UCL Anaesthesia

ANAESTHESIA AND CRITICAL CARE Special Studies Module 2022

Perioperative MEDICINE PROGRAMME

the centre for Anaesthesia UCL

CONTENTS

Introduction

Welcome to your SSC in Anaesthesia and Critical Care. We appreciate that Anaesthesia is very different to the other subjects you study, but all the staff are here to help you gain a good introduction to this broad field.

Most of your time will be spent in theatres and on the ward with anaesthetic consultants and registrars, as well as critical care, nursing, theatre and recovery staff. Do be pro-active and use this opportunity to see a wide range of cases and learn from the different members of staff. Sometimes just watching is a valid tool, but feel free to ask questions and think about why we do things in a certain way.

There are freely downloadable short articles on the students section of our website at www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students that will support the booklet. Visit our You tube site (google 'you tube ucl anaesthesia' – it's the top link) for our videos! More traditional resources are still important, and the Cruciform library has a good selection of anaesthetic and critical care books. There are also the latest journals and access to the internet and evidence based medicine.

This booklet is intended as a guide to your learning; use it in conjunction with theatre teaching and the tutorials you will have. Some of the main points you need to cover are highlighted and there is also a checklist of practical procedures you should get signed off once you have seen or done them. This SSC is a great opportunity to gain valuable experience in airway management and IV cannulation. You should try to see and do as much as possible.

The booklet includes 9 main topics, each of which forms the basis of a tutorial. One or two will present a summary of the main points, but you should all prepare in advance and be ready to discuss the subject as we will be assessing you on your participation in these tutorials as well as in theatre. There are also scenarios and questions for each topic to reinforce your learning either in the booklet or online.

There will be a formal assessment at the end of the attachment in the form of a case based discussion or peer to peer teaching session for the Year 4 students. The topic tutorials and the case report or teaching session constitute the project work that the medical school specifies you must do to pass the module.

We are always trying to improve this module: this can only be achieved with your feedback. So *please fill in the assessment form* at the end of your time.

The anaesthetists have an **online rota** you can view at https://uclh.clwrota.com You can also download the app for android and iphone. Search for 'clw rota'.
Username medical.s1 Password Student1

We have a **training tool in Perioperative Medicine**. You can do it any time on your own.
Our Introduction to Perioperative Medicine for Medical Students is here:

Our budding educationalist colleague Jey (jeyapragash.jeyapala@nhs.net) will be organizing separate tutorials aimed to help get you through Finals and make you a great FY Dr.!

Finally, enjoy your time here. Anaesthesia and Perioperative Medicine is an exciting field to work in and we believe you can learn a lot during your attachment and develop skills and knowledge that will really help you as a new doctor. If at any time you have concerns or need to raise an issue do get in touch with the consultants below.

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OBJECTIVES

At the end of your four-week special study module in Anaesthesia and critical care you should be able to**:**

1. Assess and prepare patients undergoing emergency and elective Anaesthesia for a variety of surgical conditions.

2. Understand postoperative care of the surgical patient including pain management, fluid and oxygen therapy.

3. Appropriately identify patients who require a higher level of care than can be provided on the ward and need referral to the intensive care and high dependency units.

4. Have an understanding of anaesthetic drugs and equipment and when and how we use them.

5. Carry out the following procedures

   - Basic airway management
   - IV cannulation

Provisional SCHEDULE

There are 4 areas of anaesthesia and critical care you will gain experience in

UCH Emergency Theatres (CEPOD 1&2 and Emergency weekend shift)

Join Trauma and Emergency List Anaesthetic team handover at 0740 outside DSU theatre 1 (or bleep them on 4300 to find out where they are if they are busy)
Contacts: Anaesthetic SHO & SpR (bleep 4300 & 4600)

Try to see as many patients pre-operatively and post-operatively with the team, follow them to any emergency calls/cardiac arrest situations. See how they use ultrasound to gain IV access or practice regional anaesthesia.

National Hospital for Neurology and Neurosurgery, Queen Square, Theatres and ITU

Anaesthetic Consultants: Dr I Adedugbe: iadedugbe@nhs.net and Dr L Misquita lucia.misquita1@nhs.net

On theatre days arrive at 07:45, you will receive joining instructions specific for your week

Perioperative Critical Care and outreach

- Perioperative critical care at UCLH or WMS
- Seeing "at risk" patients with the PERRT team

You are also expected to complete the Online learning module: Perioperative Risk and Safety for Med Students, in RISE. You can create an account for free yourself which allows you to access this module.

Join for the 8am handover to get an overview of the patients on the unit.
At Westmoreland Street: 1st floor Critical Care Unit, Perioperative Fellow bleep holder 2261
At UCLH – T6 PACU

PERRT – handover is in the P3 seminar room (first door on right on the Maple link corridor- opposite the Doctors' Mess) meet them for handover at 0800.

Elective Theatres at UCLH or WMS

You will be emailed details of which theatre to join.
Try to join the anaesthetic team pre-assessing their patients before theatre starts approx 0730 – find you anaesthetist mentor on the ground floor surgical reception (wms) or surgical reception Podium level 1 (uclh).

UCLH 24/7 duty Consultant phone 07944 139718
Westmoreland Duty Consultant Mobile 07908 250935

Labour Ward

You will join the anaesthetists on Labour Ward to experience obstetric anaesthesia including for elective sections and management of emergencies in obstetrics. Find the obstetric anaesthesia team in theatres level 2 Elizabeth Garrett Anderson building 0745 – Bleep 6220.

Pain

You will follow the pain team for a ½ day session for exposure to post-operative analgesia, PCAs and management of acute pain. Meet the pain team in their office 0900 , Maple Link Corridor.

Additional Activities

During your time here, we can also arrange for you to attend or spend time with the following:

CPET: Cardiopulmonary Exercise Testing in Surgical Preassessment/K-POD

- Critical Care in T3

Tutorials

Tutorials shall take place at different times during the 4 weeks with different supervisors and the details shall be emailed to you. Please prepare for discussions by looking at the materials for each in this handbook.

