



For Doctors, For Patients

# SMA HOUSE OFFICER'S HANDBOOK



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## Foreword

Greetings to all House Officers!

This handbook was pioneered in 1998 by Dr Gregory Leong Goh Han as a tool to ease the transition from a medical student into the role of a House Officer. Housemanship is probably the toughest phase in one's medical career as the expectations and demands (from medical staff and patients) escalate steeply. It is also a physically and mentally exhausting stage of life, a constant struggle between work, family, and self-care.

Creating a generic House Officer's Handbook aims to provide an orientation of the roles and duties of a House Officer and to equip oneself with practical tips on daily work and call duties. Setting a common platform helps to streamline the student-internship experiences of graduates from the 3 local medical schools and international medical graduates. The content is relevant to all specialties and will complement the respective departmental handbooks.

2020-2022 has been an unprecedented period with the COVID-19 pandemic stressing healthcare systems worldwide. Even the Secretary-General of the United Nations described this as the worst humanity crisis since World War II. Yet silently in the background, our house officers have continued their duty of care to our ward patients, arranging their scans and procedures, allaying the anxieties of family members, working with our nursing and allied health colleagues, and prescribing relief for those in suffering. Without our house officers and the work that they do (much of which goes under-recognised), our healthcare system would almost certainly fall apart.

It is with this group of hardworking individuals in mind that I present to you the latest edition of the **SMA House Officer's Handbook**. Many thanks to the team from the SMA Doctors-in-Training Committee for their help in reviewing and updating the content of this resource – Dr Calvin Tjio, Dr Lisa Ngiam, Dr Haidah Kamal, Dr Jonathan Pong, Mr Huang Yuxuan, and Mr Hafez Zanjani.

Once again, congratulations on passing your final medical examinations and obtaining your license to practice. We wish you every success in your medical journey, and look forward to working with you on the battlefield (in the wards)!

**DR IVAN LOW**

**Chairperson**

**SMA Doctors-in-Training Committee**

**Singapore Medical Association**

# 1. Introduction to Life in Singapore's Hospitals

While the system is largely similar across Sponsoring Institutions (SIs) and specialties, there will always be subtle differences to take note of.

## a) **The Hierarchy**

- i) **House Officer (HO) – You:** The main person on the ground! Look after your team/ward's patients and try to know them well as you're often the first person to be approached by nurses, pharmacists, allied health professionals, etc regarding patients. Besides that, it is also your role to coordinate and facilitate discharge matters, with the help of nurses and medical social workers if necessary.
- ii) **Medical officer (MO):** They may be in charge of their own patients or oversee the team's patients depending on the specialty.
- iii) **Registrar:** The small boss who knows all the patients and leads the round.
- iv) **Consultant/ Senior Consultant/ Professor:** The big boss.

## b) **Team-Based vs Ward-Based Systems**

The system structure depends on your specialty and hospital, though the hierarchy still applies in both team and ward based systems.

- i) Team-based systems: Your team stays together for a month or longer. Patients are assigned to your team and they stay with you until they get discharged or transferred to other providers. Hence you tend to have patients in different locations and wards. E.g. SGH DIM, CGH IM, GS in all hospitals.
- ii) Ward-based systems: You are assigned to cover almost all the patients of a certain ward for a specific duration of time. You can be dispatched to other wards for day(s) depending on manpower needs. The coverage can be further divided into morning and afternoon coverage, which may differ across institutions. E.g. KKH O&G/ Paediatrics, General Medicine in most hospitals.

## c) **Administrative Matters**

- i) Most department secretaries will send you a welcome email, with administrative details, nearing the time you are scheduled to begin the posting.
- ii) You should also receive a roster indicating which teams and wards you are posted to.

- iii) You can check with your fellow HOs who have been in the department prior for essential tips about the department, how the teams work and how the call system functions. You can also contact your MOs who would be able to add you to the team Whatsapp/ TigerText chat group.
- iv) In accordance with the Personal Data Protection Act 2012 (PDPA), MOH has mandated for all healthcare staff to use **TigerText** when communicating and sharing confidential information. Instructions will be given on how to download this mobile application when you start work.
- v) Changeover dates are when everyone changes to different teams. HOs tend to have different changeover dates from MOs, registrars and consultants so as to facilitate the handover process. This change in teams usually happens once a month.
- vi) Many departments have an orientation programme for new HOs which may or may not be after your morning duties.
- vii) You will also need to collect essential items such as your name tag, name chop and access pass.

## 2. Day to Day Work

### a) Pre-rounds

Objective: Review the patient with the following items before the actual rounds.

- i) Vitals and input/output chart
- ii) Investigation results and medication chart
- iii) Any overnight events
- iv) In General Surgery/ Orthopaedics, part of your pre-round duties involves updating the **team list**:

- This is a list containing all the patients under your team and their location, issues, results and management plans. Please ensure that the patient identifiers have been removed, prior to printing, to avoid problems when you inevitably lose the list.
- It is extremely important to prepare and print out sufficient copies in time for morning rounds (yourself, MO, registrar, consultant).
- The list is usually updated twice daily, and is typically available on the central server i.e. C drive.

Medical Specialty	Surgical Specialty
<u>6.30am (Pre-round):</u> Review past medical history, history recorded on admission, investigations and vital signs, input/output charting. All these are to be charted and synthesised on a clerking sheet. Review the patient and take a complete history and physical examination.	<u>6.30am (Pre-round):</u> Locate all the patients under your team in the hospital; ensure that the locations are accurate. Review past medical history, investigations and vital signs. These are to be compiled for all patients onto the team list. Unless the patient is acutely sick, you may not need to review the patient just yet.
<u>8am (Rounds):</u> Registrar or consultant will review the patient with you. You are to present the complete history, physical examination and background that you had done earlier.	<u>7.30am (Rounds):</u> Team registrars and consultants will arrive to review each patient with you. You should try to take a brief history from each patient if time permits.
Ensure privacy for the patient during examination by drawing the curtains around the bed. Prepare the computer on wheels (COW) and any other materials necessary for physical examination such as gloves and tendon tappers. It is important to document according to the SOAP format and any important conversation that has been made with the patient. ( <i>Refer to table on page 7.</i> )	

Time to do changes: Urgent changes must be prioritised; discharges and referrals to be made before lunchtime. Then proceed to do non-urgent changes and trace results to prepare for exit rounds in the afternoon. (Refer to “Changes” and “Referrals” on page 9-11.)

After exit rounds, note which patients are sick and will need to be highlighted via a handover to your colleague who will be on call. (Refer to “Handovers” on page 24-25.)

Most teams prefer to use the SOAP format to organise documentation during rounds. The suggested SOAP format for daily ward round documentation is as such:

Ward Round SOAP Format	Example
Seen by:	<i>S/b Dr Lim (Consultant/ Registrar)</i>
Medications: - No. of days of significant medication (e.g. antibiotic)	<i>Medications: D3 IV Tazocin</i>
S (Subjective/Situation): - Background of admission - Overnight events - Patient’s complaints	<i>S:</i> - <i>82 year old male admitted for left sided weakness</i> - <i>Started having chest pain overnight at 1am</i> - <i>Patient was kept nil by mouth and started on intravenous drip overnight</i> - <i>Patient complained of worsening breathlessness for the past 1 hour</i>
O (Objective): - Vital signs - Physical examination - Bedside results	<i>O:</i> <i>(Vital signs)</i> - <i>Afebrile</i> - <i>HR 120bpm</i> - <i>BP 90/60mmHg</i> - <i>RR 24bpm</i> - <i>SpO2 95% on 2L NP</i> - <i>Input oral 500ml, drip 1000ml</i> - <i>Output urine 500ml, bowel 3 times</i> - <i>Net balance: +1000ml</i>  <i>(Examination)</i> - <i>Alert but tachypnoeic</i> - <i>Use of accessory muscles</i>



<p>A (Assessment):</p> <ul style="list-style-type: none"> <li>- Differential diagnosis/ Impression</li> </ul> <p>P (Plan):</p> <ul style="list-style-type: none"> <li>- Investigations</li> <li>- Medication/ Intervention</li> <li>- Monitoring</li> <li>- Referral</li> <li>- Others</li> </ul>	<ul style="list-style-type: none"> <li>- <i>Well-hydrated, well-perfused</i></li> <li>- <i>Heart S1S2, no murmur</i></li> <li>- <i>JVP elevated 6cm from sternal angle</i></li> <li>- <i>Lungs bibasal crepitations</i></li> <li>- <i>Abdo not distended, soft, non-tender, no mass</i></li> <li>- <i>Calves supple, nil oedema</i></li> <li>- <i>Drip in situ</i></li> </ul> <p><i>(Investigations)</i></p> <ul style="list-style-type: none"> <li>- <i>CBG 3.5mmol</i></li> </ul> <p>A:</p> <ol style="list-style-type: none"> <li>1) <i>Stroke</i></li> <li>2) <i>Hospital-associated pneumonia (resolved)</i></li> <li>3) <i>Discharge issues</i></li> <li>4) <i>New onset SOB for investigation – TRO ACS with fluid overload vs worsening pneumonia</i></li> </ol> <p>P:</p> <p><i>(Investigation)</i></p> <ul style="list-style-type: none"> <li>- <i>FBC, renal panel, CRP, cardiac enzymes x 3 sets, arterial blood gas</i></li> <li>- <i>ECG</i></li> <li>- <i>CXR</i></li> </ul> <p><i>(Medication/Intervention)</i></p> <ul style="list-style-type: none"> <li>- <i>Hold IV drip</i></li> <li>- <i>Keep NBM</i></li> <li>- <i>Continue IV Tazocin</i></li> </ul> <p><i>(Monitoring)</i></p> <ul style="list-style-type: none"> <li>- <i>Q2H Vitals + SpO2</i></li> <li>- <i>Strict input/ output chart</i></li> </ul> <p><i>(Monitoring)</i></p> <ul style="list-style-type: none"> <li>- <i>Q2H Vitals + SpO2</i></li> <li>- <i>Strict input/ output chart</i></li> </ul> <p><i>(Referral)</i></p> <ul style="list-style-type: none"> <li>- <i>Refer to cardiology for possible acute myocardial infarction</i></li> </ul> <p><i>(Others)</i></p> <ul style="list-style-type: none"> <li>- <i>Family conference at 2pm</i></li> </ul>
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## b) Rounds

- i) The duration of each round varies depending on the registrar and consultant in charge. As a HO, you can expedite rounds by:
  - Ensuring the computer has displayed all the results, relevant imaging required and blue letter replies.
  - Knowing the patients under your care well so that you are prepared to answer any questions from the registrar and consultant e.g. pertinent results.
- ii) Review vitals, IOs and new results where indicated.
- iii) Present the cases
  - New cases (i.e. patients admitted overnight on call): know their presenting complaint, background (e.g. past medical history, medications list), physical findings, preliminary investigations and impression, and initial plan.
  - Old cases: any overnight events, new results, new complaints and physical findings, and plan for the day.
- iv) Be prepared to answer questions as some senior doctors enjoy teaching during rounds, especially if medical students are around.
- v) Document any decisions, instructions, important history or physical findings in the notes.
- vi) Document any conversations with patient and/ or family members during the rounds too.

