

**Dear Students,**

**Welcome to MedVault!**

Prepare for a jam-packed weekend of high quality, interactive talks designed to refine and perfect your understanding of over 16 core medical and surgical topics. Our aim is that every piece of information delivered this weekend will be highly relevant not only to succeeding at your exams, but also in preparing you to become a skilled, safe medical practitioner.

The course is designed to be as interactive as possible, with each talk supplemented by a section in the workbook. Please make notes, diagrams, and answer any questions in the workbook as much as possible during the sessions. We want you to make the workbook yours! Some of the questions this weekend will challenge you, so please discuss the answers with each other – many brains are better than one!

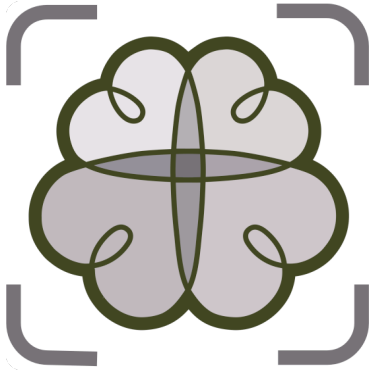
Finally, we are more than happy to answer any questions but due to our tight schedule please save them and ask us during the coffee breaks. If you have a question, the chances are someone else will be thinking exactly the same thing; we will collate and email the answers to all of you after the course.

We hope you have a fantastic weekend,

Chris and Andy

Please note: Filming or recording any part of this course is prohibited. Please turn your phones on silent!

Disclaimer: All information contained within this workbook is owned by MedVault Education and is not to be copied or used without our permission. Whilst we have made every effort to ensure that the content within this workbook is accurate and up to date, we recommend that you verify any information such as drugs doses, procedures and medical content as described in this book. MedVault Education and its contributors do not assume liability for injury and/or damage to persons or property arising from any error or omission from this workbook.



# MedVault

lock in your knowledge

## ABOUT US

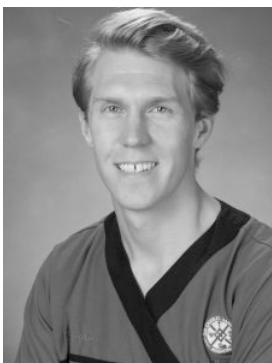


### **DR CHRISTOPHER MOSELEY BM BSc (Hons)**

Chris is an advanced trainee with the Australasian College of Emergency Medicine and is currently working as an Emergency Department Registrar at Sir Charles Gairdner Hospital, Perth.

After completing his training at the University of Southampton (UK), he became involved in medical student teaching. Since this time, he has directed a number of successful revision courses for medical students. He has developed a special interest in OSCE assessments and is an author with the popular textbook series 'Unofficial guide to OSCEs'. He is now involved in both the writing and examination of clinical stations for medical finals.

His background in teaching started prior to medicine as a senior sailing instructor with the Royal Yachting Association. In his free time, you will find him kitesurfing somewhere along the WA coast.



### **DR ANDREW JAMES STEVAL MBBS MRCS**

Andy completed his medical degree at the University of Newcastle upon Tyne (UK) before moving to London in 2011 to undertake his residency. He is now working full time at Sir Charles Gairdner Hospital, Perth as an Advanced Trainee of the Australasian College of Emergency Medicine.

After surviving a particularly dull lecture on the 26 types of glomerulonephropathies, Andy was inspired to join Chris in the founding of MedVault Education. Together they vowed to create high quality, interactive and engaging presentations to help prepare students for their medical final exams.

During his free time you can find Andy surfing at the beaches of Perth, and failing to grow vegetables in his garden at home.



## THANKS

We would like to say a big thank you to all those who have helped to make this course happen, including the guest speakers, our sponsors, Cobs popcorn for the yummy snacks and our long-suffering partners, Tegan and Jen.

A special thank you to Dr Mike Cadogan (of *Life in the Fast Lane* fame). Not only has he dedicated many hours creating our website but he has also been a mentor throughout the process of setting up MedVault Education.



## GUEST SPEAKERS



### Dr David Hudson

Born in Geraldton, Dave moved to Perth to study Public Health before gaining his MBBS through the University of Western Australia. He is currently working as a General Surgical Registrar at Sir Charles Gairdner Hospital and has a keen interest in colorectal surgery. Dave believes that the sharing of knowledge is the key to the progression and development of safe and effective health care. He is also the proud father of an eight month old boy.



### Dr Fergus Morris

Fergus studied Medicine at the University of Birmingham (UK) where he developed a keen interest in providing memorable and interactive learning opportunities for others. He graduated in 2012 and is currently working as an Emergency Department Registrar at Sir Charles Gairdner Hospital. In his spare time, he enjoys tennis, kitesurfing and wake boarding (with varying degrees of success).



### Dr Kelsey Sweeney

Kelsey graduated from The University of Life (just kidding - Notre Dame University, Fremantle). She is currently working as an Obstetrics and Gynecology RMO at King Edward Memorial Hospital, Perth. She has a passion for rural and remote health, and hopes one day to improve the health of those who have poorer access to health services in the country. She enjoys surfing small waves in Cottesloe on her longboard.

