

Belongs to: _____

Student Nurses Handbook



**Wellington
Hospital
Intensive Care
Unit
2022**

Te Rui Atawhai

www.wellingtonicu.com

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Welcome to Wellington Hospital's Intensive Care Unit!

How to use this handbook:

Please don't think you need to read through and memorise this booklet!

While the safety principles and contact guides are important, much of the information here is to give context and understanding of the many things you will see in ICU. You can use this to better understand our assessments and common medications but we do not expect you to have all this knowledge already as a student.

About us:

We provide tertiary (advanced) Intensive Care services for a zone of 300km (the upper South and lower North Island) containing over one million people. We support 6 public hospitals that have non-tertiary (less advanced) ICUs, and several private hospitals. To manage this we run a busy Flight Retrieval Service providing Intensive Care-level retrievals around the clock.

We have 24 beds in our unit made up of 16 open bed spaces and 8 isolation beds in sealed side-rooms. Our ICU is divided into 3 pods – North, Central, and South. We look after most medical specialties except for serious burns or spinal injuries, who we transfer to specialist centres. We manage most paediatric cases but refer the very sick on to Starship Hospital in Auckland, New Zealand's only specialist paediatric ICU.

30-40% of the patients in our ICU are post-operative following elective operations, such as open-heart surgery. We also have patients who are ill due to medical conditions or infections, and trauma patients.

We admit about 1800 patients every year. Our average occupancy is 16 patients, and the median length of stay for patients is 28 hours. After this, 25% stay a second day, 21% for 2-7 days, and 6% for over a week. Some people end up staying many weeks or even months. We mechanically ventilate 75% of patients and have a mortality of about 9%.

We operate under a closed model common in Australasian ICUs where admission/discharge decisions and day-to-day patient management is determined by an ICU Specialist. Patients are managed closely and co-operatively with specialists from their primary team.

Our ICU nurses have a huge amount of experience and knowledge. Tap into this and ask every question you can. There is no such thing as a silly question!

The ICU can look intimidating, but it is a safe environment. In emergencies, you may be surprised at how quickly there are suddenly many staff around to help. If you ever feel that things are not right, just say so and we can help. You will never be left alone with a sick patient.

This is a great time to become comfortable talking to and building relationships with patients, even unconscious ones! Introduce yourself and chat away. These patients are often very scared and your friendly voice can be very reassuring, making all the difference!

Staff and Contacts

On each shift there are 12-18 registered nurses, an ACNM (Associate Charge Nurse Manager), who oversees the management of the unit for that shift and coordinates care for the Central section of ICU, and a North-End and South-End Co-ordinator who help manage the other two pods.

While you are here Alex Taylor, Andy Bennett, Eilis Hogan and Rebecca Huthwaite will be responsible for your practice. If we are not here, please refer any issues to one of the Nurse Educators, or feel free to drop us an email.

Role	When to Contact	Contacts	Email, location	Phone number
ICU Student Facilitators	First point of call – struggling with anything, roster issues. If you need a debrief or saw something worrying you. Send us an email if you're off sick – but call reception first.	Andy Bennett Rebecca Gillham Karen Vander Vyver	Please contact ICUStudentFacilitatorsCCDHB@ccdhb.org.nz in the first instance. If you need to contact us specifically our emails are: Andrew.Bennett@ccdhb.org.nz Rebecca.Gillham@ccdhb.org.nz Karen.vanderVyver@ccdhb.org.nz	
Clinical Nurse Educator	When Student facilitators unavailable, specific teaching, help finding policies/ articles	Hayden Smith Jacqui Grannetia James Parsons Caitlin Burke	hayden.smith@ccdhb.org.nz Jacqui.grannetia@ccdhb.org.nz James.Parsons2@ccdhb.org.nz Caitlin.Burke@ccdhb.org.nz In the office next to the handover room	
Clinical Nurse Manager	Serious/ sentinel issues that you feel you can't talk to facilitators or educators about	Stephen James	stephen.james@ccdhb.org.nz In the office on the left when you first enter the admin section	
ICU Front desk	Phoning in sick, if you're running late, left something behind etc	Sigrid is our receptionist during office hours	At the front desk in the South end of the unit	Call through the hospital switchboard (04) 385 5999 Ask for ICU

Preceptors

You will not be allocated a preceptor during your stay here. This is unfortunately not possible due to the shifts and FTE our nurses work. However, if you find a nurse you really like and they

are happy to work with you again, then speak to a facilitator about changing your roster to accommodate this.