## c) Changes

As a HO, you may be expected to do many things after rounds. Hence, it is important to prioritise urgent changes first. In general, the order goes like this:

Urgent Changes	Passive Changes
<ul style="list-style-type: none"><li>• Definition: Things that your registrar and consultant asks you to do <b>NOW</b>. It can even be done during the rounds.</li></ul>	<ul style="list-style-type: none"><li>• Calling the laboratory for urgent results that will affect the management of the patient.</li></ul>

<ul style="list-style-type: none"> <li>• Urgent scans or referrals: You will need to call the radiologist or specialist on call, and get it arranged as soon as possible. You need to know the indication for the scan or referral, with relevant history and investigations. (<i>Refer to “Requesting for Urgent Radiological Investigations” on pages 20-22</i>).</li> <li>• Referrals: Different hospitals have different cut off times for referrals, but the general rule is that referrals should be made before 11.30am on the same day.</li> <li>• Discharges: Different hospitals also have different cut off timings for discharges, but once again, discharges in the morning should be done by noon/ lunchtime.</li> </ul>	<ul style="list-style-type: none"> <li>• Taking blood, setting IV plugs, ordering medications, removing drains and inserting indwelling urinary catheter (IDC).</li> <li>• Tracing up on results on the system and highlighting any abnormalities to your seniors.</li> <li>• Updating family and assessing for potential social or discharge difficulties.</li> <li>• Evening discharges, usually to be done by 5pm.</li> <li>• Applications for Agency for Integrated Care (AIC) subsidies.</li> <li>• Pre-discharges, tracing old notes and past medical history.</li> </ul>
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#### d) Referrals

- i) You would frequently have to call the registrar on call or the blue letter Reg that you will be referring to. Hence, the blue letter should summarise your thoughts and the case well so as to help you when presenting and referring to the registrar.
- ii) You could ask your senior what is the main purpose of the referral and clarify if in doubt, such as what are the important negative examination findings to highlight.

Referral Letter Format	Example
From: Name/Specialty To: Name/Specialty  Reason of referral: - Identify the main reason(s) for the consult.  Summarised history: - Biodata	<i>From: A/Prof John Tan (General Medicine)</i> <i>To: Prof Louis Tay (Neurology)</i>  <i>Reason of referral:</i> - <i>Management of newly diagnosed stroke</i>  <i>Summarised history:</i> - <i>Mr David Ong is 62 year old Chinese man</i>

<ul style="list-style-type: none"> <li>- Admitting complaint</li> <li>- Significant past medical/social/family history</li> <li>- Current medication and drug allergy</li> </ul> <p>Examination findings:</p> <ul style="list-style-type: none"> <li>- Highlight positive and significant negative findings</li> </ul> <p>Results:</p> <ul style="list-style-type: none"> <li>- Highlight relevant or significant results</li> </ul> <p>Provisional diagnosis:</p> <ul style="list-style-type: none"> <li>- Suspected diagnosis (hence the referral)</li> <li>- Clinical concerns</li> </ul> <p>Others:</p> <ul style="list-style-type: none"> <li>- Highlight any other details (e.g. patient's preference)</li> </ul> <p>Written by: Name/Signature (for Consultant) Date/Time: Contact detail:</p>	<ul style="list-style-type: none"> <li>- <i>He presented with left-sided weakness and numbness 2 days ago</i></li> <li>- <i>He has a history of atrial fibrillation and there is a family history of stroke</i></li> <li>- <i>He has been smoking 1 pack per day for the past 10 years</i></li> <li>- <i>He is currently on aspirin 100mg OM and there is no drug allergy</i></li> </ul> <p><i>Examination findings:</i></p> <ul style="list-style-type: none"> <li>- <i>Vital signs showed blood pressure of 180/100mmHg</i></li> <li>- <i>His pulse is irregularly irregular</i></li> <li>- <i>There is right upper motor neuron facial nerve deficit</i></li> <li>- <i>There are upper motor neuron deficits of the left upper and lower limbs</i></li> <li>- <i>He walks with a left hemiplegic gait</i></li> </ul> <p><i>Results:</i></p> <ul style="list-style-type: none"> <li>- <i>MRI brain showed hyperintensity in areas of left middle cerebral artery on diffusion weighted imaging (DWI)</i></li> </ul> <p><i>Provisional diagnosis:</i></p> <ul style="list-style-type: none"> <li>- <i>Left stroke</i></li> </ul> <p><i>Others:</i></p> <ul style="list-style-type: none"> <li>- <i>Patient request not to disclose his diagnosis to his family members</i></li> </ul> <p><i>Written by: Dr Sarah Wong (for A/Prof John Tan)</i> <i>Date/Time: 01/01/16, 11am</i> <i>Contact detail: 9123 4567</i></p>
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#### e) Discharge Documents

Pre-discharge: Whenever you have free time, try to fill in the discharge summary beforehand so it is easier to discharge the patient when the time comes.

Discharge Summary Format	Example
Patient biodata: Name, NRIC number, age, gender, drug allergies, smoker/ drinker, premorbid status (ADLs), who patient stays with	<i>Patient biodata:</i> <i>Peter Pang</i> <i>S0099887M</i> <i>62yo/M/Chinese</i> <i>ADL-assisted, wheelchair bound</i> <i>Lives with brother</i> <i>NKDA</i>
Past medical and surgical history (updated!)	<i>Past Medical History</i> <i>1) Road traffic accident 2000: Pedestrian; suffered a traumatic T10 spinal cord injury s/p intervertebral body fixation.</i> <i>2) Urinary tract infection 2003 (E. Coli pansensitive s/p antibiotics)</i> <i>3) BPH</i>
Chronic medications	<i>Chronic medications</i> <i>1) Duodart</i>
Details of preceding admission	<i>Previous admission</i> <i>1) Previously admitted in June 2022 for Salmonella bacteremia</i> <i>2' GE.</i>
Presenting complaint	<i>Presenting complaint</i> <i>1) Fever</i> <i>- Tmax 39 degrees, with chills and rigors</i> <i>- No headache/ blurring of vision/ dysuria/ limbs swelling/ cough/ sore throat/ rashes/ joint pain</i> <i>- Brother also has diarrhoea, but mild, after taking food from same source; no travel</i> <i>2) Vomiting, diarrhoea x 1 day</i> <i>- Non-bilious non bloody vomitus, a/w mild epigastric discomfort 6 times</i> <i>- Non bloody non mucoid diarrhoea 5 times</i> <i>- Last OGD/colonoscopy done 2006: NAD</i>
Physical examination and vitals	<i>Objective</i>  <i><u>Vitals</u></i> <i>• T 37.2 BP 100/67 HR 98 SpO2 100% on RA</i> <i><u>O/E</u></i> <i>• Alert, GCS 15, not in respiratory distress</i>

	<ul style="list-style-type: none"> <li>• Heart S1S2 no murmurs</li> <li>• Lungs clear</li> <li>• Abdo mildly tender, no rebound or guarding, no peritonism, BS active</li> <li>• Calves supple</li> <li>• No new neurological deficit. Paraplegia.</li> <li>• Shallow pressure sore on right little toe</li> </ul>
Progress in ED	<p>IV HM 500 mls/day given</p> <p>Started IV rocephin</p>
Initial investigations	<p><i>Investigations</i></p> <p>1) TW 13.0, Hb, 12.0, Plt 321</p> <p>2) Na 134, K 3.2, Cr 105, U 3.0</p> <p>3) LFTs normal</p> <p>4) UFEME 2/4/1</p>
Issues and progress: - Elaborate separately and in detail for each issue, summarise what procedures were done, where referrals were made to, which medications were prescribed	<p><i>Issues and progress in the wards</i></p> <p>1) Gastroenteritis</p> <ul style="list-style-type: none"> <li>- Started on charcoal tablets, IV metoclopramide, IV hydration 3L/day</li> <li>- Strict input/output charting</li> <li>- Blood cultures: NBG (No bacterial growth)</li> <li>- Urine cultures: NBG</li> <li>- Able to tolerate orally, diarrhoea and vomiting resolved on day 3</li> </ul> <p>2) Acute kidney injury secondary to dehydration</p> <ul style="list-style-type: none"> <li>- Baseline creatinine 60</li> <li>- Serum creatinine downtrended with IV hydration</li> <li>- Cr on discharge: 65</li> </ul> <p>3) Hypokalemia secondary to vomiting</p> <ul style="list-style-type: none"> <li>- No ECG changes</li> <li>- Replaced potassium IV initially, then PO</li> <li>- Recheck K: 4.0 on discharge</li> </ul> <p>4) Right little toe pressure sore</p> <ul style="list-style-type: none"> <li>- Wound swab: mixed bacteria growth</li> <li>- Started on PO Augmentin, to complete 1 week of antibiotics</li> </ul>
Medication changes	<p><i>Medication change</i></p> <p>No change to chronic medications</p>

TCU plans	<i>Plan</i> 1) TCU OPS 1 week for wound dressing, with memo
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**f) Memo**

A memo is required when the patient has follow up with other specialties, hospitals or GP/OPS (Polyclinic). It should comprise a simple summary of the patient's background, why we are referring the patient to them and what they need to do.

<b>Example</b>
<p><i>From: Department of General Medicine</i>  <i>To: GP/OPS</i></p> <p><i>Dear Colleague,</i></p> <p><i>Thank you for seeing patient Madam Tang Yong Ya, S1122334P.</i></p> <p><i>She is a 68yo lady who was admitted to Tan Tock Seng Hospital on 07/09/2001 for hypertensive urgency.</i></p> <p><i>She has a past medical history of hypertension, hyperlipidemia and chronic kidney disease with baseline serum creatinine 130.</i></p> <p><i>Her hypertensive medications were titrated, and she was discharged well on 11/09/2001.</i></p> <p><i>There were medication changes made to control her blood pressure:</i>  <i>Nifedipine LA 30mg OM increased to 60mg OM.</i>  <i>Please assist us to review her blood pressure control.</i></p> <p><i>Thank you for assisting us in the management of this patient.</i></p> <p><i>Regards,</i>  <i>Dr Jennifer Law</i>  <i>House Officer</i>  <i>On behalf of Prof Ang YK</i>  <i>Consultant, SGH Gen Med</i></p>

**g) Medical Certificate (MC)**

Certain hospitals have guidelines as to how many days MCs can be. So the number of days you can prescribe varies accordingly.

## **h) Prescribing Medications**

- i) Check through the patient's medical history and drug interactions when prescribing discharge medication. If unsure, confirm with seniors on how many days you should prescribe certain medications. If they are unsure, you can always call the pharmacist on-duty to ask for advice.

E.g. Complete 1 week of antibiotics vs Discharge with 1 week of antibiotics; the former means you have to count how many days of antibiotics the patient has received inpatient and prescribe only the remaining number of days, while the latter just means what it means.

## **i) Communicating with Your Team**

- i) Most teams communicate through Whatsapp/ TigerText. This makes it easy for us to inform our seniors of any major occurrences.
- ii) In ward-based systems, however, the people covering the ward can change from day to day, hence you may need to check the roster to see who is scheduled to cover that day.
- iii) If you will not be covering the same patients the next day or they are to be transferred to another ward for further care, it is important to handover the case to your colleague either verbally, via text or a brief written summary. This is to ensure patient care continuity.
- iv) If a patient is shifting ward e.g. to HD, ICU or isolation, it is good practice to verbally handover to the team and prepare a transfer summary to ensure plans are not missed and to highlight pertinent details to the receiving team e.g. discharge planning, or TCU rescheduling.

## **j) Communicating with Others**

You may sometimes need to scribe the discussions between physicians and family members etc.

