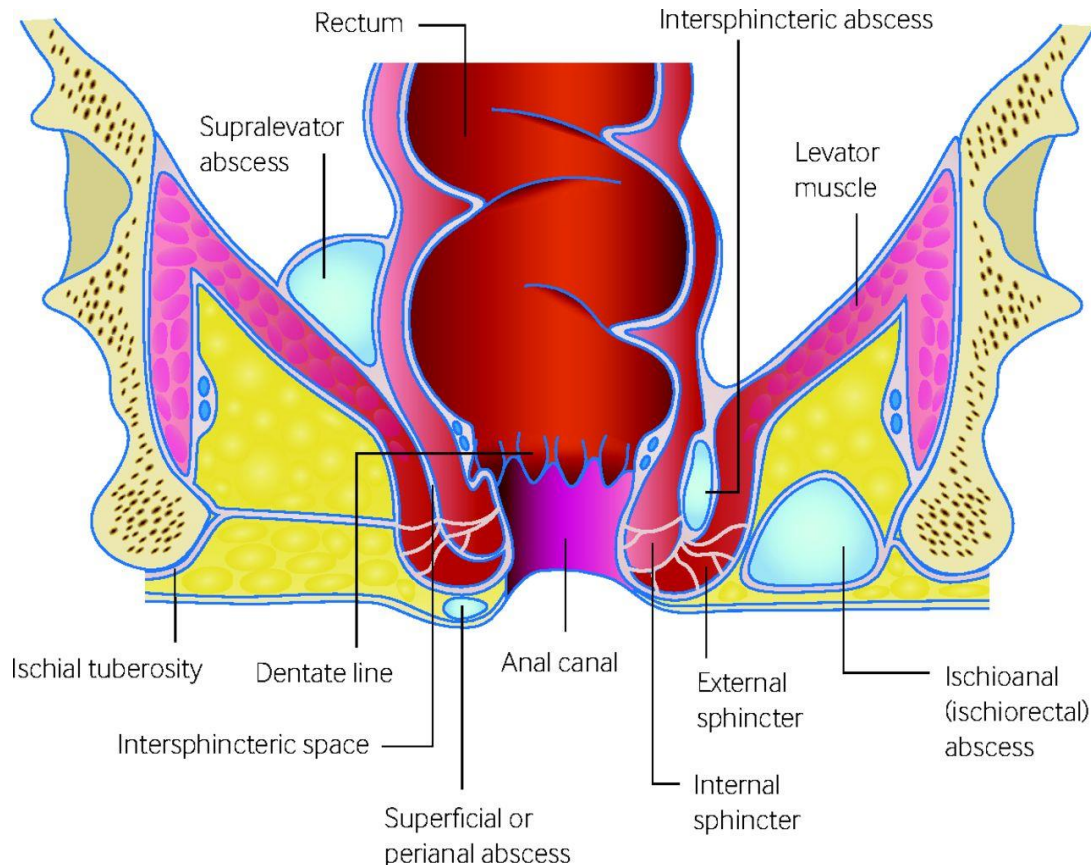
Dexamethasone 8 mg BD PO

Question 15 (10 marks)

A 32 year old man presents to the emergency department with painful defecation and a tender swelling adjacent to his anus. You diagnose a superficial perianal abscess.

List the 3 other anatomical types of perianal abscess (3 marks)

- Ischioanal (ischioanal) abscess
- Intersphincteric abscess
- Supralelevator abscess



You elect to perform an incision and drainage on his superficial perianal abscess. He is adequately sedated by a senior colleague in your resuscitation room. Outline your approach (4 marks)

- Position in lithotomy (may need an assistant)
- Prep and drape area
- Radial incision into cavity – take swab
- Blunt dissect cavity with forceps / finger
- Irrigate with normal saline
- Insert wick/pack (optional) & Clean / dress

You successfully drain his perianal abscess. List 3 aspects of your post-procedure care of this man (3 marks)

- Analgesia and prevention of constipation
- Regular dressings (remove pack day 1 and don't re-pack), Sitz baths optional
- Close follow up / rate of fistula-in-ano is ~50%
- Return precautions to the ED: fevers, worsening pain, reaccumulation etc

Candidate Name: _____

Question 16 (12 marks)

A 26 year old woman who is breastfeeding her 3 week old girl has developed fevers, rigors and left breast pain. She is haemodynamically stable and you suspect mastitis.