Andy, Eilis and Rebecca will be acting as your main preceptors during your time in ICU and will be liaising with the staff you work with for feedback. Therefore, they are able to complete any formative or summative assessments you may have; **however** we encourage you to get the nurses you work with to fill out a small part of your assessment each shift you have together, if possible. If you work with the same nurse several shifts and want them to complete your assessments, and they are happy to do this, that's fine.

It is your responsibility to ensure the nurse you are working with is aware of your objectives for the day/week. You must provide evaluations and/or other paperwork to your preceptor in a timely fashion (i.e. not on the due date!).

If for any reason you have concerns or conflicts with a preceptor please let your facilitator know.

Expectations of the Student Nurse in ICU

Shifts:

All our nurses work 12.5 hour shifts. **For all student placements (except the final 9 week placements) you will be working 8 hour shifts.** These will be divided into AM and PM shifts, which we will discuss on the first day in orientation.

- ❖ For AM shifts (0700 – 1530) please turn up ready for our morning handover, which starts at 7am sharp in the handover room.
- ❖ For PM shifts (1430 – 2300), find the ACNM or North End Coordinator when you arrive and they will point you toward a good patient for your shift.
- ❖ **If you are on a 9 week** final transition to practice placement, you will join us in 12.5hr shifts. This roughly means 3 shifts the first week, 4 shifts the next week, repeating for the entirety of your placement.
- ❖ For day shifts, (0700-1930) please turn up ready for our morning handover, which starts at 0700am in the handover room.
- ❖ For night shifts, (1900 – 0730) please turn up ready for the evening handover, which starts at 1900pm in the handover room.

General expectations:

- ❖ It is expected that you arrive on time for your shift and if you are going to be late or you are unwell and cannot come to call the unit (04-3855999, through switchboard)
- ❖ It is important for your preceptor or the nurse you are working with that he/she is aware of your objectives
- ❖ Due to infection control a clean uniform must be worn, long hair must be tied back and cardigans must not be worn when working on the floor
- ❖ If you are not achieving your objectives please see a facilitator or your preceptor (before the last week in the unit)
- ❖ Please ensure all documentation you need to complete for the polytechnic/university is accomplished before the last days in the unit – your preceptor will not be able to complete any paperwork given to them in the very last days of your placement
- ❖ **Please complete an evaluation** form of this placement during your last week here. Feedback helps us to continue to offer undergraduate placements and to improve how we manage the program.

Safety in ICU

- ❖ **You should never be left alone with a ventilated patient** (or any other advanced therapy machine). If this does happen, please let the ACNM on duty know ASAP. Your preceptors will walk away from these patients only if the neighbouring nurse is aware and able to take responsibility for watching the breathing tube and answering any ventilator alarms.
- ❖ Please **DO NOT touch our ventilators**, dialysis machines, or balloon pumps.
- ❖ We use multiple devices that look just like IV lines but could be deadly if injected into (e.g. arterial lines, extra-ventricular drains, pulmonary artery catheters...) – you must **always make sure your RN is directly supervising when administering IV medications**.
- ❖ It is unlikely that you will get a chance to work with our paediatric patients. This is because we are less familiar with them and there is often more room for error (due to less familiar equipment and needing to do lots of weight based drug calculations). Some nurses will be happy to work alongside a paediatric patient with you but please understand that a lot of us need to really focus 100% on these little patients and cannot teach or supervise you at the same time.