<b>Communication Record Format</b>	<b>Example</b>
Date: Time: Location:	<i>Date: 01/01/2016 Time: 1400hrs Location: Ward 34 Meeting Room</i>



<p><b>Medical team (attending):</b></p> <ul style="list-style-type: none"> <li>- Include doctors, nurses, allied health professionals, medical social workers</li> </ul> <p><b>Family members (attending):</b></p> <ul style="list-style-type: none"> <li>- Include name and relation to patient</li> </ul> <p><b>Discussion:</b></p> <ul style="list-style-type: none"> <li>- Concise summary of topics discussed</li> </ul> <p><b>Conclusion/Follow-up:</b></p> <ul style="list-style-type: none"> <li>- Conclusion of discussion</li> <li>- Joint decisions</li> <li>- Follow-up plans for medical team</li> </ul> <p><b>Next meeting (if applicable):</b></p>	<p><b>Medical team:</b></p> <ul style="list-style-type: none"> <li>- <i>Prof Tan XY, Dr Wong JH, SN Teo MM, Ms Sarah Tan (physiotherapist), Mr Dan Chan (medical social worker)</i></li> </ul> <p><b>Family members:</b></p> <ul style="list-style-type: none"> <li>- <i>Mr Wong CM (spouse), Mr Jon Wong (son), Ms Denise Tan (sister)</i></li> </ul> <p><b>Discussion:</b></p> <p>1) <i>Treatment options</i></p> <ul style="list-style-type: none"> <li>- <i>Medical...</i></li> <li>- <i>Surgical...</i></li> <li>- <i>Conservative...</i></li> </ul> <p>2) <i>Aim of treatment</i></p> <ul style="list-style-type: none"> <li>- <i>Curative...</i></li> <li>- <i>Reduce morbidity...</i></li> <li>- <i>Palliative...</i></li> </ul> <p><b>Conclusion/Follow-up:</b></p> <ul style="list-style-type: none"> <li>- <i>Family opted for conservative management</i></li> <li>- <i>Medical team to prepare medical summary for family to seek 2<sup>nd</sup> opinion</i></li> </ul> <p><b>Next meeting: 01/02/2016</b></p>
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#### k) **Communicating Patient's Resuscitation Status**

This is one of the trickiest tasks for junior doctors to do, and will need a lot of guidance and practice. Usually these final decisions will be counseled and the form will be signed by a more senior doctor, but House Officers can also initiate the conversation to give the family some time to think about it early on.

Some patients may have already discussed their resuscitation status in previous admissions (check discharge summaries) or have had an outpatient ACP performed (check NEHR). This should be revisited during the admission, if possible as their decisions may change depending on the scenario.

In general, there are 3 types of resuscitation statuses: Active, DNR max ward and DNR comfort care, which will take effect when a patient deteriorates rapidly.

Please check with your respective hospital policies on DNR for patients.

- i) Active: Full resuscitation that includes CPR, intubation and ICU management
  - This status is conferred to patients with good pre-morbid status and a good chance of successful outcomes from ICU management.
- ii) DNR max ward: Supportive treatment with non-invasive resuscitation. This includes fluid resuscitation, escalation of antibiotics, increased oxygen supplementation, and possibly administration of inotropic support.
  - This status is usually recommended in patients who have poor pre-morbid status or multiple comorbidities that would predict poor outcomes should active resuscitation be started.
- iii) DNR comfort care: Supportive measures to keep the patient comfortable in spite of deterioration. Blood taking may be stopped and medications such as antibiotics may be discontinued if patients are not responding. In these patients, strong painkillers and medications to reduce secretions could be prescribed, to allow the patient's passing to be easier.
  - This status is conferred to patients with terminal illness and expected demise.

Several approaches are available to initiate such a difficult conversation to counsel for DNR max ward status:

- i) Enquire about the patient's wishes in the event of a serious medical condition.
- ii) Explain the current severity of the patient's condition.
- iii) Review the patient's medical history with the family and agree that the patient is premorbidly not the best candidate.
- iv) Recommend that the patient would benefit most from DNR max ward management in view of the pre-morbid status. Measures will include things such as maximising fluid resuscitation, escalation of antibiotics and oxygen supplementation in the ward. Explain that the patient's outcome will depend on the body's response.

**\*\*TIP:** If you are uncomfortable or feel unsuited to discuss resuscitation status, please refer to your senior as this task is expected of and usually done by senior doctors. You can however sit in during the discussion to learn how this is being done as you will be a senior to a House Officer or medical student in the future!

## **I) Taking Consent**

- i) In certain hospitals and departments, HOs are allowed to take consent for minor procedures.
- ii) The most common consent taken is for blood transfusion.
  - Indication for blood transfusion: Most commonly anaemia
  - Risks of blood transfusion
    - Risks of contracting blood-borne diseases: These diseases include HIV, Hepatitis B, Hepatitis C. However, the risk is low (do not quote the numbers if you are not sure) because of the thorough checks and screens that the national blood banks carry out.
    - Risks of transfusion reaction: Reactions can be mild such as fever or rashes, which can be treated symptomatically as well as by stopping the transfusion. Severe reactions include anaphylaxis and TRALI, which require immediate termination of the transfusion and to start resuscitation. Inform the patient of signs and symptoms to look out for during transfusion.
- iii) Usual duration for the transfusion is 4 hours per pint, with a recheck blood test to be done after the entire transfusion is complete.

**\*\*TIP:** Some hospitals have specific consent forms for certain procedures or patient information sheets on their intranet. As a new HO, you can ask your fellow colleagues where to find them and then, use these forms to help guide your consent taking. Good luck!

## **m) Operating Theatre (OT) Chit**

- i) Sending an OT chit is an essential skill for surgical HOs so as to inform the operating theatre that a patient is prepped for surgery.
- ii) Chits are usually divided into elective and emergency in nature.
  - For elective chits, patients have already been put on the OT list, and all you need to do is inform the OT that the patient is ready for surgery by sending the chit.
  - For emergency chits, patients are not listed beforehand. Sending a chit means putting them on the waitlist for the emergency OT.

- Important information to obtain in order to complete the OT chit: time of last meal, P1/P2/P3 case (how quickly the emergency case needs to be done, which you can ask your senior), complete description of the operation, who is the surgeon, patient's comorbidities, which OT (usually emergency OT) and when was the latest GXM done.
  - Frequently, you will need to call the anaesthetist to inform him of the emergency case.
- iii) Different hospitals have different methods of sending OT chit. Check with your seniors.

**n) Preparing for Operation (PFO)**

- i) Bloods must be ready and corrected – FBC, RP, PT/ APTT, GXM.
- ii) May require standby blood transfusion.
- iii) ECG, CXR
- iv) Ensure anaesthesia reviews and obtains consent from patient.
  - Different workflows in different hospitals; do check with the anaesthetists which cases (elective, emergency) will be reviewed automatically by them and which requires a call to them.
- v) NBM 12 midnight
- vi) IV hydration with dextrose containing drip
- vii) Follow hospital's NBM protocol for diabetic patients for further guidance.

**o) Calling Blood Transfusion Service (BTS) MO**

- i) Blood products can often be obtained just by requesting for it from the blood bank.
- ii) However, certain products or patients will need verbal approval from the BTS MO. The number is **9186 4133 (nationwide)**.
- iii) Situations where BTS MO approval is needed:
  - Platelets, FFP, cryoprecipitate
  - Rhesus negative patients needing Rh negative blood

- Patients with antibodies needing antibody negative blood
  - Special blood products (e.g. leukocyte reduced/ leukocyte filtered/ irradiated)
  - Children
  - Many blood products required (e.g. more than 2 units)
  - When it is absolutely not indicated (e.g. Hb 12 and you want to transfuse 1 pint. In this case, BTS MO may not approve unless patient is actively bleeding)
- iv) When in doubt, the blood bank staff would call the nurses who will then inform you that you need to call the BTS MO.
- v) Essential information to know before calling the BTS MO:
- Indication for blood product transfusion;
  - Name and NRIC number of the patient;
  - Current Hb/Plt; blood group;
  - Presence of any antibodies and what antibodies; and
  - How many units of [blood product] are required

**p) Blood Products**

- i) Packed red blood cells (Plt)
- Made from a unit of whole blood by centrifugation and removal of plasma.
  - Leukodepleted PCT decreases cytomegalovirus (CMV) infection rate by removing TW (e.g. used in patients undergoing chemotherapy, immunocompromised patients).
  - Irradiated PCT reduces transfusion associated graft versus host disease (e.g. used in stem-cell transplant patients for leukemias).
  - Indication: Anaemia
- ii) Fresh frozen plasma (FFP)
- Contains all factors of the soluble coagulation system.
  - Indication: Factor deficiency, coagulation disorder

iii) Cryoprecipitate (Cryo)

- Contains concentrated subset of FFP components, including fibrinogen, von Willebrand factor and factor XIII.
- Indication: Fibrinogen/von Willebrand factor deficiency, factor deficiency (volume-restricted patient)

iv) Platelet (Plt)

- Single unit derived from 1 whole blood unit
- Pooled Plt derived from multiple donors from whole blood collections
- Apheresis Plt refers to multiple packs of Plt derived from single donor
- Indication: Thrombocytopenia

**q) Requesting for Urgent Radiological Investigations**

- i) Know the indication for an urgent scan (e.g. suspected perforated viscus, Cauda Equina Syndrome, etc)
- ii) History, past medical history, **pregnancy status**
  - **Ensure UPT done and recorded for all female patients of reproductive age; document refusal**
- iii) Examination findings – e.g. Is there guarding, signs of peritonism? If for urgent MRI Spine in patient with suspected Cauda Equina Syndrome, what are the neurological deficits? How is the anal tone on DRE? Is there any Saddle Anaesthesia? (*Refer to “Common Orthopaedic Emergencies” on page 40-45 for more information!*)
- iv) Prior investigations – Previous scans?
- v) Unsure of which scan to order?
  - There are multiple different types of CTs and MRIs and it can be confusing as to which is the appropriate study to order. Please double confirm with your MO/registrar prior to ordering. If they are also unsure, call up the radiology department to enquire. Ordering a wrong study can cause further delays in patient management.

vi) Important information you will need to convey to your friendly radiologist:

- If you're requesting for a **CT study** where iodinated intravenous contrast is indicated, please check the following:
  - What is the patient's renal function? Intravenous contrast carries a risk of contrast induced nephropathy (CIN) in patients with renal impairment.
    - If the eGFR is <45, the patient **will not** be able to receive intravenous contrast, **unless** the patient is on dialysis.
    - If the eGFR is between 45-60, you will need to counsel your patient on CIN risk, and obtain consent. Please document this process on the Electronic Medical Record (EMR). Proof of documentation is required before the study can be performed. Some departments use the Mehran Scoring for CIN risk.
  - Does the patient have >2 drug allergies or a history of asthma? If yes, he/she will require steroid preparation prior to the study. Please double confirm the protocol for steroid preparations as different hospitals have different protocols. Some departments use IV hydrocortisone 100mg 1 hour prior to IV contrast administrations.
- Please ensure that your patient has a working intravenous cannula prior to them going for a scan requiring intravenous contrast. Most studies will require at least a 22G IV cannula (blue plug). However, certain studies will require a larger bore IV cannula due to the need for higher flow (20G; pink plug). If you are unsure of which IV cannula is appropriate, please check with the radiology department. Sending a patient down for a scan with an inappropriate/ non-functioning IV cannula will cause delays in getting the scan done. A CTPA usually requires a large bore cannula (at least 20G).
- If you are requesting for a **MRI study**, please check the following:
  - If the eGFR is <30, the patient **will not** be able to receive intravenous contrast, **regardless of whether the patient is on dialysis. This is due to the risk of systemic nephrogenic fibrosis.**
  - Does the patient have any implants? (e.g. pacemakers) Implants must be MRI compatible, before a MRI can be performed.
    - Recently inserted implants may or may not qualify for a study – most MRI compatible implants will only be considered safe for imaging 4-6 weeks post-insertion (due to risk of implant migration in the initial period).