List 2 risk factors for mastitis (2 marks)

Risk factors for mastitis:

- Incomplete breast drainage due to:
 - Poor positioning and attachment
 - Missed feeds or long intervals between feeds
 - Tongue-tie
- Restrictive clothing/external pressure on the breast
- Trauma to breasts or nipples
- Engorgement and/or chronic oversupply
- Unresolved blocked ducts or white spot on the nipple (blocked nipple pore)
- Rapid or abrupt weaning
- Stress, fatigue, overall poor health and nutrition
- Previous history of mastitis

Name 2 organisms that commonly cause mastitis? (2 marks)

- **Staphylococcus aureus (essential)**
 - **MRSA becoming increasingly common**
- **Beta-haemolytic streptococcus e.g. group A strep**
- **E Coli**

You decide to admit the woman and place her on intravenous antibiotics. Please outline two antimicrobial regimens (include dose, route and frequency)

First Line (1 mark)

Flucloxacillin 2g IV q6H

Cephazolin 2g IV TDS

Beta-lactam allergy (1 mark)

Lincomycin 600mg IV q8H

Clindamycin 450mg IV q8H



Candidate Name: _____

Describe the image and state the most likely diagnosis (2 marks)

Hypoechoic, round region beneath the skin

Breast abscess

Outline the preferred management of the above condition (2 marks)

Needle aspiration

- I&D not done as first line

Up to 3x daily needle aspirations / usually US-guided

Outline 2 important aspects of breast-feeding advice for this patient (2 marks)

- Continue breastfeeding on affected side
 - May need to re-position baby if aspirations done or drain in-situ
- See midwife / lactation consultant to determine underlying trigger and prevent future

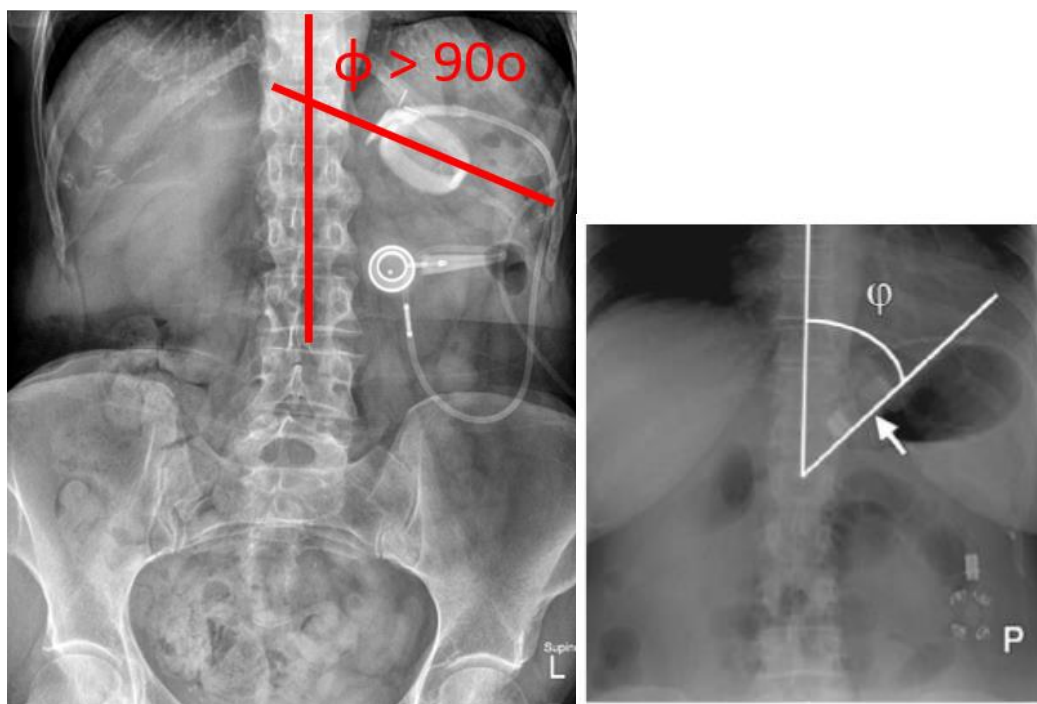
Question 17

A 32 year old woman comes to the ED with persistent vomiting and epigastric discomfort. She has no other symptoms. She has no significant comorbidities with the exception of significant weight loss following laparoscopic gastric banding done 3 years ago.