Regular teaching sessions

Monday	0900	Preop exercise testing intermittently all day (Pod 1 Clinic A – room A4) – call on 70162 / email ucl-tr.CPXref@nhs.net to check the times.
	1300	ICU case presentations in the ICU Seminar Room
Tuesday	0830	Journal Club ICU
Thursday	**0800**	**ICU Ward Round in Coffee Room or seminar room followed by**
	0830	**Core topics teaching ICU**
	0900	Preop exercise testing intermittently all day (Pod 1 clinic A – room A4) – call on 70162/ email ucl-tr.CPXref@nhs.net to check the times.
	0915	**Consultant Teaching Ward Round ICU**
	1230	Multidisciplinary Round ICU
	1300	'Grand Round' in the ICU Seminar Room
	1600	Ward round ICU
Friday	0800	Anaesthesia Dept Meeting (Anaesthesia Seminar Room, Maple Link Corridor)

Website:

We have a website with a section for medical students, with downloadable teaching material accessible at:

www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

If you have any suggestion for more downloadable teaching aids or changes in the SSM please do contact Rob Stephens on robcmstephens@googlemail.com - we are always looking to improve!

PRE-OPERATIVE ASSESSMENT

Learning Objectives

- Realise the importance of pre-assessment to the anaesthetist.
- An understanding as your role as a surgical FY in pre-assessment.
- The ability to recognise, investigate and refer appropriate high risk patients.

Points to cover

- Anaesthetic considerations in the history
- Fasting guidelines
- ASA grading
- Important anaesthetic considerations in the examination
- Airway assessment
- Premedication
- Relevant pre-op investigations

Web resources:

You tube Podcast:
Anaesthetic pre-operative assessment and the pre-operative visit

Key Tutorial Learning Points

- Pre-assessment by Anaesthetist establishes therapeutic relationship with the patient, and allows discussion of choices of anaesthetic technique.
- A structured approach should be adopted (applicable to all medical specialties!) with attention given to the patient's history, examination and relevant investigations.
- Particular attention should be given to taking a systems-based history with emphasis on detecting conditions which may influence the conduct of anaesthesia (espec cardio/resp/renal/GI/musculoskeletal)
- A standard physical examination forms part of all anaesthetic pre-assessment but attention should also be focused on the airway assessment.
- Investigations may include routine bloods, ECG,CXR and/or more specialised tests e.g. Echocardiogram based on patients history and physical examination.
- Overall Anaesthetic impression of patients health given by an ASA (American Society of Anaesthesiologists) grade after assessing patient.
- Airway assessment should be recorded in basic form by a Mallampati score, but more advanced assessments e.g. "Wilson's score" may be useful in those with a suspected "difficult airway".
- Fasting guidelines will generally be of the order of 6 hours for solids (includes milk) and 2 hours for clear fluids. This may be altered by delayed gastric emptying e.g, Pain, opiates, autonomic neuropathy.
- Pre-medication is less common-place nowadays but still used in cardiac surgery, paediatrics and the anxious patient. (Pre-medication may also include analgesics, pro-kinetics and antacids rather than just anxiolysis!)
- Referral for further investigations/ further assessment should be based on a patient's medical status at time of pre-assessment.

Free space for tutorial notes:

Scenario 1

Mr Tolu ALIKI a 65 year old gentleman is attending the pre-assessment clinic prior to his scheduled right inguinal hernia repair operation.
He tells you that he has high blood pressure for which he takes a 'water tablet' and that he gets short of breath after climbing 2 flights of stairs. His BP today is 170/87.
He is a lifelong smoker of 20 cigarettes a day and has a chronic productive cough. He lives alone in a flat on the 6th floor but copes independently for all his activities of daily living.
He is very keen to have this done as a day case.

Questions;

1) **Is his blood pressure adequately controlled?**
2) **What are the criteria for patients to be done as day cases?**
3) **Is he a suitable candidate for day case surgery? Why?**
4) **What would you tell him about being done as a day case?**

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Scenario 2

Mr Martin Bruce, 67 is a retired construction worker who has come in for a right total hip replacement. He has a history of chronic renal failure and has haemodialysis twice a week at his local hospital. He has hypertension secondary to his renal disease but this is well controlled on 50mg atenolol once daily.

Questions;

1) **What three preoperative investigations would you order for him and why?**
2) **Which hospital teams should be involved with his peri-operative care?**
3) **Should he have pre-operative haemodialysis?**
4) **Where should a patient like him recover post-operatively? Explain your answer.**

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AIRWAY MANAGEMENT

Learning Objectives

- Revise airway anatomy
- Be able manage an airway using simple manoeuvres and aids
- An awareness of the different equipment involved in airway management
- Understand the principles involved in endotracheal intubation

Points to cover

- Airway assessment
- Face mask ventilation
- Oropharyngeal airways
- Nasopharyngeal airways
- Laryngeal mask airways (LMA)
- Endotracheal tubes (ETT)
- Laryngoscopes
- Grades of intubation
- Difficult intubations
- Tracheostomy

Web resources:

- 'The Airway'
- 'How to insert an emergency airway'
- UCL Centre for Anaesthesia Podcast on 'Managing Airway Obstruction' on youtube

All in via: www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

Key Tutorial Learning Points

1) Mallampati score of basic airway assessment.

2) Recognition of those with likely difficult airways i.e Pre-existing conditions (Ankylosing Spondylitis, Rheumatoid disease, thyroid disease, morbid obesity) and acute conditions (facial fractures, c-spine injuries, epiglottitis.)

3) Basic airway management (head positioning, jaw thrust, chin lift)

4) Simple airway adjuncts (oropharyngeal and nasopharyngeal airways and how to size them for each patient).

5) More advanced airways i.e the Laryngeal Mask Airway (LMA) and indications/contraindications for their use.

6) Indications for endotracheal intubation (pre-existing conditions/ type of surgery/ acute conditions).

7) Grading system of laryngoscopy and relevance to future anaesthetics.

8) "Difficult" airways exist and if anticipated, meticulous planning must be used to ensure safe intubation of the airway i.e awake fibre-optic intubation.

9) A "failed intubation" drill exists and all Anaesthetists must be fully conversant with it.