- If the patient requires a MRI scan prior to this period, ensure that you document that this has been discussed with the surgeon who inserted the implant, and is agreeable to proceed.
- Does your patient require sedation for the procedure?
  - Unlike a CT study, MRI studies take a significantly longer time to perform, and will require the patient to lie still to prevent motion artefacts. For example, a non-contrast MRI brain done for a stroke protocol takes approximately 20-30 minutes. If your patient is unlikely to lie still for such a long period of time (e.g. patient is restless, anxious, claustrophobic; AMS from delirium/ dementia, young children, etc), please highlight this when requesting a scan. Your patient may benefit from IV sedation.
  - Please note that not all patients can qualify for IV sedation and this will require assessment prior to booking the scan. Sedation cases are only done during the day.
  - In children, all radiological investigations must be run through seniors. Consider following methods for reducing movement – feed and wrap (for younger children), oral sedation, IV sedation. Please discuss with your seniors.

**\*\*TIP:** If not sure of the indication for an urgent scan, always check with your senior i.e. MO or senior registrar. If the wrong information is conveyed to the duty radiologist, scan may be delayed and therefore potentially life-saving treatment as well.



### **3. How to Survive on Call**

#### **a) Pre-call Preparation**

- i) Make sure you know which day you are on call.
- ii) Get a good night's sleep before that.
- iii) Bring your phone charger.
- iv) Bring a set of scrubs or wear scrubs to work, and wear comfy footwear.
- v) Place your belongings in the call room/shower.
- vi) If your team is nice and there is very little work to do, you may be able to end work earlier and head to your call room.
- vii) Grab a good dinner and buy snacks. Always have some food with you.
- viii) Prepare a sheet of paper on which you will write all your call changes. This can be divided by location, or actives vs passives.
- ix) Find out who your MO and registrar are, and save their numbers on your phone. Inform them of any new patients and sick patients.

#### **b) Handovers**

- i) Most hospitals have a handover system where the daytime teams will handover any urgent things that need to be done at night.
- ii) Some examples of handover items include:
  - Tracing blood/ radiological investigations
  - Reviewing patients at night
  - Following up on blue letter replies

iii) Most departments use SBAR format for verbal handover of patients

Handover SBAR Format	Example
<p>S (Situation):</p> <ul style="list-style-type: none"> <li>- Identify yourself and location</li> <li>- Patient identification</li> <li>- Patient's current condition or change in condition</li> </ul> <p>B (Background):</p> <ul style="list-style-type: none"> <li>- Reason for admission</li> <li>- Significant past medical history</li> <li>- Current medication</li> <li>- Recent interventions</li> </ul> <p>A (Assessment):</p> <ul style="list-style-type: none"> <li>- Working diagnosis</li> <li>- Clinical concerns</li> </ul> <p>R (Recommendation):</p> <ul style="list-style-type: none"> <li>- Suggested management plans (investigation, treatment, referral, etc)</li> <li>- Plan of action if patient's condition changes</li> <li>- Areas of focus for next shift</li> </ul>	<p>S:</p> <ul style="list-style-type: none"> <li>- <i>I'm Dr Robert Lee from ward 78</i></li> <li>- <i>I'm calling about Mr Lee TH from ward 78 bed 24</i></li> <li>- <i>He has been complaining of left-sided weakness for the past 2 hours and his blood pressure is elevated at 180/110mmHg. Physical examination also revealed right facial weakness and left upper and lower limb weakness</i></li> </ul> <p>B:</p> <ul style="list-style-type: none"> <li>- <i>He was admitted yesterday for chest pain and headache</i></li> <li>- <i>He had a history of atrial fibrillation on aspirin daily</i></li> </ul> <p>A:</p> <ul style="list-style-type: none"> <li>- <i>The working diagnosis is left-sided stroke</i></li> </ul> <p>R:</p> <ul style="list-style-type: none"> <li>- <i>I'm requesting for urgent cranial imaging</i></li> <li>- <i>I'm referring to the Neurologist urgently</i></li> <li>- <i>Start anti-hypertensive if his blood pressure worsens</i></li> </ul>

### c) Changes on Call

i) These changes can be divided into:

- **Actives:** New cases that have just been admitted. Clerk, examine, and come up with an impression, and order investigations and treatment for the patients.
- **Passives:** Preexisting patients to whom something has happened. Ideally, all patients should be assessed before initiating treatment.

- ii) Prioritise seeing patients who are unwell e.g. new admissions for early ward review, passives who are sick with unstable vitals.
- iii) It is useful to refer to the respective departmental guidelines for more detailed management or drug dosages.
- iv) When in doubt or the patient is unwell, escalate to your MO.
- v) In general, whenever nurses call you to attend to patients for medical complaints, screen their status by asking for vital signs.
- vi) It is important to document your findings and patient's vital signs whenever you review a patient on call. Use the CTSP (called to see patient) format.

### **Example**

*Date/Time:*

*CTSP: Fever Tmax 39.9 degrees at 11pm*

*S: Patient nil complaints of abdominal pain, headache, blurring of vision, cough, sputum, sore throat, lower leg swelling, rashes, joint pain or pain over IV plug. However, complains of new onset dysuria and urinary frequency for 1 day.*

*O: Vitals: T38.5 BP 120/80 HR 95 SpO2 99% on RA*

*o/e:*

*Alert, non-toxic, GCS 15, not in respiratory distress*

*Heart S1S2*

*Lungs clear, good air entry bilaterally*

*Abdomen soft, mild suprapubic tenderness, renal punch negative*

*Calves supple*

*No phlebitis, no rashes seen*

*A: Possible UTI*

*P: 1) Collect UFEME and urine cultures*

*2) Bloods – FBC, RP, CRP, Procalcitonin, blood cultures x 1 set (aerobic and anaerobic)*

*3) Start IV Ceftriaxone to cover empirically for UTI*

*4) Inform if BP <90/60, HR >110*

*[Chop & Sign]*

d) **Approach to Common Call Conditions**

i) Fever

Possible Causes of Fever		
<b>URTI:</b> Runny nose, sore throat, cough, myalgia	<b>UTI:</b> Dysuria, suprapubic pain, renal flank pain, chills & rigors, catheterised or recent catheterisation. Check for renal punch.	<b>Pneumonia:</b> Check SpO <sub>2</sub> , respiratory distress, cough. Listen to lungs for chest signs such as reduced air entry or crepitation.
<b>Intraabdominal:</b> Cholecystitis, cholangitis, etc. Examine the abdomen for Murphy's Sign. Post-operative patients may have infected collections or haematomas.	<b>Lines:</b> Check the IV plug sites for phlebitis. Check any central lines for signs of infection such as tenderness, erythema, and pus discharge.	<b>Skin:</b> In bedbound patients, check for infected sacral sores. Look for rashes that might suggest dengue or viral causes.
<b>DVT:</b> Check the calves for any tenderness or swelling.	<b>Gouty flare or Joint infections</b>	

- Defined as T 38.0 or above
  - T 37.5–37.9: Low grade fever
- Essential questions to answer:
  - First fever of the admission? Have they been admitted for more than 48 hours which means that the likelihood of a hospital-acquired infection is higher?
  - What is the current diagnosis? Are they already on antibiotics? Are the antibiotics appropriate for the blood/ urine/ swab culture results?
  - Any new symptoms?
  - Are the vitals stable? Is the patient hypotensive?
  - Did they undergo any procedures recently (e.g. post-operative, interventional procedures)?
- The general guide for post-operative patients with fever
  - Day 1: atelectasis/tissue trauma
  - Day 2-4: pneumonia, UTI
  - Day 3-5: DVT, pulmonary embolism (PE)
  - Day 5-7: wound infection
  - Any time: drug fever

- What to do?
  - Full septic work up
    - Blood: Blood cultures, FBC/CRP +/- procalcitonin
    - Urine: UFEME, urine cultures
    - Swabs: Throat swabs for viral URTI
    - Stool: GI Panel PCR, Stool c/s. If > 48-72 hours in hospital and/ or receiving broad spectrum antibiotics, consider Clostridium difficile PCR.
    - Lines (e.g. CVC, PICC): 1 set of blood cultures from each port and KIV fungal blood cultures
    - **DO NOT** take blood cultures from dialysis lines.
- If patient is clinically unwell, consider starting antibiotics and giving IV hydration. If already on antibiotics, consider escalation.
- Generally, blood cultures should be taken as long as a patient spikes a fever UNLESS
  - Post-operative day 1 and non-infective causes are likely.
  - Blood cultures have been recently taken and still pending.
  - Primary team indicates no need for blood cultures because fever is likely to be due to malignant fever/ intra-abdominal abscess for which fever is down-trending.
  - Patient refuses – in which case document clearly that you explained to patient risks of not taking blood culture and starting antibiotics.
- In well patients, you can leave the decision to start or escalate antibiotics to the primary team the next morning OR you can wait for the infective markers to return before deciding.
- In well children, consider that fever is likely viral in nature, and further investigations may not be necessary. Cut off for fever is usually 38.0. Take a history, examine (include otoscopy and examining the pharynx and genitoanal region). If indicated, do a FBC and CRP. If inflammatory markers are high, proceed with a full septic work-up which includes blood cultures/ microbiological serology studies/ RP, in-out catheterisation for UFEME and urine culture, +/- lumbar puncture (e.g. if suspecting neonatal sepsis), +/- respiratory swabs if ARI symptoms, +/- stool studies if GI symptoms, and starting antibiotics and antipyretics as appropriate.
- **Neutropenic Sepsis:** Temperature 38.3, or sustained temperature >38 for > 1h with ANC <500 (or expected drop <500 in 48h). Medical emergency.
- **\*\*STRICTLY NO DRE**

- Consider sending for stool and urine fungal cultures in addition to the full septic workup.
- Start broad spectrum antibiotics according to hospital's neutropenic sepsis antimicrobial guidelines e.g. IV Tazocin.

ii) Abdominal Pain

Common Causes	Less Common Causes	Less Common but Life-threatening Causes
<ul style="list-style-type: none"> <li>- GERD or Gastritis</li> <li>- Constipation colic</li> </ul>	<ul style="list-style-type: none"> <li>- Renal colic</li> <li>- UTI</li> <li>- ARU</li> <li>- Gynaecological causes</li> <li>- Post-op ileus</li> <li>- Diabetic ketoacidosis</li> </ul>	<ul style="list-style-type: none"> <li>- Intestinal obstruction</li> <li>- Abdominal aortic aneurysm</li> <li>- General surgical conditions: acute cholecystitis, cholangitis, appendicitis, pancreatitis, perforated peptic ulcer</li> <li>- Gynaecological conditions: ruptured ectopic pregnancy/ ovarian cyst, ovarian torsion</li> <li>- Acute coronary syndrome: epigastric pain, atypical presentations</li> </ul>

- Approach
  - Check vitals – stable? If patient is tachycardic, it could be due to pain, sepsis or hypovolemia.
  - History – Has patient had this pain before? Screen for GERD/ constipation. Always ask for last menstrual period in females! Any recent surgery/ procedure? → If yes, keep in mind serious surgical complications such as anastamotic leak, intra-abdominal collection.
  - Examination – Look for any abdominal distension, palpable bladder, hernia, tenderness, guarding or rebound, ensure bowel sounds present. Always examine genitalia for hernias/ scrotal pathology that can present as abdominal pain!
  - ECG – For patients with epigastric pain TRO ACS.
- Most patients are generally well, so you can give a trial of magnesium carbonate 10ml stat or antacid or gaviscon if gastritis is suspected. Can also trial fleet, bisacodyl suppository or lactulose if constipation colic is suspected.