What is the most significant finding on this AXR? What is the normal appearance? (2 marks)

Phi angle significantly greater than normal (usually 4-58°). Suggest band slippage.

The Phi (ϕ) angle of the band is the angle formed by a straight line through the long axis of the band and a vertical line through the spinal column



What is the diagnosis? (1 mark)

Band slippage

How common is this? (1 mark)

12%, usually occurs after 3 months

This is a fairly typical presentation

List 2 complications of this condition (2 marks)

- Intolerance of food/fluid – dehydration and its consequences
- Gastric necrosis / perforation

Outline your management (4 marks)

- Analgesia / Antiemetics (not prokinetic)
- NBM / IV Fluids (deficit + maintenance)
- Aspirate balloon to deflate (usually ~5mL)
- Refer to surgical team to facilitate further inpatient Ix and Mx
 - May get contrast study or CT with PO contrast to assess for perforation
 - Often get endoscopy and/or laparoscopy to identify further damage

Candidate Name: _____

Question 18 (12 marks)

You are working as a new consultant in a rural emergency department and have been tasked with developing a clinical governance team to augment the local health care service

What is clinical governance? (3 marks)

- System by which the governing body, managers, clinicians and staff
- share responsibility and accountability
- for the quality of care, continuously improving, minimising risks, and fostering an environment of excellence in care for patients and consumers.

List the 7 pillars of clinical governance (7 marks)

- Patient & Public Involvement
- Information & IT
- Risk Management
- Audit
- Training / Education
- Clinical Effectiveness and Research
- Staff management

What is the main difference between research and audit? (2 marks)

Research = what is the right thing to do?

Audit = are we doing the right thing?

Book 3

Candidate Name: _____

Question 19 (13 marks)

You are an ED physician working in a mixed tertiary ED when a 2 year old boy is brought in by his step-father refusing to weight bear, agitated and distressed. His stepfather states that he been limping for a few days, but becomes defensive on specific questioning. He is 12kg and has normal vital signs.

You are concerned for the possibility of non-accidental injury.

In addition to non-accidental injury, what are three other differentials for a limb in this patient? (3 marks)

- Toddler's fracture
- Transient synovitis
- Inguinal hernia
- DDH
- Septic arthritis (although less likely in absence of other normal vitals)
- Foreign body or wound on foot

On examination, you notice several bruises around the trunk and circumferentially around the upper arm of the child. The stepfather states "he falls a lot".

Name 5 other examination findings that may be consistent with non-accidental injury (5 marks)

- Bite marks
- Burns (especially cigarettes)
- Broken frenulum
- Retinal haemorrhages on fundoscopy
- Bruising around mastoid area
- Perineal or genital trauma/mutilation
- Obvious neglect ie very poor hygiene
- Abnormal behaviours demonstrated between child/parent

Given your concerns, you decide to perform a skeletal survey and find several old fractures, healing at different stages across several limbs. Name two other differentials apart from non-accidental injury that may give a similar appearance on imaging. (2 marks)

- Osteogenesis imperfecta
- Osteopetrosis
- Severe malnutrition → osteopenia
- Chronic kidney or liver disease

The child remains irritable and inconsolable in the ED. What other investigation would you consider? Provide justification. (3 marks)

- CT head
 - Child remaining irritable – may be marker of concealed injury
 - Exclude intracranial bleeding from shaken child injury
 - Exclude skull fracture from blunt trauma

Candidate Name: _____

Question 20 (15 marks)

A concerned parent of a 15 month old boy presents to your emergency department with concerns for measles after her child has developed fever at home of 39.5 degrees. She was notified some days prior of exposure to a confirmed case of measles during a flight from overseas. The child does not have a visible rash.