Infection control

The infection control management you see here may be quite different from what you have experienced in other wards. Please try to be mindful of our efforts to avoid cross-contaminations and ask your preceptors if you are confused about our practices. In particular;

- ❖ Use the “5 moments of hand hygiene” for all moments of patient care. We have black lines drawn on the floor around bedspaces to mark what we consider the ‘patient environment’ – you must perform hand hygiene whenever you cross these lines, even (especially) going between the patient bedspace and their charts.
- ❖ **Use the sinks at the bedspaces for hand washing only.** This is a measure brought in to combat serious superbugs now known to colonise taps and plumbing. This means you cannot use the water from our sinks for anything else – not to wet flannels for patients, not for drinking water, not to clean a pill crusher, not to get water to reconstitute NG meds... literally just hand washing. All other water must be taken from sterile water bottles or sourced from the water coolers.
- ❖ Likewise, **do not tip anything down our hand washing sinks**. All extra fluid must be disposed of in the sluice out back or suctioned up into our ‘waste liquid’ disposal unit on the left side of the patient bedspace. Small volumes of fluid can be thrown into the rubbish bin if reasonably clean, or the sharps bin. This even includes sterile fluids for disposal, such as leftover saline in an IV fluid bag. Nothing in our sinks except for hands, please!
- ❖ Gloves and gowns are worn for any patient contact likely to come into contact with body fluids or be very up close with patients– you will notice we use these more than most places, including during most turns. Routine clean tasks such as neuro obs, taking temperatures and NIBP, giving oral medication require good hand hygiene but not gloves and apron.

Emergencies

One of the most feared parts of nursing is an arrest situation. These are not very common in ICU. We do, however, often intubate patients and this is generally in a very controlled calm situation.

If an arrest does happen and CPR/chest compressions need doing, the staff here are happy for you to be involved – just offer and we'll talk you through it.

When an emergency bell sounds feel free to observe the response process and get involved if appropriate. Take every opportunity to watch what happens and then discuss the procedure with the nurse you are working with.

As with anything you encounter while here in ICU, if you find a resuscitation distressing, sticking in your mind, or if you find it has raised some questions please feel free to contact a facilitator and we would be very happy to set up a debrief (preferably involving your uni tutor too) to go through this.

Day-to-day in ICU

Safety checks and Head to Toe Assessment

On the back of our chart is a safety checklist, and a head to toe assessment that we complete at the beginning of each duty. Doing full assessments of your patients, whatever area you work in, is a good habit to get into. We suggest that with every patient you help your nurse to complete the assessment. This is a great task to do from Day One.

The charts are legal documents and if you are unsure about what to write, please ask as the nurse signs their name to this. When you are new at this, it is okay to take several hours to complete it.

Observations such as blood pressure, pulse, breathing, input and output are documented hourly and this is something you can take initiative and complete yourself.

Medication/Blood products

Medications are given in abundance and this is the perfect place for you to become familiar with the drugs and preparing them. You will get plenty of practice with the five 'R's'. Again, ask if you are not sure and do not give a drug intravenously unless the nurse is present and prepared to be responsible for your practice. The ICU drug manual is an excellent resource which is on every bedside computer, and is also available in an online/ mobile format at drug.wellingtonicu.com/, or via PDF at:

wellingtonicu.com/Data/Wellington%20ICU%20Drug%20Manual%20v2013.pdf

All blood products and controlled drugs must be checked and signed by two RNs, but feel free to check as well to get the practice.

Basic/Fundamental Cares

These may not away seem very exciting; however, they make a huge contribution to the comfort of the patient, and lead to the best outcomes. Our patients are generally unable to perform activities of daily living. We perform eye and mouth care two hourly, turn patients three hourly, brush teeth six hourly, perform washes, shave faces, etc.

Getting involved, using your initiative and offering to perform mouth and eye cares can be really helpful for the nurse you are working for, and you can really 'own' these little jobs.

Especially in sicker patients, these basic cares often end up being missed, but they really do improve outcomes (see the nursing resource in the hot room about the links between mouth care and rates of pneumonia! A great learning objective topic...)