- However, if patient appears unwell, consider investigations such as:
  - Amylase/ Lipase if suspicious of pancreatitis, lactate
  - Erect CXR to look for free air under the diaphragm.
  - AXR – To look for dilated bowel loops, urinary calculi, faecal loading.
  - Update your MO to see if further investigations such as CT abdomen and pelvis are warranted.

iii) Shortness of Breath/ Desaturation

Possible Causes of Shortness of Breath/Desaturation		
<u>Cardiology/Respiratory</u>		<u>Others</u>
Acute coronary syndrome	Pulmonary embolism	Anaphylaxis
Arrhythmias	Pneumothorax	DKA/ Metabolic acidosis
Acute pulmonary oedema	Pleural effusion	Neuro e.g. myasthenic crisis
Asthma/ COPD exacerbation	Pneumonia	Splinting of diaphragm due to abdominal distention
		Anxiety

- Approach
  - Check vitals
    - Whenever nurses tell you a patient is breathless, take it seriously. Check their SpO2. Any fever?
    - If there is a desaturation, take note of the increase in oxygen requirements which gives you an idea of the severity of the desaturation. E.g. A desaturation to 88% on room air to 95% on 100% non-rebreather mask vs a desaturation from 93% on 2L nasal prongs to 95% on 3L nasal prongs.
  - History
    - Look through the case notes. What is the patient admitted for? Occasionally, patients may have been known to have pneumonia and their breathlessness is actually improving.
    - Past medical history
    - Nature of the breathlessness
    - Associated symptoms
    - Drug history

- Examination
  - Any increased work of breathing or tachypnoea?
  - Can they speak in full sentences?
  - Look for signs of fluid overload – elevated JVP, bibasal crepitations, peripheral oedema (look at sacrum, scrotal and lower limbs)
  - Look for possible DVT.
- Investigations
  - CXR
  - ABG – Indicated when patient is desaturating. Take note of what O<sub>2</sub> supplementation is on when taking the ABG for calculation of P/F ratio.
  - ECG
  - Other bloods – cardiac enzymes, electrolytes, FBC
- Management
  - Depends on the underlying cause. Give patient oxygen to maintain saturations. Keep SpO<sub>2</sub> >94%. Consider escalating to MO if patient is unwell and especially if patient requires high oxygen concentration to maintain saturations e.g. Venturi Mask 40–50% or Non-Rebreathable Mask (NRM).
  - Consider HDU/ ICU transfer.
  - Pneumonia: Culture and start IV Antibiotics.
  - Pulmonary oedema: IV Furosemide. Strict I/O charting. Insert IDC.
  - Asthma/ COPD exacerbation: Nebulised bronchodilators, steroids, KIV antibiotics if there is suggestion of infective exacerbation.

**\*\*TIP:** Do not panic! It is always easy to give into our nerves when we see patients who are acutely SOB. Ensure the patient is alert (indicating patent airway) and getting adequate oxygen to keep his/ her saturations up. Obtain the history and examine the patient. Get the necessary investigations including ABG especially if the patient has desaturated. If the patient is drowsy (i.e. unable to protect airway) or has poor saturations despite being on NRM/ requires high concentration of oxygen, escalate to your MO while waiting for investigation results.

Let the nursing staff know that the patient is sick and ask for their help to administer supplemental oxygen and to monitor them closely too.

Remember! You are not alone!



iv) Chest Pain

Important Causes of Chest Pain		
Acute coronary syndrome	Aortic dissection	Pulmonary embolism
Pneumothorax	Oesophageal rupture	Musculoskeletal/ GERD

- Another complaint to take seriously.
- Once again, check vitals, history and examination. Check for radio-radial delay. Palpate chest wall for any reproducible tenderness.
- Investigations
  - ECG (can ask nurses to do over the phone so that it will be ready by the time you see patient), cardiac enzymes
  - If GERD suspected, consider gastritis medications.
  - If there are any new ECG changes (compare to old ECGs or old notes), consider possibility of non-ST elevated myocardial infarct and unstable angina.
  - Trace the cardiac enzymes urgently.
  - Consider completing 3 sets of cardiac enzymes.
  - Presence of ST elevation on the ECG, refer to cardiology urgently for possible percutaneous coronary intervention.
  - KIV load aspirin/ Clopidogrel or Ticagrelor.

**\*\*Tip:** Not sure if the patient has significant ECG changes to suggest myocardial ischemia? Fret not! All of us have been through this before and interpreting ECGs can sometimes be difficult when you first start out. If in doubt, please ask your MO. We have all sent ECGs to our seniors over TigerText to get an opinion! **You are not the only one and do not be afraid to ask!**

v) Acute Retention of Urine

Common Causes	Less Common Cause
<ul style="list-style-type: none"> <li>- Immobility</li> <li>- Constipation</li> <li>- Infection</li> <li>- Recent surgery (general anaesthesia)</li> <li>- BPH/ chronic urinary retention</li> </ul>	<ul style="list-style-type: none"> <li>- Cauda Equina – ask for back pain</li> </ul>

- Common complaints
  - Patient NPU for >12h
  - Patient complains of unable to pass urine and has suprapubic discomfort.
- Physical examination
  - Palpable or percussible bladder?
  - Suprapubic tenderness or renal punch?
  - +/- DRE for enlarged prostate/saddle anaesthesia
  - If patient has back pain → lower limb neuro examination
- Bladder scan (ask nurses to do before you go see patient) – Insert IDC if >250-400mls, OR if patient in great discomfort.
- Occasionally, patients refuse IDC insertion. Explain to patient risk of infection, sepsis, renal impairment, bladder rupture, etc.
- Document that patient understands and accepts these risks.
- Conservative management: clear patient's bowels.
  - Some people try Potassium Citrates but there is no evidence that this helps.
- Consider obtaining urine for UFEME and culture.

**\*\*CAUTION No. 1:** You will notice that some of your colleagues have tried Potassium Citrate mixture to relieve ARU (though there is no evidence). Please exercise caution in patients with chronic kidney disease (CKD). Patients with CKD have been discharged accidentally with Pot Citrate and subsequently re-admitted with hyperkalemia – some patients have been re-admitted with K >7, which is lethal! Discontinue this if not required!

vi) Hypotension

Causes of Hypotension (more common ones in bold)	
<b>Hypovolemic/ Hemorrhagic</b>	Think about where the fluid loss is coming from – Bleeding? Diarrhea/ Vomiting? High urine output? Over-dialysis? Drains?
Cardiogenic	<b>Acute coronary syndrome</b> <b>Heart failure</b> <b>Arrhythmias</b>

Obstructive	<b>Pulmonary embolism</b>
Distributive	<b>Septic</b> <b>Anaphylactic</b> Neurogenic Addisonian Crisis
Others	<b>Low baseline blood pressure in some young females</b> <b>Pharmacological</b> – Look at patient's current BP medications.

- Look through the vitals chart to see the BP trend.
  - If there is a sudden drop in BP associated with tachycardia, treat it seriously.
- Review the input/ output chart to see what patient has been receiving over the past few days.
- Check the stool chart for possible PR bleeding or melena.
- Look through case notes to see what patient is admitted for.
- Important to look at past medical history as well to identify patients who may need fluid restriction (e.g. CKD/ heart failure/ liver disease).
- Examine the patient
  - Look for evidence of fluid overload/ pulmonary oedema.
  - Dehydration
  - Source of sepsis (may already be identified)
  - Abdominal tenderness due to hemorrhage from peptic ulcer disease or AAA
  - Per rectal examination if gastrointestinal bleeding cannot be excluded
- Management
  - Run a fluid bolus fast to see if BP improves e.g. 250-500ml normal saline over 30 minutes, with Q15min blood pressure and heart rate measurements until blood pressure is stable.
  - Strict input/ output charting
  - Consider FBC, blood cultures, cardiac enzymes, electrolytes, ABG, ECG and lactate.
  - Consider escalating antibiotics (ask MO).

vii) Hyperkalaemia

- Commonly found in renal impaired patients.
- Check that the K is truly elevated – is the sample haemolysed?  
Was it taken from a drip arm? If patient is completely well with no risk factors for hyperkalaemia and ECG is normal, consider asking for a repeat K.
- If K is truly high:
  - Check patient to see if they have a pulse! They may be in pulseless electrical activity.
  - ECG: Look for tall tented T waves, flattened P waves, prolonged QRS, etc.
  - Look through their medications list and suspend any that can cause hyperkalaemia.
- Indication for insulin-dextrose:
  - ECG changes – Give IV Calcium Gluconate!
  - K 6 or more
- Steps of administration
  - Ensure that patient has a patent IV plug. Try a larger bore plug if possible as dextrose is highly caustic to veins. Flush with normal saline first to ensure that plug is patent. If not patent, you may need to insert a new plug.
  - Put on gloves (50% dextrose is extremely sticky)
    - Draw out 40 mls of D50 in 2 x 20mls syringes.
    - **Using an insulin syringe**, withdraw 10 units (or less) of Actrapid.
    - Transfer the insulin to the syringes of D50.
    - Push in the 2 syringes of D50, slowly.
    - Flush with normal saline.
    - Check hypocount stat 1-2 hours later.
    - Can consider repeating K in 4 hours.

**\*\*CAUTION:** Actrapid has been drawn up using normal syringes which is incorrect! As such, wrong doses of insulin have been administered before. Familiarise yourself with an insulin syringe before your first call and double-check before administering the medication.

If you realise that wrong dose of Actrapid was given, immediately escalate to your senior so that the patient may be transferred to HDU/ ICU for closer monitoring.

viii) GCS Drop/ Drowsiness

Common Causes	Less Common Causes
<ul style="list-style-type: none"> <li>- Hypoglycemia*</li> <li>- Stroke</li> <li>- Intracranial haemorrhage</li> </ul>	<ul style="list-style-type: none"> <li>- Metabolic causes e.g. thyroid dysfunction, hepatic, uraemia</li> <li>- Electrolyte disturbances e.g. Hypo-/ Hypernatremia</li> <li>- Sepsis</li> <li>- CO2 narcosis</li> <li>- Post-seizure confusion/ drowsiness</li> <li>- Non-convulsive Status Epilepticus</li> </ul>

- Approach
  - Check vitals.
  - **STAT** Capillary Blood Glucose (Hypocount)
- History
  - Look through the case notes. What is the patient admitted for? What is the baseline mental status? How has the patient been during this admission – Conversant vs drowsy?
  - Past medical history
  - Drug history – Any new psychotropic drugs or analgesia e.g. Opioids? Any history of illicit drug use?
- Examination
  - Is the patient responsive? Able to follow commands?
  - Any suggestion of airway compromise
  - Pupils: Dilated or pinpoint. Reactive?
  - GCS scoring – e.g. E3V2M4-5
  - Able to move all 4 limbs?
  - Plantars – Down-going or Extensor?
- Investigations
  - Bloods – FBC, renal panel, electrolytes, liver function tests (KIV ammonia levels if known cirrhotic and/ or previous episodes of hepatic encephalopathy), PT/ APTT, thyroid function (if not done recently), inflammatory markers if there is suspicion of sepsis
  - CT Brain
- Management
  - Correct hypoglycemia! – IV Dextrose 50% 40ml STAT (If patient has poor GCS, they will not be able to safely take a glucose drink – may aspirate.)

- Escalate to MO if glucose normal and patient has acute GCS drop – KIV CT Brain STAT.

**\*\*TIP 1:** Ensure that a capillary blood glucose is checked! One of the most common causes of GCS drop is due to hypoglycemia – which is easily correctable! You should see a drastic improvement in patient's mentation – hold off the patient's oral diabetic medications and insulin thereafter!

**\*\*TIP 2:** If the cause of patient's acute GCS drop is likely to be due to an ischemic stroke, patient may be a candidate for systemic thrombolysis +/- endovascular thrombectomy if within eligible window. Hence, act fast and escalate to your senior once the basic investigations and management are done. Also, consult your senior before getting an urgent CT Brain.