What is the incubation period for measles (1 mark)

Accept between 6 and 21 days, median is 13

List 3 signs on examination that would lead you to suspect measles over other causes of fever (3 marks)

Koplik Spots

Non purulent conjunctivitis

Pharyngitis

Lymphadenopathy

Splenomegaly

You are suspicious this may be measles.

List 3 specific investigations you would perform (3 marks)

Nose/Throat swab for PCR

Urine PCR

Blood serology (IgM and IgG)

Describe the appearance of the measles rash (2 marks)

Marks for

Cranio caudal progression (starts on face)

Palms and soles rarely involved

Maculopapular, Morbilliform, Erythematous (must have 2/3 for 1 mark)

No marks for blanching as can be petechial especially later

List 3 complications from the measles virus in this patient (3 marks)

Encephalitis

Pneumonia (also accept bronchiolitis)

Otitis media

Immune suppression

Bacterial superinfection

Subsclerosing pan encephalitis

The child examines otherwise well and a decision is made for discharge after appropriate investigations. Outline your discharge advice for the mother. (3 marks)

Contagious – highest risk 5 days before and 4 days after rash. Should stay at home until at least 4 days after rash. Must mention contagious, 1 mark for mention another mark for timeframe.

Other advice maximum 1 mark for sensible answers eg

Follow up plan for results

Warning about complications

Expected clinical course

Contact tracing

Candidate Name: _____

Question 21 (15 marks)

A 7 week old boy is brought in by his parents with inconsolable crying for 16 hours. The parents look exhausted and dejected. The boy has unremarkable birth history and is thriving.

List the potential causes of the boys crying (5 marks)

- T** — Trauma (accidental and nonaccidental injuries) and bites (e.g. insects), tumours
- I** — Infections (otitis media, herpes stomatitis, urinary tract infection, meningitis, osteomyelitis, etc)
- M** — Maternal/ parental stress, anxiety or depression
- S** — Strangulation (hair/fiber tourniquet)
- C** — Cardiorespiratory disease
- R** — Reflux, reactions to medications, reactions to formulas, rectal (anal fissures)
- I** — Intracranial hypertension, immunizations, intolerance of lactose or cow's milk allergy
- E** — Eye (corneal abrasions, ocular foreign bodies, glaucoma, retinal haemorrhages)
- S** — Surgical (volvulus, intussusception, inguinal hernia, testicular torsion)

What are important features in history that need to be obtained? (5marks)

- Temporal association of crying with feeds.
- Variation of crying with contextual or environmental factors.
- Parental response — in terms of emotional responses and actions.
- The parents support system. Screen for depression. Consider the potential for non-accidental injury.
- Growth and development — physical causes of chronic crying are rare if the child is thriving.
- Associated symptoms — e.g. vomiting, diarrhoea, eczema.

You do not find a significant cause for the boys crying and decide to discharge him. What approach to discharge would you use? (5 marks)

- Explain that the infant is not unwell or in pain and that crying and unsettled behaviour will improve with time.
- Provide empathic acknowledgment of anxiety and stress, constructive options for ongoing support from within and outside the family.
- Provide printed information with management advice and support contacts
- Follow up with Maternal/ child health nurse, General practitioner or General paediatrics have been arranged
- Offer Inpatient admission — for severe cases or if there is risk of parental exhaustion or non-accidental injury to the infant.

Candidate Name: _____

Question 22 (12 marks)

A 17 year old female has been brought in from school after a collapse. Her mother tells you that her GP has referred her to a psychiatrist over concerns of her body weight, they suspect she has an eating disorder. They are currently awaiting an appointment.