Planning to incorporate all these cares is an important part of time management and they are excellent skills to gain.

Advanced care

Ventilators, arterial lines, pacemakers, PA Catheters, and balloon pumps are all advanced types of equipment we use in ICU. You will not find most of them outside the intensive care setting.

It is not appropriate, as an undergraduate student, that you set these as objectives to learn about while on placement in ICU.

Families in Crisis

ICU is often a terribly distressing place for a patient's family/friends/whanau to visit. The stressful nature of the situation means they will often ask the same question time and time again. Be patient and considerate, and if you don't know the answer, please do not guess – find out, or pass it onto the nurse you are working with. It is okay to say "I don't know, but will find out for you".

This placement is good for developing the skills at starting conversations, developing empathy and reassurance, and helping people deal with crisis. Watch the nurses you work with—they will all have their own special way and one way may appeal to you more than another.

Down Time

When it is quiet with your patient, please feel free to wander around the unit and ask other nurses if there is anything you can do. We love initiative and a helping hand! You're also welcome to peel away to a computer to work on your ILOs or other school work.

We also suggest that each day you take time out to work on your set objectives and complete the ICU workbook.

Shift times/meal breaks

You will be working either AMs (0700-1530), PMs (1430-2300), or 12 hour shifts (LD=long day 0700-1930, LN=long night 1900-0730) depending on which semester you are placed with us. These will be set depending on your university's preference and how the unit believes it can best accommodate you.

Meal breaks are negotiable (and must be organised with neighbouring nurses) but are generally 30 minutes for morning tea and 30 minutes for lunch. On night shifts, we take one 30 minute break usually between 2100 and 2400, and an hour long break where you can sleep if you wish, normally between 0200 and 0500. The precise times you take breaks are negotiable depending on your preference and workload.

Sick leave/Shift changes

It is okay to be sick! Our patients are generally already immuno-compromised, so if you are sick please just call the ACNM (04 806 0431) and let them know, and send ICUStudentFacilitatorsCCDHB@ccdhb.org.nz an email. If you want to swap a shift with another student, please check with a student facilitator first.

Tasks/skills

When you are with us, try to tick these tasks off:

Assessments:

- Doing a blood sugar
- Taking an ECG

Airway cares:

- Endotracheal and oral suctioning

Cares for sedated/ intubated patients:

- Oral cares on the intubated patient
- Eye cares on the unconscious patient
- Washing a patient's hair in bed
- Tracheostomy dressing
- Endotracheal tube tie changing

Medications management:

Mix and administer medications via different routes:

- Intravenous
- Nasogastric
- Nebulised
- Priming an IV giving set
- Priming a syringe driver line
- Management of Patient Controlled Analgesia (PCA)
- Management of Total Parenteral Nutrition (TPN)

Wound/ dressing cares:

- Central line dressing
- Dressings of wounds
- Staple/ suture removal
- Removal of lines

Psychosocial cares:

- Sit in a family meeting
- Care for a palliative/ end of life patient

General ICU procedures:

- Inserting a nasogastric tube or in-dwelling urinary catheter
- Witness an intubation or tracheostomy insertion
- Accompany a patient to the CT or MRI scanner
- Isolation procedures

Skills the Student Nurse can focus on in an ICU Placement

- Head to toe assessment
- Washing, pressure area care, eye and mouth cares, patient appearance
- Patient communication, with conscious and unconscious patients, families and friends
- Emergency ABCs
- Neurological observations
- Safe repositioning of patients
- Excellent dressing technique
- Infection control issues
- Interpreting ABG's
- Preparing a patient for discharge
- Documentation and handover

HEAD TO TOE ASSESSMENT

Head to Toe assessment is something you will spend a lot of time doing in ICU and is a skill that will be transferrable to any future nursing employment. This is an ability we are constantly using, even unconsciously, every time we interact with our patients.

NEUROLOGICAL ASSESSMENT

Glasgow Coma Scale Assessment (GCS)

The level of consciousness (LOC) is the most important aspect of the neurological examination, and often a subtle alteration in the patient’s LOC is the first indication of deterioration.