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## RESPIRATORY MEDICINE

“Remember, patients with complex esoteric problems’ still present with common symptoms, and your learning should focus on, for example, a problem solving approach, reasoning, or communication and not the details of a rare condition. Depending on where you plan to work in the future, the necessity for that knowledge will come later.” – UWA syllabus.

### EXAMINATION

- Inspect, Palpate, Percuss and Auscultate.
- Most of your marks will come from the first 3 of these.
- BUT try to spend adequate time auscultating as this will probably give you the diagnosis.

#### End of the bed exam

- Clues from the bedside: oxygen masks, inhalers, sputum pots.
- Nature of breathing: any increased work of breathing, use of accessory muscles, cough.

#### Hands:

- Feel and look for clubbing, nicotine staining, peripheral cyanosis, muscle wasting.
- Estimate pulse rate and respiratory rate (simultaneously).
- Ask the patient to hold their hands out in front (tremor from bronchodilators). Now cock the wrists back to look for CO<sub>2</sub> retention flap.



#### Common causes of clubbing

- **Chronic lung disease:** Interstitial lung disease, Lung cancer, Mesothelioma
- **Cardiovascular disease:** Cyanotic congenital heart disease, infective endocarditis
- **Diseases of malabsorption:** Inflammatory bowel disease, Cirrhosis, Cystic Fibrosis

#### Face

- Look for pallor of the conjunctiva, ptosis/pupillary constriction (Horner’s syndrome).
- Central cyanosis of the lips.



#### Horner’s Syndrome

- Compression of the sympathetic plexus within the thorax (often secondary to a Pancoast lung tumour)
- Ipsilateral pupillary constriction, Ptosis, anhidrosis
- May be associated with hand muscle wasting if brachial plexus is also affected (T1 root lesion)

## Neck

- Look for elevated JVP (signs of CCF/Cor pulmonale).

## Chest (All of these steps front and back)

### Observation:

- Expose the entire chest - Inspect for symmetrical chest wall movement, use of accessory muscles, any scars, skin changes.

### Palpation:

- *Look* for any tracheal deviation and palpate for position and tracheal tug.
- *Palpate* for the Apex beat (front only!).
- Palpate for symmetrical chest wall expansion.
- Tactile vocal fremitus – I wouldn't bother (unreliable, difficult to perform well).

#### Tracheal deviation



- Almost always pushed towards the lesion (upper lobe collapse, fibrosis, pneumonectomy).
- Only pushed away in tension pneumothorax or massive pleural effusion (unlikely in your OSCE!).

### Percussion – don't forget the lung apices

#### Percussion Notes



- Normal lung will be resonant.
- Dull percussion: Pleural effusion, collapse, consolidation.
- Hyper resonant: Severe COPD or pneumothorax.

## Auscultation

- Vocal Resonance: Ask the patient to say '99' whilst auscultating the chest again.
- Increased resonance suggests areas of increased tissue density (collapse, consolidation).

#### Breath Sounds



- **Bronchial breath sounds** can be heard in normal people by auscultating over the trachea (for practice)
- If heard over the lung this indicates loss of noise filtering by alveoli (lung consolidation, fibrosis, collapse)
- **Wheeze** suggests asthma, COPD or pulmonary oedema
- **Crackles:** Early inspiratory crackles may suggest COPD
- Fine, late inspiratory crackles are likely to be caused by interstitial lung disease (a common favourite in the OSCE)
- Coarse crackles may be caused by bronchiectasis, pneumonia or pulmonary oedema

## Sit the patient forward

- Feel for lymphadenopathy (infection, malignancy) .
- Perform the chest component of the exam again on the posterior aspect of the chest.

## PITFALLS OF THE RESPIRATORY EXAM

- Spending too long examining for peripheral stigmata of disease and failing to complete the chest component of the examination, front AND back.
- Worrying too much about nailing the diagnosis (realistically only worth several marks).
- Forgetting your Banker Points (washing hands, introducing self, exposing patient with permission etc.).
- Stressing about accurately measuring the pulse or respiratory rate – Just comment on these if they are obviously fast or slow.

## CXR INTERPRETATION

- Lots of mnemonics out there, just find one that works for you.
- Get the easy points quickly (details, film adequacy).
- Then state *the most obvious abnormality* before applying your systematic approach.

### DR ABC

#### Details

#### RIPE

- Rotation
- Inspiration
- Picture
- Exposure

*THE MOST OBVIOUS ABNORMALITY IS...*

#### Airway

#### Breathing and Bones

#### Circulation

## OBSTRUCTIVE AIRWAYS DISEASE: COPD/ASTHMA

- The **Big Dogs** of respiratory – Why? Because these diseases are *common*, and management can be both *acute* and *chronic*.
- If you don't know this stuff back to front but can reel off 20 causes of Sarcoidosis whilst simultaneously detecting a 6<sup>th</sup> added heart sound you *deserve to fail*.