Free space for tutorial notes:

Scenario 1

You are helping a Consultant anaesthetist with a 68yr old man who is scheduled to have a laparoscopic hemicolectomy under general anaesthetic.
He weighs 98kg and is 1.6m tall. He has a past history of reflux and of a duodenal ulcer for which he takes ranitidine 150mg bd. Otherwise he is fit and well. He has been appropriately starved pre-operatively.

Questions;

1) **What problems can you foresee with his airway?**
2) **What three pieces of airway equipment would you prepare for use to anaesthetise him and why?**
3) **What airway tools may be useful in maintaining a patent airway once he is asleep but not yet intubated?**
4) **What two other pieces of equipment would be useful for laparoscopic procedures? Why?**

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CONDUCT OF ANAESTHESIA

Learning Objectives

- An understanding of the principles involved in administering general anaesthesia
- An awareness of the various classes of anaesthetic drugs used
- An understanding of the equipment used

Points to cover

- Monitoring requirements
- Induction
- Rapid sequence induction
- Maintenance
- Wakening the patient
- Criteria for discharge from recovery
- Potential problems in recovery and their causes
- Post-operative nausea and vomiting causes and treatment

Web Resources

- 'Basics of Anaesthesia' at www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students
- Recommendations for standards of monitoring during Anaesthesia and recovery: 4th edition at **www.aagbi.org/publications/publications-guidelines/S/Z**
- Podcast on 'Conduct of Anaesthesia' - Youtube

Key Tutorial Learning Points

- Classes of anaesthetic drugs: Hypnotics, analgesics, muscle relaxants.
- Minimum standards of monitoring during induction of anaesthesia.
- Indications for rapid sequence induction (RSI) of anaesthesia.
- Maintenance of anaesthesia (Gaseous and intravenous).
- Depth of anaesthesia monitoring and “awareness” during anaesthesia.
- Waking the patient from anaesthesia (awake versus deep extubation and indications for both).
- Transfer to ITU for high risk/sick cases.
- Equipment for transfer to recovery and monitoring within recovery.
- Treatment of post-op nausea and vomiting (PONV) in recovery and criteria for discharge from recovery to ward.
- “Analgesic ladder” for treatment of acute post-operative pain.

Free space for tutorial notes:

Scenario 1

You are the A&E SHO on call.
Mr Nazım Yılmaz attends A&E in fast atrial fibrillation with a heart a rate of 168 bpm.
The duty medical registrar wants to attempt DC cardioversion back into sinus rhythm. You talk to the anaesthetist to arrange a general anaesthetic for this procedure.
He asks you to sort out some monitoring for the cardioversion procedure. Questions:

1) **What is purpose of monitoring this patient?**
2) **What monitoring modes would you like to commence on the patient?**
3) **What equipment would help you to achieve this?**
4) **What are the shortcomings of each of your chosen monitoring modes?**

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Scenario 2

Ms Julia Harris is a 23 year old ballet dancer who presents with a suspected ruptured ectopic pregnancy. You, the surgical SHO, are asked to assess her prior to her coming to theatre as an emergency. When you see her on the ward she looks pale, sweaty and is rather quiet. Her observations are:
BP 80/40
HR 130
SpO_2 93% on room air

The anaesthetic registrar has asked you to put an intravenous line into the patient.

Questions;

1) **What further assessment would you like to make on this patient?**
2) **What type and size IV cannula would you use in her case?**
3) **Where would you ideally place the IV cannula and why?**
4) **Name three complications that can ensue from peripheral venous cannulation. How can these be avoided?**

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Oxygen Delivery

Learning Objectives

- An understanding of the various types of oxygen delivery device, their applications and limitations.
- Revised the basic aspects of respiratory physiology and realised their relevance in clinical practice.
- Understood the causes of postoperative hypoxia and have a rationale for treating them.
- An awareness of the lung as a route of drug administration.
- An awareness of the importance of humidification, pulmonary toilet and physiotherapy in clinical practice.

Points to cover

- Different devices can be used to deliver oxygen
- Definition of hypoxia and classification
- Oxygen cascade
- Oxygen carriage by blood
- Ventilation/perfusion mismatch and shunt
- Effects of anaesthesia on oxygen cascade
- Post-operative oxygen requirement

Web Resources

- Article " Oxygen delivery and consumption".

www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

- Podcasts- 'Hypoxia' and 'ABG interpretation'

Key Tutorial Learning Points

- 4 classes of hypoxia. (Cellular/cytotoxic, anaemic, stagnant and hypoxaemic).
- Delivery and uptake of oxygen to the patient is based on basic physiological principles (oxygen cascade, ventilation/perfusion and haemoglobin uptake/delivery).
- Causes of hypoxaemia under anaesthesia(pre-existing causes and factors related to the type of surgery and anaesthesia).
- Ways of improving oxygenation under anaesthesia (increased FIO_2, effects of PEEP and increasing minute ventilation).
- Ways of giving supplemental oxygen on the ward (Venturi principles) and recognise when to refer to ITU for further ventilatory support.
- How to prescribe supplemental oxygen for ward patients.
- How to interpret respiratory failure on blood gas analysis.

Free space for tutorial notes:

Scenario 1

You are helping to anaesthetise a 36 yr old man, who is fit and active with no medical history. He is having an elective inguinal hernia repair.
He has undergone an uneventful general anaesthetic and has been stable throughout. At the end of the operation the consultant anaesthetist waits until he is awake and removes the LMA. She asks you to escort the patient to recovery.
On arrival in recovery the nurse asks you about oxygen therapy.

Questions;

1) **Why does this patient require supplementary oxygen in the recovery room?**
2) **How much oxygen would you give?**
3) **How long should he have supplemental oxygen in recovery and how would you monitor him?**
4) **What devices are available for oxygen delivery to patients in recovery?**
5) **Which device would suit him best? Why?**

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Scenario 2

You are bleeped to A&E to see an asthmatic girl. When you arrive you find the 16 yr old, Emily, looking pale, sweaty and anxious. She is extremely short of breath but she manages to tell you her name and address. The nurses have put some monitoring on her and have obtained the following values:

Pulse 120bpm **Respiratory rate 35min**
BP 140/90 **SpO_2 92%**

Questions;

1) **What other information would be helpful in assessing her?**
2) **What is your first step in her management? Why?**
3) **An arterial blood gas shows her PaO2 is 8.5 kPa. Is she hypoxaemic?**
4) **What subsequent steps in management would you institute?**
5) **How would you assess her response to therapy?**

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Scenario 3

You are asked you to see a 78 yr old lady on the ward. She was admitted two days ago with an infective exacerbation of her chronic airways disease. She is normally on home oxygen and is wheelchair bound. She has not improved with therapy so far.
You want to take a set of blood gases on this woman on 28% oxygen.