Define Anorexia Nervosa (2 marks)

Restriction of calorie intake resulting in pathologically low body weight

Define Bulimia Nervosa (2 marks)

Repetitive and Compulsive episodes of Binge eating

Compensatory actions to stop from gaining weight (Purging / Laxatives / Diuretics)

List 4 complications of Anorexia Nervosa from 4 separate systems (4 marks)

CVS - Syncope / Dysrhythmias

Met - Hypoglycaemia / Hypo(K/Mg/PO4/Na)

Haem - Anaemia, Neutropaenia

GI - Liver Failure, Constipation

Skeletal - Osteoperosis

Psychiatric - Depression

Refeeding Syndrome - Hypo K/Mg/PO4/glycaemia

List 4 criteria for medical admission in anorexia Nervosa (4 marks)

Maximum of 1 indication per body system

BMI < 12

Hypothermia (<35.5)

CVS

- Brady cardia < 50

- SBP <80mmHg

- Postural Hypotension (>20mmHg)

Electrolytes

- K+ < 3mmol/L

- Na < 125mmol/L

- BSL < 3mmol/L

Haem - Neutrophils < 0.7

Renal - eGFR < 60mls/min

Failure to respond to outpatient management

Candidate Name: _____

Question 23 (11 marks)

A 33 year old Indigenous man from remote Northern Territory presents during the wet season with 3 days of fever, cough and abdominal pain with decreased oral intake. He looks quite unwell from the end of the bed.

His vital signs are:

P 120

BP 85/50

Temp 39.6

SaO₂ 88% R/A

GCS 14

Your resident has ordered basic blood tests including VBG, FBC, EUC, CRP and blood cultures and ordered a CXR which is shown below.



List 2 abnormal features on the CXR (2 marks)

Right sided mediastinal mass

Elevated right hemidiaphragm

Cavitating lesions R UL (may be hard to appreciate, not required for 2/2)

List 3 potential causative organisms in this patient (3 marks)

Mycobacterium tuberculosis

Burkholderia pseudomallei

Staphylococcus aureus

List 2 further investigations with justification for each (4 marks)

Investigation Justification

CT brain, chest and abdomen with contrast

Candidate Name: _____

Abscess formation common in melioidosis (patient septic with abdominal pain)– stem points to these areas

Quantiferon gold, sputum AFB, sputum culture

Diagnose/exclude TB

No marks for generic or non specific answers

Others accepted esp tropical disease serology, syphilis, HIV

LP needs discussion about reduced LOC / shock to score mark

Name 2 target areas of the federal 'closing the gap' framework (2 marks)

Child mortality

Indigenous 4 year olds enrolled in education

School attendance

Reading and numeracy

Year 12 attainment

Employment

Life expectancy

Question 24 (13 marks)

You are overseeing the care of a 63 year old woman with septic shock who has been given appropriate broad spectrum antibiotics and 2L of intravenous hartmanns solution. She has no clinically apparent source however her urine dipstick is positive for leukocytes and nitrites. She was previously healthy with no significant comorbidities, medications or known allergies.

Her current vital signs are:

P 122

BP 72/40

GCS 12 (E3V4M5)

RR 32

SaO2 poor trace

Your registrar is planning to commence a noradrenaline infusion to support that patients MAP. They would like to insert a CVC prior to commencing therapy however you encourage them to start via peripheral IVC.

What is the advantage of peripheral vasopressor therapy? What is the safety profile? (2 marks)

Immediate therapy / avoids time delay (with organ hypoperfusion) associated with placing CVC
Evidence suggests incidence of extravasation is low (<2%), and ischaemic complications extremely uncommon

Risk vs. Benefit is almost always towards short term peripheral vasopressors to stabilise patient

List 2 factors associated with reducing complications associated with extravasation (2 marks)

Well placed IVC, if US-guided >10mm in vessel

Regular assessment of IVC site

Outline your management of extravasation (4 marks)

Stop infusion

Commence infusion via alternate IV access

Aspirate IVC of all remaining vasopressor

Administer vasodilator

Subcutaneous infiltration of up to phentolamine (0.5mg/mL) via 25g needle

Can consider administering phentolamine via the involved IVC, then remove

Close monitoring of limb

A central line is inserted in the right internal jugular vein and vasopressor therapy continued.