- Both conditions present acutely with SOB, wheeze, reduced FEV1/FEV ratio but there are some important differences:

| Characteristic           | Asthma                        | COPD                      |
|--------------------------|-------------------------------|---------------------------|
| <b>Age at onset</b>      | Young                         | Older, usually >40        |
| <b>Smoking history</b>   | Possible                      | Usually >10 pack years    |
| <b>Allergies</b>         | Common                        | Infrequent                |
| <b>Clinical course</b>   | Relapsing/remitting           | Progressive and worsening |
| <b>Sputum production</b> | Usually absent                | Common                    |
| <b>Spirometry</b>        | Often normalises with therapy | Absence of reversibility  |

### Case Number 1.)

- *What is your immediate management?*
- *What is the most likely diagnosis?*
- *Suggest two other possible differentials*

#### QUIZ BREAK –ABG Interpretation

1.) Please interpret the following ABG:

**pH 7.12 (7.35-7.45)**  
**PaCO<sub>2</sub> 86.8 mmHg (35-45)**  
**PaO<sub>2</sub> 57.7 mmHg (80-100)**  
**Hb 90 g/L**  
**satO<sub>2</sub> 87%**  
**cHCO<sub>3</sub> 29.8 mmol/L (22-26)**

2.) Please interpret the following ABG:

**pH 7.25 (7.35-7.45)**  
**PaCO<sub>2</sub> 20.5 mmHg (35-45)**  
**PaO<sub>2</sub> 130 mmHg (80-100)**  
**Hb 120 g/L**  
**satO<sub>2</sub> 99%**  
**cHCO<sub>3</sub> 16 mmol/L (22-26)**





## COPD

A combination of:

1. Chronic Bronchitis - airway obstruction from damage to small bronchi and bronchioles. (Causing wheeze, increased mucous production, cough)
2. Emphysema – Destruction of alveoli with subsequent hypoxaemia and hypercarbia.

### The COPD OSCE classic:

- A 60 year old male who smokes, with a history of increased SOB, cough, sputum production and reduced exercise tolerance.

### Clinical signs:

- Nicotine staining
- Clubbed fingers
- Barrel-shaped chest (hyper-expansion)
- Reduced chest wall expansion
- Hyper-resonant percussion
- Reduced breath sounds throughout +/- early inspiratory crackles.

### Management in the acute setting

- Assessment of severity: **ABCD**
- **Investigations** (*always* simple bedside tests, blood tests, imaging, special tests)
  - Vital signs, ECG, U&Es/FBC, ABG, Blood cultures, CXR, Spirometry, sputum culture
- **Treatment** (escalate depending on severity):
  1. Oxygen to maintain saturations between 88-92% (especially if CO<sub>2</sub> retaining)
  2. Inhaled/nebulised bronchodilators: Salbutamol and Ipratropium
  3. Corticosteroids: Oral prednisolone or IV hydrocortisone
  4. Consider antibiotics if signs of concurrent infection
  5. Non-invasive ventilation (CPAP/BIPAP)
  6. ICU support: intubation and ventilation

## ASTHMA

- Usually an immune mediated disease (IgE), resulting in abnormal release of inflammatory cells into airways.
- Airway inflammation causes bronchoconstriction, increased bronchial wall secretions.
- Although reversible in the early stages, severe disease will cause progressive airway remodelling and irreversible changes to lung function.

### The Barn-Door Asthma OSCE Classic:

- A 22 year-old lady presents with severe SOB and wheeze. Background of dry cough mainly at night, and SOB on exercise. Recent viral illness. Has 3 cats at home who

| Severity                              | Clinical signs   |
|---------------------------------------|--|
| <b>Moderate</b>                       | PEF > 50-75% best or predicted<br>No features of severe asthma   |
| <b>Severe</b>                         | PEF 33-50%<br>RR > 25<br>HR > 110<br>Inability to complete sentences in one breath   |
| <b>Life-threatening (33-92-CHEST)</b> | < <b>33%</b> (PEF)<br>< <b>92%</b> (Sats)<br>Cyanosis<br>Hypotension<br>Exhaustion<br>Silent chest<br>Tachycardia/bradycardia (arrhythmia) |
| <b>Near fatal</b>                     | Rising PaCO <sub>2</sub>   |

enjoy rolling around on her thick-pile carpet from Harvey Norman.

### Stepwise approach to ABG interpretation

1. **Oxygenation** – what is the PO<sub>2</sub>. Normal 80-100mmHg
  2. Determine the **respiratory component (PaCO<sub>2</sub>)**. (Normal PaCO<sub>2</sub> 35-45 mmHg)
  3. **PH** - Is the patient acidotic (PH<7.35) or alkalotic (PH>7.45)
  4. Determine the **metabolic component (HCO<sub>3</sub><sup>-</sup>)**. Normal 22-26mmol/L
  5. Other clues for **bonus points** (haemoglobin, renal function, potassium etc.).
- Example: If the patient is acidotic with a high PaCO<sub>2</sub> and normal bicarbonate, this is a *primary respiratory acidosis*.
  - If the bicarbonate is raised, this indicates *metabolic compensation*.
  - If the bicarbonate is low, there is a *mixed metabolic/respiratory acidosis*.