Questions;

1) **How are you going to ensure that she is breathing 28% oxygen?**
2) **Why is it important to take the blood gases at 28% oxygen?**

Her ABGs are: pH 7.39 pCO2 8.0 kPa, pO2 7.5 kPa, HCO3 34, BE +2.4.

3) **Is she hypoxaemic?**
4) **Comment on the PaCO2 and HCO3.**
5) **How much supplemental oxygen should she now have?**

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Scenario 4

Cmdr Walter Smith is a 68 yr old retired naval officer who was a heavy smoker until he stopped ten years ago. He has a permanent tracheostomy since he had a total laryngectomy seven years ago for a carcinoma.
He has been admitted with a chest infection as a result of sputum retention. He has been treated with intravenous antibiotics and supplemental oxygen via a tracheostomy mask for two days. Although he is improving the progress is slow.

Questions;

1) **Why is sputum retention a problem in this case?**
2) **What other therapeutic manoeuvres may speed up his recovery?**
3) **Why should his supplemental oxygen be humidified?**
4) **What methods are there for humidification of oxygen?**

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PERI-OP FLUID THERAPY

Learning Objectives

- Revise the basic physiology of water and electrolyte composition in adults.
- An understanding of the composition of various intravenous fluids and blood products available for use, and the rationale for their use.
- Understand the National Institute of Clinical Excellence (NICE) 5 ***Rs*** of prescribing fluid

  Resuscitation ***R***outine Maintenance
  Replacement ***R***e-distribution ***R***eassessment

- A simple rationale for prescribing fluid therapy in the peri-operative period.

Points to cover

- Normal fluid balance and distribution
- How the normal balance can be affected peri-operatively – in particular losses
- IV fluids and Blood products commonly used
- How to assess fluid balance including peri-operative acute blood loss

Website Resources

- Basics of Fluid and Analgesia
- Article: "How to do: Blood Transfusion"
- Article: "How to prescribe Fluid Therapy"
- NICE Guidance ward-based fluid guidelines algorithm 2013
- NICE Composition of Fluids
- NICE Diagram of ongoing Losses
- "Hypotension" – brief learning sheet

All found at: www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

Key Tutorial learning points:

- Distribution of fluids into intracellular and extracellular compartments.
- Understand how fluid distribution between compartments relates to “Starling’s equation” (influence of hydrostatic and oncotic pressures).
- Understand how disease states influence the distribution of fluids within compartments (heart failure, sepsis, nephritic syndromes etc).
- Understand the difference between crystalloid and colloid solutions and how to prescribe fluid therapy for the post-op patient.
- Understand indications for blood transfusion peri-operatively and hazards of transfusion.
- Understand the use of blood products such as Fresh Frozen Plasma, platelets, cryoprecipitate in the treatment of peri-operative coagulopathy.
- Understand clinical assessment of fluid balance in the peri-operative patient (BP, pulse, capillary refill, jugular venous pressure, urine output) and how to resuscitate the hypovolaemic post-op patient.
- Understand that fluid administration may be guided by invasive methods (central venous line pressure monitoring, oesophageal Doppler cardiac output assessment) in the critically ill patient.
- Understand the relationship between guided fluid administration (i.e via central venous pressure monitoring) and cardiac output**:** Starling’s law

Free space for tutorial notes:

Scenario 1

Mrs Kiran Bal has been admitted with suspected cholecystitis. She is to receive analgesia and undergo further investigations. She is to be kept nil by mouth until the investigations are complete.
She is 1.56m tall and weighs 80kg. She has no significant past medical history.

Questions;

1) **What are her estimated intra-vascular volume, extra-vascular volume and total body water?**
2) **What is her likely maintenance fluid requirement? How did you calculate it?**
3) **What type of IV fluids would be best for maintenance in her case?**
4) **Write below an appropriate fluid regime for her for the next 12 hours bearing in mind your previous answers.**

PATIENT'S NAME **PRESCRIPTIONS FOR INTRAVENOUS AND SUBCUTANEOUS INFUSIONS**

DATE	INFUSION FLUID			I.V. or S.C.	SITE OF ADMIN/ LINE No.	DRUG ADDED		PRESCRIBER'S SIGNATURE	PHAR-MACY	TIME START	TIME STOP
	STRENGTH/TYPE	VOL	DUR			APPROVED NAME	DOSE				

Scenario 2

Mr John Wilson is a 58 year old gentleman who had an elective hemicolectomy this afternoon. He is on the post-operative surgical ward but has not had any IV fluids prescribed for him. The ward sister asks you to prescribe him some postoperative fluids.

Questions;

1) **What further information you would like about this patient?**
2) **How would you estimate his likely fluid status?**
3) **What would you expect this fluid status to be and why?**
4) **Is he likely to have an electrolyte imbalance? If so, what and why?**
5) **On the chart below prescribe a regime for the next 24 hours.**

PATIENT'S NAME **PRESCRIPTIONS FOR INTRAVENOUS AND SUBCUTANEOUS INFUSIONS**

DATE	INFUSION FLUID			I.V. or S.C.	SITE OF ADMIN/ LINE No.	DRUG ADDED		PRESCRIBER'S SIGNATURE	PHAR-MACY	TIME START	TIME STOP
	STRENGTH/TYPE	VOL	DUR			APPROVED NAME	DOSE				

Scenario 3

Dr Jane Summers is brought into A&E with a massive ante-partum haemorrhage. She tells you that she woke to find the bed covered in blood. According to the paramedics she has lost at least a further 2 litres of blood in the ambulance.
As you are taking a history from her she is becomes vague and goes quiet. You can only feel very a feeble radial pulse.