List 3 modalities of confirming venous placement, including expected findings (3 marks)

CXR – in SVC with tip just above RA

PoCUS –Saline flush test / visualise Wire moving freely within IJ on PoCUS

Blood gas – reduced pO2 / O2 saturation

The patient remains hypotensive despite 30mcg/min of noradrenaline. You are planning to commence a second vasoactive agent and perform a bedside cardiac ultrasound. Please suggest a second-line agent based on the following findings. Assuming no pericardial effusion, normal volume status, no RV strain (2 marks)

Reduced LV function	Hyperdynamic LV function
Adrenaline Milrinone	Vasopressin

Candidate Name: _____

Question 25 (12 marks)

A 10 year old boy with known haemophilia A presents to the emergency department with a painful ankle after trivial trauma at home. He has a diffuse tenderness and is unable to weight bear. He is systemically well. His X Ray shows no fracture. He weighs 30kg and his vital signs are normal.

What is Haemophilia A (1 mark)

Deficiency of Factor 8

How is the severity of Haemophilia defined into mild, moderate and severe (3 marks)

Based on amount of residual active factor 8

Mild = 5-40% active factor

Moderate = 1-5% active factor

Severe = <1% active factor

What is the likely diagnosis in this case? (1 mark)

Haemarthrosis (most common presentation of Haemophilia A)

Outline two aspects of supportive care in this case (2 marks)

1. Analgesia: oral paracetamol 450mg, oxycodone 2.5mg
2. Splinting/immobilisation

State the specific factor replacement, including initial dose and target (3 marks)

Recombinant factor 8

1unit /kg raises activity by 2%

Target 50% activity in haemarthrosis

Thus $25\text{u/kg} = 25 \times 30 = 750$ units

How would this dose be altered in the setting of intracranial haemorrhage, and why? (2 marks)

Target 100% activity in life-threatening bleeding

Thus $50\text{u/kg} = 1,500$ units

Candidate Name: _____

Question 26 (11 marks)

A 13 year old boy presents after a head collision whilst playing rugby. He had a witnessed loss of consciousness lasting approximately 10 seconds and was assisted from the field. He has been transported to your ED by his parents.

He is GCS 15 and you are not concerned about an intracranial bleed. Your diagnosis is concussion. You are planning to discharge the patient from your department

Aside from headache, list 5 symptoms of concussion that may occur in the days following the injury (5 marks)

Headache

- Feeling “Pressure in the head”
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- “Don’t feel right”
- Feeling more emotional than usual • Being more irritable than usual
- Sadness
- Being nervous or anxious
- Neck pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slow
- Feeling like “in a fog”

Source – SCAT 5 and Sports medicine Australia concussion guideline

Name one assessment tool, which may assist in the diagnosis and ongoing monitoring for a patient with a concussion (1 mark)

SCAT

The boy tells you his Grand Final match is in 1 week. Outline your discharge advice (5 marks)

-
- **Rest** (body and mind)
 - Time course of recovery and symptoms (is variable)
 - **Graded return to play plan**(in some capacity – ideally state a graded return to play guided by a medical professional). 3 weeks is the minimal plausible time to return, however further caution often taken in paediatric patients
 - Return to school, or a statement about emotional/concentration/learning difficulty post concussion)
 - **Adequate follow up** (GP, paed, sports med)
 - Others accepted

Candidate Name: _____

Question 27 (12 marks)

A 45 year old man presents with shoulder pain. A junior doctor has performed an X ray which shows no fracture. She plans to discharge him with a diagnosis of 'soft tissue injury'.

Complete the following table (12 marks)

	Time course (Acute, sub-acute, chronic)	Mechanism	Specific physical examination test
Subacromial impingement	Sub-Acute or chronic	Rotator cuff weakness/tear with superior migration of humerus	Neer Hawkins-Kennedy Painful Arc Jobe test
Glenoid labrum tear	Acute	Overhead throwing Fall on outstretched hand with tensed biceps	Active compression test (O'Briens) Crank test
AC joint sprain	Acute	Direct blow to shoulder or fall onto shoulder tip	Cross body adduction Will accept noticeable step deformity/asymmetry
Adhesive Capsulitis	Sub acute or chronic	Idiopathic (will accept as this is most common) Post trauma, or post surgical	Symmetric loss of active and passive ROM

Candidate Name: _____