#### ix) Haematemesis

Common Causes	Less Common Causes
<ul style="list-style-type: none"> <li>- Bleeding gastric/ Duodenal ulcer</li> <li>- Oesophageal varices (in patients who are known cirrhotics)</li> </ul>	<ul style="list-style-type: none"> <li>- Angiodysplasia</li> <li>- GI malignancy</li> <li>- Aorto-enteric fistula (in patients with AAA)</li> <li>- Mallory-Weiss Tear</li> <li>- Dieulafoy's Lesion</li> </ul>

- Approach
  - Check vitals immediately.
  - Attend to patient.
- History
  - What is the nature of bleeding? Fresh red blood or coffee ground vomitus?
  - Any melaena, per rectal bleeding?
  - Any abdominal pain?
  - Past medical history – history of peptic ulcer disease, cirrhosis, or previous endoscopies
  - Drug history – Any antiplatelets, anticoagulation e.g. Warfarin, NOACs
- Examination
  - GCS – Is patient alert? Obtunded?
  - Peripheries – Pulse? Cool or well-perfused?
  - Any hypotension?
  - Abdomen – Soft? Any signs of peritonism?
  - DRE: Any melaena?

- Investigations
  - Bloods – FBC, renal panel, electrolytes, liver function tests, lactate, PT/APTT, GXM
- Management
  - Ensure airway patent.
  - Give supplemental oxygen.
  - Set 2 large bore plugs (at least one green plug).
  - Stabilise haemodynamics
    - Fluid resuscitation with crystalloids e.g. normal saline, Hartmann's, Plasmalyte (if available)
    - Arrange for blood transfusion to keep Hb >7.
  - Correct Coagulopathy
    - e.g. Platelet transfusion, FFP
    - If patient is on anticoagulation – KIV and consult Haematology for use of reversal agents like prothrombin complex concentrate.
  - IV Proton Pump Inhibitor infusion e.g. Esomeprazole
    - KIV IV Somatostatin in suspected variceal bleeding (discuss with MO).
    - If cirrhotic, start prophylactic IV Ceftriaxone.
  - Escalate to MO on call!
  - Refer Gastroenterology/ General Surgery urgently KIV for OGD.
  - If large volume and persistent GI bleeding, may need to activate Massive Transfusion Protocol.
  - KIV transfer to HDU/ ICU for closer monitoring.

x) Hypertension

- Approach
  - If SBP >180, DBP >100, need to rule out end organ damage as it indicates HTN emergency.
  - If no end organ damage → HTN Urgency
  - If end organ damage, consider:

<b>Neuro</b>	Infarct/ bleed/ encephalopathy/ papilloedema
<b>CVS</b>	AMI/ acute pulmonary oedema/ aortic dissection
<b>Renal</b>	AKI

- History

- Any chest pain, SOB?
- Any headache, nausea/ vomiting, blurring of vision, weakness/ numbness?
- Past medical history
- Drug history
- Examinations
  - GCS
  - Neurological exam
  - JVP, auscultate lung bases for crepitations
  - Peripheral pulses
  - Fundoscopy to look for papilloedema
- Investigations
  - If suspicion of HTN Emergency – Send off FBC, renal panel, electrolytes, PT/ APTT, cardiac enzymes
  - ECG
  - CXR
  - CT Brain urgent
- Management
  - HTN Urgency: Serve anti-HTN medications early. If already served, KIV low dose calcium channel blocker (e.g. Amlodipine 2.5-5mg once), or alternatively give Captopril (remember to check renal function before giving).
  - HTN Emergency: Inform MO urgently! Perform hourly vitals, GCS charting and KIV transfer to HDU/ ICU.

**\*\*TIP:** It will be quite difficult to review every patient with high BP on call! Some helpful things that you can ask for before deciding to review are the patient's vitals and GCS. If patient is comfortable, you may be able to give low dose anti-HTN medications and ask for a recheck BP in 1-2 hours. However, if patient sounds unwell (e.g. confused/ poor GCS/ symptoms of chest pain, SOB), please see the patient as quickly as possible to ensure that HTN emergency is not missed!

#### xi) Hyperglycemia

- Approach
  - Usually called when CBG >20 mmol/L; suspect poorly controlled DM.
  - Ask for: Vitals, mental status (GCS).
  - If well, avoid prescribing additional insulin or OHGAs after dinner time as may get nocturnal hypoglycemia.



- If CBG >20, can review CBG trend; non-urgent KIV give small dose Actrapid ~4 units or give according to Sliding Scale (check CBG 4 hours later e.g. 2am)
- If patient has signs of drowsiness or acidosis (e.g. Obtunded, Kussmaul Breathing), be on the alert for hyperglycemic crisis!
- Suspect DKA if:
  - Glucose >14 mmol/L
  - Urine ketones positive OR serum ketones >2.0 mmol/L
  - Bicarbonate <15 mmol/L; pH (on ABG or VBG) <7.3
- Suspect HHS if:
  - Glucose >30 mmol/L
  - Serum osmolality (Calculated) >320
  - No acidosis
  - Estimated serum osmolality =  $2 \text{ Na} + \text{Urea} + \text{Glucose}$
- Causes
  - Infection/ Sepsis, inappropriate OHGAs/insulin, non-compliance, ACS, pancreatitis, drugs e.g. corticosteroids
- Investigations
  - Bloods if suspicion of hyperglycemic crisis – FBC, RP, electrolytes, VBG/ ABG, ketones, osmolality
  - KIV UFEME, urine culture, blood cultures
  - ECG
  - CXR
- Management
  - Hyperglycemic crises: Basic principles are fluid resuscitation/ replacement, IV insulin administration, correction of underlying cause e.g. infection.
  - If unstable (e.g. poor GCS, unstable haemodynamics), then will require HDU transfer for closer monitoring.

**\*\*TIP:** If patients just have hyperglycemia secondary to poorly controlled DM or missed medications, you can give a small dose of Actrapid overnight to achieve euglycemia. You can follow the sliding scale which most hospitals have if in doubt.

Every hospital should have a DKA/ HHS protocol that you can follow as well to save you the stress of browsing furiously through UptoDate! If in doubt, consult your MO as well!

xii) Ordering of Medication

- Please screen through the medication list to ensure no drug interactions/ allergies.

Common Medications to Order on Call		
Sleeping pill	<ul style="list-style-type: none"> <li>• Piriton 4mg once</li> </ul>	<ul style="list-style-type: none"> <li>• Be wary of elderly patients who may easily be tipped into delirium.</li> <li>• Do check that the coughing patient is not having an asthmatic attack.</li> </ul>
Cough mixture	<ul style="list-style-type: none"> <li>• Dextrometorphan 10ml TDS</li> <li>• Procodin 10ml TDS</li> </ul>	
Panadol	<ul style="list-style-type: none"> <li>• Paracetamol 1g QDS PRN (lower dose if patient has transaminitis, none if patient has liver cirrhosis)</li> </ul>	<ul style="list-style-type: none"> <li>• What is the indication: pain/ fever/ headache/ chest pain?</li> <li>• If the patient has fever, chest pain or other worrying symptoms for which they ask for pain relief, it is important to review the patient.</li> </ul>
Laxatives	<ul style="list-style-type: none"> <li>• Lactulose 10ml TDS</li> <li>• Dulcolax PO 10mg once</li> <li>• Dulcolax suppository 10mg once</li> </ul>	<ul style="list-style-type: none"> <li>• Only God knows why laxatives suddenly need to be ordered at night, but just do it.</li> </ul>
Gastric meds	<ul style="list-style-type: none"> <li>• Magnesium carbonate 10ml TDS</li> <li>• Antacid 1 tab TDS</li> </ul>	<ul style="list-style-type: none"> <li>• May cause diarrhea.</li> </ul>

e) **Common Orthopaedic Emergencies**

i) Open Fractures = Fractures that communicate with external environment

- Gustilo & Anderson Classification

Grade	Characteristics
<b>I</b>	Wound <1cm with minimal soft tissue injury
<b>II</b>	Wound >1cm <b>without extensive</b> soft tissue injury
<b>IIIa</b>	Wound 1cm, severe bony comminution from high energy trauma

<b>IIIb</b>	Extensive soft tissue loss with periosteal stripping requiring soft tissue coverage
<b>IIIb</b>	Arterial injury requiring vascular repair

- Initial Management:
  - ATLS principles
  - Antibiotics: IV Cefazolin (Add on Gentamicin ± Metronidazole if gross contamination or soilage)
  - Anti-tetanus toxoid
  - Analgesia
  - Irrigate wound to remove gross contaminants, then dress
  - Reduction of fracture, application of splint for temporary stabilisation
  - Keep patient NBM, PFO bloods
- Definitive Treatment:
  - Early wound debridement and surgical stabilisation. External fixation with a negative pressure dressing of the soft tissue defect is utilised in most cases.
  - Refer to BAPRAS guidelines for more details.

ii) Compartment Syndrome = Condition where an osseofascial compartment pressure rises to a level that decreases perfusion. This can lead to muscle ischemia and necrosis.

- Presentation
  - Severe pain out of proportion
  - Paraesthesia
  - Other signs such as pallor, pulselessness, paralysis are *late* signs.
- Etiologies

<b>Extrinsic Compression</b>	<b>Intrinsic</b>
Constrictive dressing	Fractures (Commonly tibial, forearm fractures)
Tight splints or casts	Crush injuries
Burns	Haematomas
	Reperfusion injury

- Investigation
  - **Compartment Syndrome is a clinical diagnosis.**

- Needle manometry is an adjunct used to measure compartment pressure when assessment is difficult (e.g. obtunded patients, paediatric patients).
  - Absolute compartment pressure of >30mmHg is diagnostic.
  - Creatinine kinase levels
- Management
    - Loosen all constrictive dressing.
    - Emergent fasciotomy, temporising stabilisation of fractures if any (external fixators)
    - Haematogenous
    - Direct inoculation
    - Contiguous spread
- iii) Septic Arthritis = Inflammation of a joint caused by bacterial infection. The most common sites of infection are the knees (>50%), followed by hip, elbow and shoulder. This is an orthopaedic emergency as it causes irreversible cartilage destruction in the involved joint.
- Differentials: crystal arthropathies (e.g. gout or pseudo-gout)
  - Etiologies of bacterial seeding
    - Haematogenous
    - Direct inoculation
    - Contiguous spread
  - Common offending organisms
    - Staphylococcus (MSSA, MRSA, epidermidis)
    - Streptococcus (strep pyogenes, strep agalactiae)
    - Neisseria gonorrhea
  - Presentation
    - Acutely painful joint with effusion
    - Joint erythema and warmth
    - Inability to weight-bear
    - Limited range of motion even on passive ranging
  - Investigations
    - Bloods:
      - FBC, ESR, CRP
      - Blood cultures
      - X-Ray of the affected joint
    - Joint aspiration (gold standard for diagnosis), to perform before initiation of antibiotics
      - Gram stain

- Fluid cultures (aerobic and anaerobic)
- FEME (**WBC cell count of >50K is diagnostic**)
- AFB and fungal smear and culture
- Treatment
  - Urgent arthrotomy and washout
  - Empiric antibiotics (IV Cefazolin/ Vancomycin), followed by culture-guided

iv) Necrotising Fasciitis

- Necrotising fasciitis (NF) is a rapidly progressive severe soft tissue infection of the superficial fascia with thrombosis of the cutaneous microcirculation but relative sparing of underlying muscle. It is an orthopaedic emergency as it can be potentially limb and life threatening.
- The diagnosis of necrotising fasciitis is made clinically. Serial examinations will aid in the diagnosis.
- History
  - Predisposing trauma or injury
  - Exposure to marine organisms/ seawater
  - Risk factors: elderly, immunocompromised host (e.g. poorly controlled DM)
- Examination
  - Speed of progression
  - Tenderness extending beyond apparent area of skin involvement
  - Warmth and swelling of limb
  - Rapidly progressing cutaneous manifestations (erythema, blistering)
  - Dusky skin discolouration with haemorrhagic bullae in late stage
  - Crepitus
  - Patient with necrotising fasciitis will look toxic
  - Close monitoring of vital signs is imperative
  - Serial examination to look for rapid spread of erythema or skin signs
- Investigations
  - X-Ray of affected limb – look for soft tissue gas
  - MRI: fluid along fascial planes
  - Biochemical markers for LRINEC score
    - CRP, WBC, Hb, Na, Cr, glucose
    - 8 points signify high risk of NF
  - Blood culture, as patient usually septic and febrile
- Treatment
  - Close monitoring with hourly vitals. Consider high dependency monitoring.