Questions;

1) **What would your first step in her management be? Why?**
2) **How would you calculate her percentage blood loss?**
3) **What IV fluids would be best to immediately replace the lost volume and why?**
4) **How much fluid would you give her and how fast?**
5) **How would you ascertain whether she needs a blood transfusion?**

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Scenario 4

Mrs Rose Acorn is a 64 yr old lady, weighing 75kg, who had a total abdominal hysterectomy yesterday. Her postoperative haemoglobin (Hb) is 7.6g/dl today. Previously her Hb was 13.5g/dl. She was well preoperatively and has no specific complaints at present.

Questions;

1) **How can you estimate her blood loss?**
2) **Do you think she needs a blood transfusion? Explain your reasoning.**
3) **How would you obtain blood for transfusion if you required it?**
4) **Name two complications associated with blood transfusions.**
5) **What three precautions would you take before administering blood to any patient?**

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PAIN & ANALGESIA

Learning Objectives

- Revise the physiology and pharmacology of pain
- Understand how to prescribe effective analgesia
- Basic knowledge of acute pain management in peri-operative patients
- Understanding of your duty as a doctor in providing effective analgesia.

Points to cover

- Pain receptors
- Pain pathways
- Analgesic ladder
- Mechanism of action of paracetamol, NSAIDs, codeine, tramadol, morphine
- Mechanism of action of gabapentin, ketamine, TENS, local anaesthetics
- Side-effects of the different analgesics
- Patient-controlled analgesia
- Epidural analgesia

Web Resources

- Article: "How to prescribe Perioperative Analgesia"
- Article: "How to look after an Epidural on the Ward"
- Podcast: "Mechanism of Acute Pain"

All found in: www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students*:*

Key tutorial learning points

- Pain may be targeted at any point in afferent pathway from peripheral receptor to higher cortical centres.
- Understand basic classes of analgesics (NSAIDS, opiates, paracetamol and adjuncts i.e ketamine, amitryptiline, gabapentin).
- All analgesics have side-effects and analgesia must be tailored to the individual patient.
- An “analgesic ladder” should be considered in the post-operative treatment of pain for all surgical patients.
- Pain may also be controlled post-operatively by peripheral nerve blocks or central neuroaxial blocks (epidural or spinal injections) performed by the Anaesthetist in theatre.
- Central neuroaxial block (spinal, epidural) have contra-indications in certain patients and conditions.
- Patient-controlled analgesia (PCA) may provide an alternative form of analgesia where pain is severe or if neuroaxial block has been unavailable.
- Epidural analgesia should be monitored closely post-operatively for signs of neurological compromise which could indicate epidural abscess or haematoma, which are emergencies requiring immediate treatment.
- Any patient receiving opiate analgesia should be monitored for respiratory depression and knowledge of the administration of naloxone for respiratory opiate-sensitivity should be held by all doctors.

Free space for tutorial notes:

Scenario 1

You are reviewing patients on the post-operative ward. You are seeing Mr Roger Evans who had an appendicectomy earlier today. He is to remain nil by mouth on IV fluids for the next few days. He has no significant medical history.

Questions:

1) **What analgesia would you prescribe for him for today?**
2) **What is an analgesic ladder? How are they useful in pain management?**
3) **What analgesia would you prescribe for him on Day 3 postoperatively and why?**

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Scenario 2

Mrs Abeo Kuti , 78 yrs old, is scheduled to have a left total knee replacement for osteoarthritis. She is very worried about postoperative pain.
She already takes codydramol and 'ibuprofen' regularly. She asks you about options for post-operative pain relief.

Questions;

1) **What are Codydramol and 'ibuprofen'? How do they work?**
2) **Would these drugs be helpful in managing her post-operative pain?**
3) **What other agents and options would you tell her about for managing post-operative pain?**
4) **What are the advantages and disadvantages of each of your options?**
5) **Which options do you think would suit Mrs Kuti best?**

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Peri-operative Complications, Risk and Safety

Learning objectives:

- Understand the incidence of mortality and morbidity associated with surgery

- Recognize the importance of identifying key risk factors for post-operative complications in a patient's past medical history

- The ability to identify key opportunities to prevent post-operative complications in the patient journey

- Specific and associated complications of anaesthesia and surgery

- Understand the concept of Enhanced Recovery After Surgery (ERAS) pathways

- Understand the concept of Risk & Communicating Risk to patients (Online Course - Week 3)

- Scoring systems for risk in anaesthesia e.g. P-Possum, SORT surgery (Online Course – Week 3)

- Definition of a "Never Event" in accordance with NHS England associated with Anaesthesia and Surgery (Online Course - Week 3)

Points to Cover

- Risk factors for peri-operative haemorrhage
- Definition of oliguria and classification
- Causes of post-operative pyrexia – "the seven Cs"
- Classification of post-operative infections
- Virchow's triad and Wells Score in DVT/PE
- Effects of anaesthesia and surgery on bowel function
- Post-operative delirium
- Role of checklists in Safer Surgery
- ERAS pathway model

Web Resources

- Article "Introduction to Post-operative Complications" www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

- Online Course to be completed during Week 3: Perioperative Risk and Safety for Med Students, www.versal.com, accessed via Google Chrome browser. Passwords to course supplied: contact cfrith@doctors.org.uk if you do not receive yours by Week 3.

Free space for tutorial notes:

BASIC & ADVANCED LIFE SUPPORT

Learning Objectives

- Revise the current **Basic Life Support (BLS)** and **Advanced Life Support (ALS)** guidelines
- An understanding of the aetiology and outcome from cardio-respiratory arrest
- An understanding of the differences in BLS and ALS algorithm for adults and children
- An understanding of the use of a defibrillator
- A rationale for the use of drugs in cardio-respiratory arrest

Points to cover

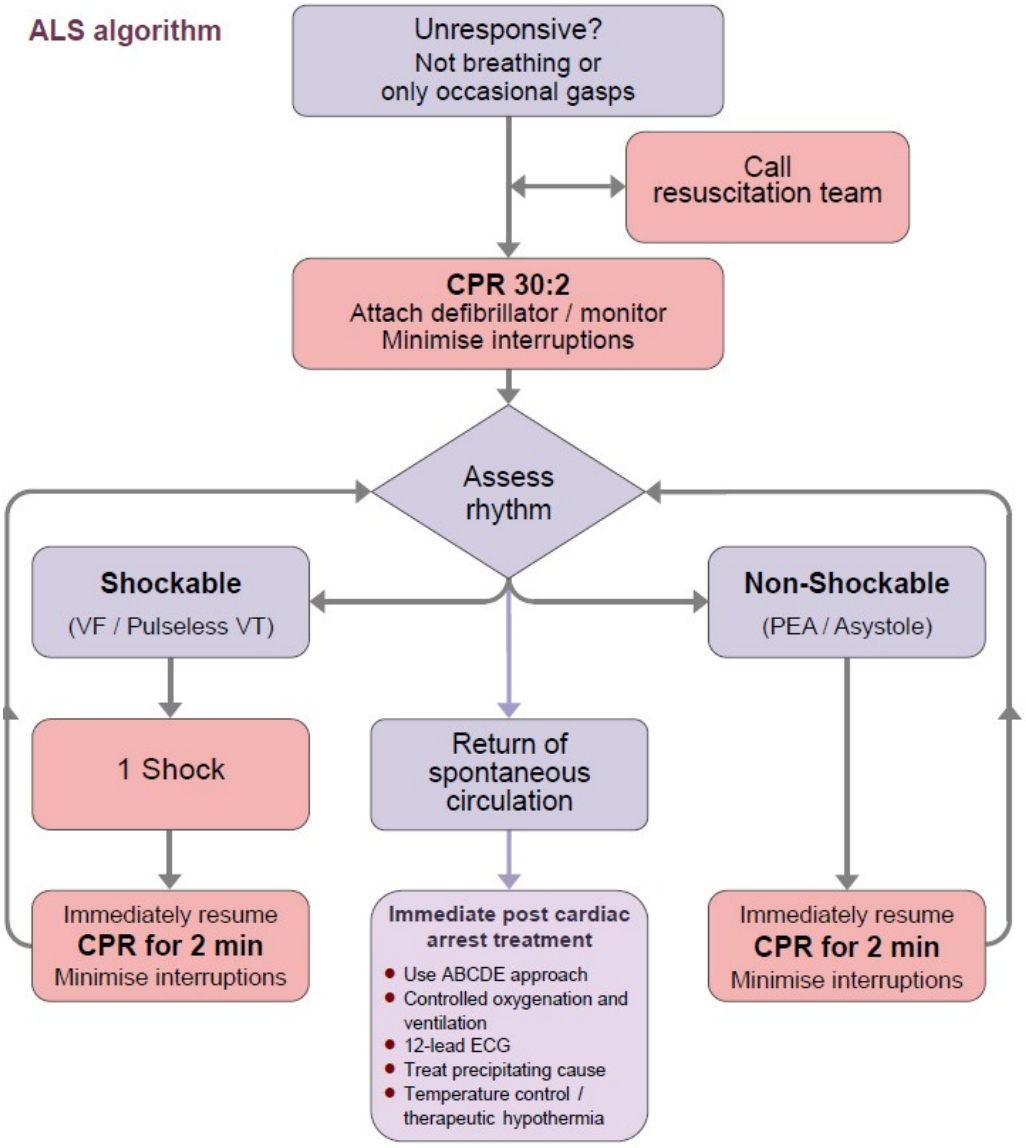
- BLS and ALS algorithms
- Paediatric resuscitation guidelines
- Reversible causes of cardiac arrest
- Anaphylaxis management
- Drugs used in resuscitation

Web resources:

- **ALS**: www.resus.org.uk/pages/als.pdf
- **BLS :** www.resus.org.uk/pages/bls.pdf
- **Paediatric BLS:** www.resus.org.uk/pages/pbls.pdf
- **Paediatric ALS:** www.resus.org.uk/pages/pals.pdf

Resuscitation Council (UK)

ALS algorithm



During CPR

- Ensure high-quality CPR: rate, depth, recoil
- Plan actions before interrupting CPR
- Give oxygen
- Consider advanced airway and capnography
- Continuous chest compressions when advanced airway in place
- Vascular access (intravenous, intraosseous)
- Give adrenaline every 3-5 min
- Correct reversible causes

Reversible Causes

- Hypoxia
- Hypovolaemia
- Hypo-/hyperkalaemia/metabolic
- Hypothermia
- Thrombosis - coronary or pulmonary
- Tamponade - cardiac
- Toxins
- Tension pneumothorax

Free space for tutorial notes:

Scenario 1

You are alone on a train platform apart from an elderly man sitting alone on a bench. Suddenly the man clutches his chest and slumps off the bench to the floor.

Questions;

1) **What should you do in the first instance?**
2) **If he shows no response to your initial action what is the next step you should take? What is the rationale for this?**
3) **What determines how long should you remain with him?**
4) **What would you ask the first helper on the scene to do?**
5) **What is the survival rate for 'out of hospital' adult cardiac arrest?**

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Scenario 2

You are outside a newsagent when a shout for help from inside the shop catches your attention. In the shop you find a young boy appears to be choking and is blue.
You can feel a pulse of around 40 bpm.

Questions:

1) **What is the first thing you will do? Why?**
2) **Is there any useful assessment you would make at this stage?**

He loses consciousness and stops breathing. You can still feel a pulse of 40 beats per minute. The shop assistant hands you the first aid box and the AED. The ambulance is three minutes away.

3) **What help would you request from the assistant and bystanders?**
4) **What information would you give to the ambulance crew when they arrive?**
5) **What further help can the ambulance crew supply on their arrival?**

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Scenario 3

You are the medical house officer on call at your hospital. Whilst on the Coronary Care Unit Mr. Cesar Frank, who you admitted last night with unstable angina, collapses. The cardiac monitor shows him to be in ventricular fibrillation and he is unrousable.