- Demarcate area of involvement to track progression.
- Keep NBM and PFO.
- Antibiotics: IV Penicillins, IV Ceftazidime, IV Clindamycin (or based on the Abx guidelines of your institution)
- Refer Orthopaedics for urgent aggressive debridement KIV amputation.

v) Cauda Equina Syndrome

- Cauda Equina Syndrome (CES) is a constellation of symptoms that result from compression of the terminal spinal nerve roots at the lumbosacral spine.
- It is imperative to know the signs and symptoms well in order to come to diagnosis. As a HO, you must have a clear and detailed documentation due to potential medico-legal issue.
- Etiology
  - Large disc herniation
  - Severe spinal stenosis
  - Tumours – most commonly metastatic
  - Trauma
  - Epidural abscess
- Symptoms
  - Bilateral lower limb pain
  - Sensorimotor loss in the lower limbs
  - Bowel and bladder dysfunction
  - Saddle anaesthesia
  - Severe low back pain
- Examination
  - Assess lower limb power and sensation (from L2 to S1, based on ASIA score).
  - Assess lower limb reflexes (expect hyporeflexia/ areflexia).
  - Perform a DRE, checking for perianal sensation (saddle anaesthesia), and anal sphincter tone integrity.
  - Tenderness might be elicited over lumbar region.
- Investigations
  - PFO bloods, inflammatory markers (i.e. ESR, CRP if infective etiology such as epidural abscess is suspected)
  - XR L/S spine (AP + Lat): useful for assessing for any destructive changes, disc-space narrowing or spondylolysis
  - MRI L/S spine

- Treatment
  - Escalate to MO/ Registrar
  - Keep NBM, PFO bloods
  - Spinal nursing
  - PVRU, keep in view IDC insertion
  - XR, urgent MRI
  - Can consider IV Dexamethasone (check with spine consultant)
- Definitive management
  - Surgical decompression within 48 hours (laminectomy, discectomy).

**f) Common O&G Emergencies (adopted from KKH O&G HO guidebook)**

**i) Post-Partum Haemorrhage (PPH)**

- CTSP for PV bleeding in a postpartum patient.
- Definition
  - Primary PPH: PVB >500mls within 24 hours of delivery
  - Secondary PPH: PVB >500mls more than 24 hours but less than 6 weeks after delivery
- Causes: “4Ts”
  - Tone: uterine atony – most common cause
  - Trauma: tears in the vagina, cervix, vulva
  - Tissue: retained placenta tissue
  - Thrombin: DVC/ HELLP/ Coagulation disorder
- History
  - Timing and mode of delivery (NVD, assisted instrumented delivery, LSCS)
  - Complications during delivery (e.g. 3<sup>rd</sup>/4<sup>th</sup> degree lacerations)
  - Placenta delivery and inspection post-delivery (placenta and membranes complete? Any manual removal of placenta required?)
  - Weight of baby (risk of atony for big baby)
  - Estimated blood loss during delivery
  - Baseline Hb level
- Examination
  - GCS, signs of pallor/ shock
  - Uterine tone
  - Speculum to check for cervical or vaginal lacerations
  - Inspect placenta and membranes for completeness if in labour ward
  - Estimate blood loss

- Investigations
  - FBC, PT/PTT, fibrinogen, ensure valid GXM, IV fluids
- Immediate management by HO
  - Activate help immediately! (Call MO/Registrar)
  - Vitals q1hrly
  - Fluid resuscitation
  - Prepare for replacement of blood products KIV activate MTP for massive blood loss
  - Obtain PPH kit – get uterotonic agents ready (IV syntocinon infusion, IV duratocin, IM carboprost, PR misoprostol)
  - Prepare for transfer to OT if indicated (e.g. examination under anaesthesia (EUA), repair of laceration, manual removal of retained tissues)

## ii) Pre-Eclampsia

- CTSP for raised BP in pregnant/ post-natal patient
- Important points to note:
  - Pre-eclampsia can develop **post-natally**.
  - Severe pre-eclampsia can lead to significant end-organ dysfunction, such as pulmonary oedema, progressive renal insufficiency, transaminitis.
  - Signs and symptoms of impending eclampsia: headache, blurring of vision/ visual disturbance, epigastric pain, hyperreflexia, clonus
  - **Eclampsia: onset of seizure in a women with severe pre-eclampsia**
- General Approach
  - History
    - Symptoms of impending eclampsia
    - PMHx for pre-existing hypertension/ pregnancy-induced hypertension/ pre-eclampsia
    - Existing hypertensive medications (if any)
  - Physical examination
    - Papilloedema
    - Reflexes (presence of hyperreflexia)
    - Presence of clonus (presence of 3 or more beats)
  - Investigations
    - PE blood: FBC, U/E/Cr, LFT, PT/APTT, uric acid
    - Urine dipstick to look for: albm, urine PCR, 24-hour UTP
  - Mx
  - Inform MO/Registrar STAT.
  - Arrange transfer to delivery suite (for pregnant patient).
  - Stabilise patient: ABCs, insert IV plug, and IDC,
  - Monitoring



- PE chart and strict I/O
  - Ensure urine output >30ml/hour
  - Fluid regimen
    - Judicious fluid to prevent pulmonary oedema – ensure clinically lungs are clear
    - Fluid restrict 80mls/hour
  - Antihypertensive regimen
    - PO/IV depends on severity
    - PO Labetalol (avoid if asthmatic)
    - IV Labetalol/ IV Hydralazine (check protocol book for dosages and preparation)
  - Anticonvulsant regimen
    - IV MgSO<sub>4</sub> if s/s of impending eclampsia (check baseline renal function)
    - KIV IV Diazepam if seizure not aborted with MgSO<sub>4</sub> or MgSO<sub>4</sub> is contraindicated,
  - +/- inform anaesthetist
  - +/- inform neonatologist (especially if preterm)
- **Eclampsia**
    - CODE BLUE
    - Resuscitate patient – ABCs/IV access,
    - Stop seizures (IV MgSO<sub>4</sub>),
    - For crash, LSCS after stabilising patient,

## **g) Procedure Tips**

### **i) Venipuncture**

- In most institutions, nurses help to take most of the bloods. They will escalate to you when they have failed to take the blood or if unable to obtain bloods from upper limb.
- Doctors are required to take blood cultures and GXMs.
- Order of blood collection: blood c/s → red/ yellow tubes (empty/ plain tubes) → blue (citrate tube) → purple/ pink (EDTA containing tube) → grey, green (others)
- Approaches to handle the difficult venipuncture
  - Use a glove: Tourniquets may not be as tight. Although painful, a rubber glove does compress veins well.
  - Palpate the vein: Not all veins are visible. Feel in areas where veins generally run – the radial surface of the forearm, the antecubital fossa, etc.
  - Place the vein in a dependent position.

- Tap the vein.
- Warm the vein.
- In oedematous limbs, press until the edema is cleared, or elevate the limb.
- Vary your equipment
  - Needle with syringe: Various needle and syringe sizes. Smallest needle is the blue 22g needle. After collecting the blood, you can directly transfer the blood into the blood tubes (beware needlestick injury). Switching from a 22g to a green 18g needle can be helpful to reduce haemolysis when taking renal panel, liver panel or other electrolytes.
  - Butterfly needle with syringe or vacutainer: Butterfly needles come in 18g (green) and 22g (blue) sizes. The 22g needle may be hidden by nurses, so you can ask them for a few if you're unable to find them. The tubing can be connected to either a large syringe or a vacutainer (blue cap) to which blood tubes can be directly attached, hence ensuring that you do not take too little or too much blood.
  - Needle alone: When desperate, resort to the Paeds collection method of blood by puncturing the vein with needle alone and letting blood drip out into uncapped blood tubes. Remember to swirl EDTA tubes to ensure blood doesn't clot.
  - IV plug with syringe or vacutainer: Connect vacutainer directly to IV plug. Vacutainers tend to have rather high pressures and can collapse small veins, making drawing blood impossible even though you know you are in the vein. They also tend to lyse blood, hence messing up your renal panel. Try using syringe instead to slowly pull blood from a tiny vein.
  - Arterial puncture – When all else fails, or when you are in a great hurry.

## ii) Arterial Blood Gas

- Indications
  - Desaturating patient – COPD, asthma, pneumonia
  - Patient with metabolic acidosis (e.g. DKA)
  - Pancreatitis as part of Ranson's Score
- Prepare all materials beforehand
  - ABG syringe: Remove stopper, move plunger several times to mix the heparin within tube.
  - Ice: Prepare plenty of it within a specimen bag.
  - Another specimen bag
  - Needles and syringes, alcohol wipes
  - Gauze for compression
- Ensure that the patient is positioned optimally such that you are able to feel the pulsation well.

- Radial: If large quantities of blood are needed, use a butterfly and vacutainer/ syringe.
  - Extend the wrist: Stabilise wrist on pillow, side of bed or kidney dish – It helps to make artery more superficial,
  - Feel the pulse. Localise pulse to one point.
  - Insert needle at 45 degrees angle. Tends to be superficial, hence try not to go too deep. Once flashback is seen, do not advance needle further. You should be able to see the pulsation of the arterial blood.
- Femoral: Large artery
  - Located at the mid-inguinal point. May be hidden by fat folds, ask staff nurse to help to retract fat. Ensure patient lying flat. You may have to do this yourself if no one is free.
  - Use a green needle and a large syringe (10 or 20mls) and insert needle at 90 degrees to skin.
  - Once you see flashback, use your other hand to withdraw the plunger. Release the fat folds, generally needle will stay within the artery as long as you do not move the hand holding the syringe.
  - Avoid in patients with peripheral arterial disease.
  - Compress for 5 minutes!
- Brachial
  - Use a butterfly needle.
  - Dangerous! It is an end artery, risk of thrombosis and acute limb ischemia so use as last resort only.
- Remember, compress for at least 5 minutes to avoid pseudoaneurysms or haematoma!

### iii) Blood Culture

- Indication
  - Suspicion of sepsis: Fever, hypotension, altered mental state, etc.
- Preparation
  - Blood culture kit
  - Blood culture bottles – consider if need fungal (e.g. immunocompromised patients, patients with lines)
  - Cleaning solution and swabs – may be inside the blood culture set
  - Syringes and needles, or IV plug
  - Sterile gloves

- Steps
  - After assessing patient, explain to patient you will need to take blood for investigation.
  - Tourniquet and identify a good vein.
  - Prepare your set, uncap blood culture bottles and clean the tops, and open all your items into dressing set.
  - Wear sterile gloves.
  - Clean and drape.
  - Draw blood in sterile fashion.
  - Fill blood culture bottles FIRST before filling other blood tubes.

iv) Indwelling urinary catheter

- Indication
  - Strict input/ output charting
  - Retention of urine – generally, if patient is in discomfort and unable to PU; OR more than 250-400mls on bladder scan (threshold varies)
  - Obtaining urine for tests
- Female nurses generally help to catheterise female patients, hence most doctors will be doing male IDCs.
- Prepare set beforehand.