Questions:

1) **What would you do first?**
2) **What help and equipment would you ask for?**
3) **You decide to give him DC shocks. After 2 DC shocks he remains in ventricular fibrillation. What do you do next?**
4) **Would you give him any drugs? If so, which ones and why?**
5) **What are the current UK survival rates for 'in hospital', witnessed cardiac arrest?**

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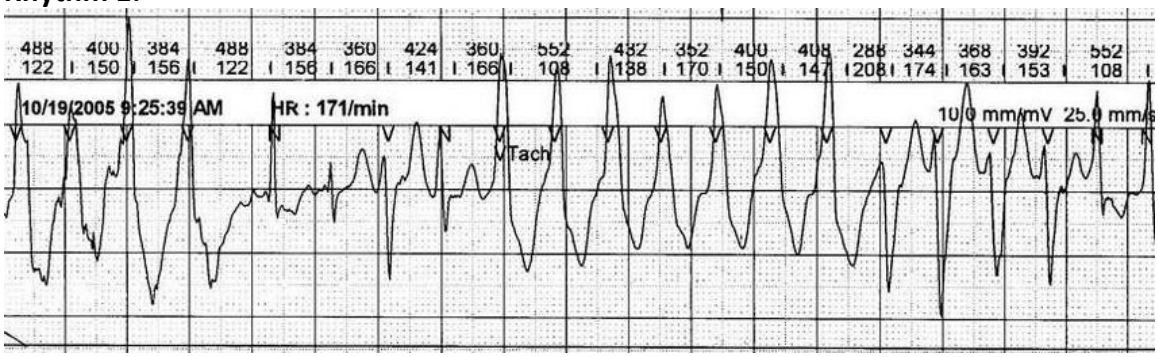
Scenario 4

You are the medical house officer on call. The cardiac arrest bleep goes off. You have been in post for 5 months and the medical registrar decides that you should lead the next arrest as practice. You are carrying out the ALS according to current protocol.
During the arrest the patient has these three rhythms.

Questions:

1) **Identify each rhythm and state how you would continue with resuscitation faced with each rhythm.**
2) **Regarding rhythm 1, what assessment would you make of the patient? Why?**
3) **Regarding rhythm 2, what drugs would you use? Why?**
4) **What investigations or assessment would you make if the patient was in rhythm 3**

Rhythm 1:



Rhythm 2:

Rhythm 3:

Scenario 5

You are attending a paediatric cardiac arrest in A&E you have had 2 attempts at peripheral intravenous canulation with no success. The 2 year old child still does not have a palpable cardiac output.

Questions:

1) **Why is it imperative to obtain venous access?**
2) **What other mode of access could you or the paediatric team attempt?**
3) **What are the risks associated with this procedure?**
4) **Can you subsequently give drugs through this route?**

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SICK PATIENT SCENARIOS

Learning Objectives

- Revise basic aspects of respiratory, renal and cardiovascular physiology
- Recognize the importance of basic physiological monitoring
- The ability to recognize unwell patients
- A stepwise approach to the management of the critically unwell patient
- Knowledge of when, how and who to refer critically ill patients to

Points to cover

- Shock
- Sepsis
- Hypoxia
- How to interpret Arterial Blood Gasses
- Glasgow Coma Score

Website Resources

- Article “recognise Critical Illness”
- Brief document: “Basics of Intensive Care”
- Brief document: “Basics of Renal failure”
- Podcast “recognising the critically ill patient’

www.ucl.ac.uk/anaesthesia/StudentsandTrainees/students

Key Tutorial learning points:

- Taking a basic history, examining the patient and requesting pertinent investigations allows identification of the critically ill patient in need of support from Intensive Care.

- Many ward patients subsequently requiring admission to ITU will have demonstrated several hours of decline in their ward observations.

- Basic physiological ward scoring systems (NEWS etc) have been devised to allow early identification of patient deterioration and subsequent referral for prompt treatment.

- ITU may provide single organ or multi-organ support for patients unable to respond to simple measures (i.e fluid resuscitation, supplemental oxygen etc) on the ward.

- Intensive Care patient management is based on a systems-based model with strict attention paid daily to patient CVS,Resp,GI,Renal,Neuro,Microbiological and pharmacological parameters.

- In addition to basic observations, patients may receive more invasive monitoring to guide therapy such as arterial blood pressure recording, central venous pressure recording and cardiac output monitoring (Oesophageal Doppler, thermodilutory measures i.e pulmonary artery catheter devices).

- Circulatory support often requires the use of inotropes and/or vasopressors and a thorough understanding of cardiac physiology and pharmacology is central to patient treatment.

Free space for tutorial notes:

Scenario 1

A woman who appears in her 40's was found on the street unconscious and brought in by an ambulance. When you see her she is lying on her back in resus. She is unkempt and smells of alcohol. She opens her eyes when you squeeze her fingernails but pulls her hand away and groans incoherently.

Her observations are, BP 140/90, P110, SpO2 96%, RR 8 and T 35.8C.

Questions:

1) **What is her Glasgow coma score? Why is this assessment relevant?**
2) **What would you do in response to having assessed her GCS?**
3) **What assessment and information would be useful to you?**
4) **What do you think is the major problem with her?**
5) **What should the next step in her management be?**

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Scenario 2

You are the surgical FY1 who is asked to see one of the post-operative patients by the nursing staff. He is a 72-year-old man who had a laparotomy for an elective resection colonic carcinoma three days ago. He remains nil by mouth and has been having IV fluids since the operation. When you see him he is drowsy and cannot remember what day it is.

His observations are; BP 80/60, Pulse 120, SaO2 94% on air, Resp 28 and Temp 38.6°C.

Questions:

1) **On this assessment, what are the main issues with this patient? Is there anything that you should do immediately?**
2) **What other information and investigations would be helpful?**
3) **What do you think is the likely diagnosis?**
4) **What is this patients' qSOFA score?**
5) **Does he have sepsis?**
6) **Where is the potential source of infection?**

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Scenario 3

You are asked to see a 62 yr old man who had an elective total knee replacement done yesterday morning. He has no urinary catheter in situ. He is bed-bound because of the operation and has therefore being using a bottle. The nursing staff are concerned because according to the 24 hr fluid chart he has only passed 68 mls of urine.

Questions;

1) **What is the 24 hour urine output expected to be in a healthy adult man?**
2) **Give three possible reasons why the charted 24 hour urine is only 68mls in this man?**
3) **What investigations would help you to find out the cause?**
4) **Does he need a catheter? Explain your reason.**
5) **How would you ensure that he has a good urine output in the subsequent 24 hours?**

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Scenario 4

You are asked to see Mrs Florence Harper, a 78-year-old woman. She has been admitted with breathing difficulty. She has been increasingly short of breath for four days and has been diagnosed with a chest infection and has started antibiotic therapy.
When you see her on the ward she looks distressed, her observations are, BP 150/90, Pulse 92, Resps 20, and Temp 36.8^{o}C.
Her arterial blood gas on air shows pH 7.36, pCO2 4.5kPa, pO2 7.8kPa, Bicarb 34, BE 2.0

Questions:

1) **Is Mrs. Harper hypoxic? Explain your answer.**
2) **What should your first intervention be? Why?**
3) **Are there any further investigations you would ask for?**
4) **How could you assess if your intervention was making an improvement in her condition?**
5) **Does she need ventilatory assistance at this stage? To whom should she be referred? How?**

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Things to do in theatre that will make you a more confident and competent Medical student AND ….FY1.

There are lots of opportunities during cases in theatre for you to learn/practice some skills that will be invaluable for you in finals and make you a better FY1!

- DO ask to perform **cannulations** on **asleep patients**. There is no better time to learn this essential skill before you find yourself on call as a FY1 .
- If the patient requires **urinary catheterization** do take this opportunity to learn (get patient **consent** first!).
- Look at the different types of IV cannulae, their gauge and maximum flow rates (has been asked in finals).
- Discuss **blood gas** results and define respiratory and metabolic acidoses/alkaloses.
- Look at common **IV fluids** given in theatre and discuss the constituents of crystalloids and colloids with the Anaesthetist.
- Discuss with the Anaesthetist how **blood** is prescribed and administered and how it is requested in emergency situations.
- Fill in a **routine prescription** chart for the ward. Go through prescribing a sliding scale for **insulin** and how to prescribe **warfarin** and antibiotics (which would need monitoring of levels such as Gentamicin).
- Discuss prescription of "**maintenance" fluids** for a ward patient and what fluids to prescribe for "**fluid resuscitation**".
- Discuss **DVT prophylaxis** for the surgical patient and prescribe it on the drug chart where appropriate
- Set up **monitoring** for transfer of a critical patient and practice transferring patients to recovery.
- Discuss prescription of post-op **oxygen** for the surgical patient. Relate oxygen prescription to pre-existing conditions i.e COPD. Look at different devices (i.e Venturi masks) for giving oxygen.
- Prescribe post-operative **analgesia** and discuss the "pain ladder" of analgesic prescription.

PROCEDURES CHECKLIST

Procedure	Seen	Done	Supervised by
Airway manoeuvres/maintenance.			
Bag valve mask ventilation			
Insertion Guedel airway			
Insertion nasopharyngeal airway			
Insertion LMA			
Oral tracheal intubation			
Nasal intubation			
Fibre-optic intubation			
Rapid-sequence induction			
Insertion NG tube			
IV cannulation: 22G 20G 18G 16G 14G			
Arterial line			
Central line			
Run through fluid giving set			
Preparation IV drugs			
Preparation IV drug infusions			
Attach and start monitoring pre-induction			
Aseptic technique for procedures			
Pre-op assessment			
Spinal anaesthetic			
Epidural			
Nerve block			
WHO checklist			
Cardiac output monitoring			
Intra-hospital patient transfer			
Cardiac arrest			

ATTENDANCE CHECKLIST

Week 1	Location	Supervisor signature
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Week 2	Location	Supervisor signature
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Week 3	Location	Supervisor signature
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Week 4	Location	Supervisor signature
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Tutorial	Date attended
Pre-op Assessment	
Airway Management	
Conduct of Anaesthesia	
Peri-op Fluid Therapy	
Oxygen Delivery	
Pain and Analgesia	
Peri-operative Complications	
Basic and Advanced Life Support	
Sick Patient Scenarios	

CASE BASED DISCUSSION

Student Name:

Module:
Date:
Assessor Grade: Cons SpR Trust Grade SHO PRHO

Setting: OP Clinic IP A&E GP session

Patient: Age: Sex: M F

Please use the marking guide to help with your assessment

	Below expected standard (tick)		Achieving expected standard (tick)		Exceeding expected standard (tick)		
Domain	**1**	**2**	**3**	**4**	**5**	**6**	Not assessed
History							
Examination							
Diagnosis and Management							
Overall clinical judgement							
Insight into aspect(s) of case							
Record keeping							

Total Mark:

Points of good performance:

Points for action: (please indicate specific problems if assigning a mark of 1-2)

Signed: Assessor Student

By signing this form, the assessor affirms that the student has been given feedback and the student agrees that he/she agrees with the result of the assessment and the feedback given.

	1	2	3	4	5	6
History	Very deficient in content	Lacking in detail	Systematic. Few omissions	Good.All aspects complete	Very good detail	Superb and completely accurate
Examination	Unable to elicit or describe any findings	Unable to elicit or describe many aspects. Many omissions	Relevant examination performed but with few omissions	Good examination with good understanding	Very good and able to discuss meaning of abnormality easily	Excellent. Complete understanding of the examination
Diagnosis / management	No attempt made	Only limited diagnosis, differential or management	Adequate. Identifies major probably diagnoses and management	Good. Identifies most probably diagnoses and management	Very good. Identifies all probably diagnoses and management	Excellent. Identifies all probable diagnoses and management with complete understanding
Overall judgement	No understanding of patient's diagnosis or problems	Limited understanding of patient's diagnosis or problems	Reasonable understanding of patient's diagnosis or problems	Good understanding of patient's diagnosis or problems	Very good understanding of patient's diagnosis or problems	Complete understanding of patient's diagnosis or problems
Insight / reflection	No reflection undertaken	Reflective aspect considered very briefly	Able to discuss a reflective aspect	Good insight into a reflective aspect of care	Detailed insight into a reflective aspect of care	Comprehensive and profound insight into a reflective aspect of care
Record keeping	Deficient in content with many omissions or illegible	Lacking in detail. Not systematic	Covers main pints and no major omissions	Good detail and no omissions	Very well recorded and clearly above average	Superb, excellent and comprehensive

FEEDBACK FORM

Please fill in our feedback form at
https://forms.gle/fqmxh5to63Mp9Xin9