IDC bag	IDC insertion set	<ul style="list-style-type: none"> <li>• IDC: Foley's catheter ranges from 12-18Fr - typically 16Fr.</li> <li>• Larger sizes for patients with BPH. Smaller sizes for younger patients and patients who may have urethral strictures.</li> </ul>
Lignocaine syringe gel	Sterile gloves	
20ml syringe	Non-sterile gloves	
20ml of sterile water (no other fluid should be used to fill up IDC balloon)	Tape	

- Steps
  - Explain to patient what you are going to do.
  - Expose patient with non-sterile gloves.
  - Prepare your equipment: open up the dressing set, open all your items into the set in a sterile fashion, draw up 10mls of water and test the IDC balloon.
  - Expose area.
  - Retract foreskin and ensure urethra is visible.

- Clean urethra and penis till the base.
  - Drape the area.
  - Apply lignocaine gel onto the urethra. Squirt the whole tube into the urethra.
  - Insert the IDC all the way to the base of the catheter, awaiting clear urine. If encounter resistance, do NOT force your way through else you may create a false passage.
    - If no urine actively drains, can attempt the following:
      - Press suprapubic area.
      - Connect syringe and aspirate.
      - Flush 5mls and aspirate.
  - Once urine is obtained, inflate balloon with 10mls of water and attach catheter to urine bag.
  - Clean up, secure IDC with minimal tension with the tape.
  - Restore (pull forward) foreskin!
- Remember to document! E.g. “Patient cleaned and draped. \_\_\_ Fr IDC inserted under aseptic technique. 10mls water inflated, clear urine drained. Patient tolerated procedure well.”

**\*\*TIP:** IDCs may be difficult to insert especially for patients with pre-existing urological conditions e.g. BPH. If there is difficulty inserting after 2 attempts, escalate to your MO on call! There have been cases where multiple attempts resulted in traumatic gross haematuria with clot retention and worse, false passages requiring urological intervention!

#### v) Removing Drains

- Prepare your set

Sterile gloves	Dressing set	Steristrips or dressing
Blade	Tegaderm	Chlorhexidine wash

- Steps
  - Explain to patient what you are about to do, that it may be slightly painful but quick if they are cooperative.
  - **Clamp drain** and release the pressure usually by opening up one of the openings.
  - Open up your items into the dressing set, with sterile technique.
  - Expose patient.
  - Wash hands, put sterile gloves.
  - Clean the exit site as well as drain tubing with sterile wash.
  - Locate the anchoring stitch and cut one side using blade.

- Remove the anchoring stitch.
- Press down on the exit site by using a gauze, and remove the drain in one smooth motion.
- Use steristrips to close the exit site if required.
- If large or gaping, may need to place a stitch. In this case, you may need to use subcutaneous lignocaine. Ask MO or fellow HOs for guidance.
- Cover steristrips with gauze or Tegaderm.

## 4. **COVID-19**

COVID-19 is an infection caused by SARS-CoV-2, a novel respiratory pathogen from the coronavirus family. The first imported case of COVID-19 in Singapore was diagnosed on 23 January 2020, followed soon after by the first case of local transmission.. Since COVID-19 is an evolving situation, so are our containment and control measures. Please always refer to hospital guidelines for the most updated protocols.

As new House Officers, it is understandably daunting to start your careers with a global pandemic evolving before your eyes. Hence, we have introduced a section on the COVID-19 infection to prepare you for ward work in this current climate.

### **a) Staff Safety**

A hospital's most valuable resource is its staff. It is critical that staff take appropriate measures to safeguard their own health and the health of their colleagues during the ongoing COVID-19 pandemic.

#### **i) Personal Protective Equipment (PPE)**

- Guidelines on the appropriate usage of PPE in the context of COVID-19 in our institution are updated and disseminated by the Department of Infection Prevention and Control (IPE).
- In general, a risk-stratified approach is adopted with regards to the usage of PPE based on setting, personnel and type of activity performed.
- All staff should practice standard precautions (including hand hygiene with alcohol-based hand rub and the 7 steps) in all situations.
- Staff must wear surgical masks at all times.
- If staff are required to perform aerosol generating procedures (AGPs) in any clinical context (e.g. intubation, suctioning), full PPE should be used (N95 mask + eye protection + gown + gloves).
- The appropriate PPE according to the PPE guidelines should be used in the individual's area of work: please refer to the guidelines if unsure.
- All staff should ensure that they have been mask-fitted for N95 masks. If you have not been mask-fitted, please inform your supervisor.
- If eye protection (goggles) is required as part of your PPE, and you do not have a pair, please enquire with your ward sister/ supervisor where you can obtain one.

- Some institutions will require all staff to change into scrubs prior to entering restricted wards. Please check your respective institution guidelines.

ii) Reporting Sick

- As COVID-19 can present with relatively mild symptoms indistinguishable from other common viral causes of respiratory infection, staff who develop acute respiratory symptoms should seek medical attention immediately, instead of coming to work.
- Staff with acute respiratory symptoms (e.g. fever, cough, sore throat, runny nose) are to seek treatment from designated clinics (either respective institution's Staff Clinic or polyclinics during working hours, or at the Emergency Department of your respective institutions after working hours).
- This is to allow for detailed history taking and facilitation of contact tracing, should the need arise.
- Staff whose fever and/ or respiratory symptoms still persist after completion of medical leave should report sick at their respective institution's staff clinic, or Emergency Department (outside of Staff Clinic's operating hours). **Please do not return to work.**
- For staff who are well, please comply with regular self-reported temperature monitoring during this period. Temperature taking and submission of results is compulsory twice daily.

iii) Social Distancing

- Measures have been put in place at the different social spots within the campus to ensure safe distancing e.g. food and retail outlets, staff rest areas and staff clinic.
- Staff are to observe the markings to keep a safe distance from one another.
- Safe distancing should be adhered at external social settings outside the workplace as well.
- These measures are put in place as there is a certain degree of risk of acquiring COVID-19 for all staff, during ongoing periods of community transmission. Complying to social distancing measures mitigates the potential of a cluster of COVID-19 infection developing amongst staff.



iv) Peer Support

- We recognise that these are challenging times for all healthcare workers working at the frontlines.
- Should any staff require peer support, please do not hesitate to contact your respective institution's Peer Support Hotline.

b) **Areas Designated for COVID-19 Management during Ongoing COVID-19 Outbreak**

Different institutions have different ward allocation to help handle the workload during the COVID-19 outbreak. As a general rule of thumb, most/ if not all institutions will have isolation wards. Please ensure that you familiarise yourself with the different types of wards involved in suspected cases/ patients with respiratory symptoms in your respective institutions.

- The general principle is that cases at higher risk of COVID-19 should be managed in designated areas, where the appropriate PPE can be utilised and testing to rule out COVID-19 can be performed.
- In general, patients fulfilling our local Ministry of Health's (MOH) suspect case definition for COVID-19 should be admitted to the isolation ward.
- As case definitions will continue to evolve, please continue to keep yourself updated regarding the MOH's suspect case definition for COVID-19.
- Please familiarise yourself with the prevailing protocols, PPE guidelines and workflows if you are working in a designated ward for COVID-19 management – this can be found on the hospital intranet.
- In some cases, the suspicion of COVID-19 may only arise after the patient has already been admitted (e.g. through additional history-taking that reveals an additional epidemiological link).

**If in doubt,**

- Check the latest MOH criteria.
- Stay updated with your respective institutions' internal screen criteria.
- Discuss with COVID-19 on-call if the patient should be moved to a designated ward for COVID-19 management, if there are suspicious features.
- Patients who require COVID-19 swabs may require pre-approval by dedicated personnel. For example, in SGH, only the COVID-19 ID Physician on-call can approve

patients who require swabs. Please ensure you're up-to-date with your respective institutions policies.

- The name of the COVID-19 swab test is different in different institutions. Please familiarise yourself with your respective institutions' order details.

It is a very difficult time for all of us as healthcare professionals, especially yourselves as you are about to embark on your journey as a physician. Please know that we are all here to give you any support that you may need. Here are some tips for work that you should be aware of!

**TIP 1:** Always wear face masks in clinical areas. At least N95 mask with PPE in pneumonia/ isolation wards! Please refer to your hospital intranet for updated information on PPE required for different locations.

**TIP 2:** Wash your hands frequently and especially before you start work, take breaks/ have meals and leave work!

**TIP 3:** Check with your seniors whether certain patients require clearance for COVID-19. Never be afraid to ask – Silence is definitely not golden at this juncture!

**TIP 4:** Visit your hospital's intranet to keep yourself updated regarding the suspected case definition – allowing you to identify patients who may have COVID-19 infection. In addition, you can also keep yourself updated as there will be a list of clusters that you will need to use as a contact history screen for your patients.

**TIP 5:** Help each other out – nobody is ever alone and let us all make sure that every individual is well supported during this challenging time. Stay United and we will overcome this!

## 5. **Common Medical Abbreviations**

Please check with your respective institutions for the approved acronyms.

<b>Acronym</b>	<b>What It Stands For</b>
AAA	Abdominal aortic aneurysm
ABG	Arterial blood gas
ACP	Advanced care planning
ADL	Activities of daily living
AKI	Acute kidney injury
AMS	Altered mental status
APTT	Activated partial thromboplastin time
a/w	Associated with
BNO	Did not open bowels
BP	Blood pressure
BPH	Benign prostatic hyperplasia
BS	Bowel sounds
BTS	Blood Transfusion Service
CIN	Contrast induced nephropathy
CKD	Chronic kidney disease
COPD	Chronic obstructive pulmonary disease
CPR	Cardiopulmonary resuscitation
CRP	C reactive protein
CTPA	CT pulmonary angiogram
CXR	Chest X-Ray
DKA	Diabetic ketoacidosis
DM	Diabetes mellitus

DNR	Do not resuscitate
DRE	Digital rectal examination
DVT	Deep vein thrombosis
d/w	Discussed with
ECG	Electrocardiogram
eGFR	Estimated glomerular filtration rate
FBC	Full blood count
FFP	Fresh frozen plasma
GCS	Glasgow Coma Scale
GERD	Gastroesophageal reflux disease
GXM	Group X-match (cross-match)
HR	Heart rate
Hb	Haemoglobin
HDU	High dependency unit
HHS	Hyperosmolar Hyperglycemic Syndrome
ICA	Intermediate care area (similar to HDU)
ICU	Intensive care unit
IDC	Indwelling urinary catheter
In situ	In place
IV	Intravenous
JVP	Jugular venous pressure
KUB	Kidney, ureter and bladder
LFT	Liver function test
MC	Medical certificate
MRI	Magnetic resonance imaging
MTP	Massive transfusion protocol

NAD	No abnormality detected
NBG	No bacterial growth
NBM	Nil by mouth
NEHR	National electronic health record
NKDA	No known drug allergy
NPU	Not passing urine
O/E	On examination
OGD	Oesophago-Gastroduodenoscopy
OM	Omni mane (every morning)
OPS	Outpatient polyclinic service
OT	Operating theatre
PCT	Packed red blood cells
Plt	Platelet
PO	Per oral
PR	Per rectal
PT	Prothrombin time
PRN	Pro re nata (as necessary)
Q_H	Every ___times hourly
QDS	Quarter die sumendus (4 times a day)
RA	Room air
RP	Renal panel
RR	Respiratory rate
S1S2	First and second heart sounds
SOB	Shortness of breath
SpO2	Oxygen saturation
s/b	Seen by

s/t	Spoke to
TCU 2/52, FBC OA	To be seen in clinic in 2 weeks' time, with a full blood count test to be done on arrival at the clinic.
TCU OPS	TCU – To see you OPS – Outpatient service
TDS	Ter die sumendum (3 times a day)
TRALI	Transfusion-related acute lung injury
TW	Total white (cell count)
UFEME	Urine full examination microscopy elements
URTI	Upper respiratory tract infection
UTI	Urinary tract infection

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