The GCS is an assessment tool used to numerically categorise a patient’s LOC, from a minimum score of 3 to a max of 15 points. A score of eight or less indicates coma and generally will require intubation and ventilation.

Glasgow Coma Score		
Eye opening (E)	Verbal Response (V)	Motor Response (M)
4 = Spontaneous 3 = To voice 2 = To painful stimuli 1 = No response	5 = Normal conversation 4 = Disorientated conversation 3 = Words, but not coherent 2 = No words, only sounds 1 = No verbal response T = ‘tube’ – artificial airway means patient is unable to talk. Worth 1 point.	6 = Obeys simple commands 5 = Localises to pain 4 = Withdraws from pain 3 = Decorticate posturing 2 = Decerebrate posturing 1 = No motor response P = ‘Paralysed’ by medication and unable to move. Worth 1 point.
		Total GCS = E + V + M

Only use a painful stimulus if the patient is unresponsive to voice or touch. If the patient is unresponsive, our preferred noxious stimulus is a firm pinching of the trapezius muscle.

The pressure should be applied for up to 30 seconds to accurately assess the response. If there is no response, apply a peripheral painful stimulus (such as nail bed pressure) to each limb individually to elicit the degree of deficit. This determines the lower level basic spinal response.

Whatever the patient displays during your assessment of motor function, the best response is the one that is entered in your GCS score.

Pupils: Evaluation of the pupillary response includes assessment of size, equality, shape (are the pupils round or ovoid?) and the degree of reactivity to light.

Size - Record the size in mm when the pupils have constricted to the ambient light.

Other routine neurological assessments include assessing pain (using a numerical scale, or an ICU specific observational scale such as CPOT), assessing for delirium (CAM-ICU is our most common tool), checking level of sedation (RASS), looking for limb movement deficits, and checking any neurological equipment such as extra-ventricular drains or intra-cranial pressure monitors.

RESPIRATORY ASSESSMENT

Note presence of an artificial airway, such as an oral endotracheal tube (OETT) or tracheostomy. If either is present, how long has it been in? Check the depth, size, and the inflation of the internal balloon.

In any airway, including in the self-ventilating patient, note signs of obstruction. If there are no sounds heard from movement of air and no rise and fall of the chest then the patient has complete airway obstruction—this is a clinical emergency. Partial obstruction can be heard with snoring, wheezing, stridor (harsh high pitched sound heard on inspiration) and gurgling. Also note—does the patient have a cough? Is it productive, and what is the colour and volume of the sputum produced?

Inspection: Observe the patients general appearance. What is their work of breathing? Is it relaxed, pursed lip, laboured? What is the respiratory rhythm? Is it regular, shallow, irregular? Are they using accessory muscles and are they able to speak? By asking how they feel you assess all of the above as well as their level of consciousness; new confusion can be a sign of hypoxia and poor oxygenation to the brain.

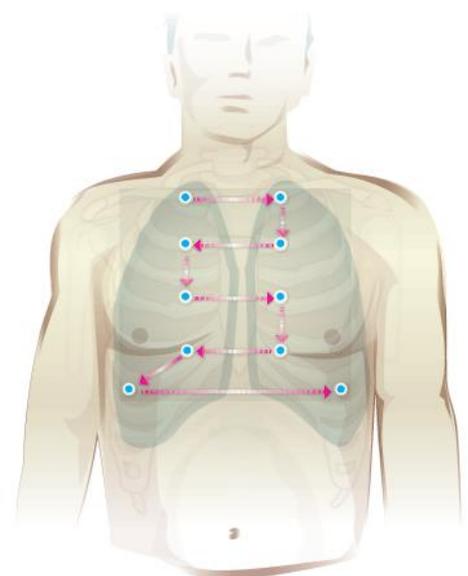
Note SpO₂—a normal measurement is >95%, however this is relative to the patient’s pre-existing conditions, age and smoking status. In ICU we generally aim for SpO₂ >90%. Measure the respiratory rate—RR <8 and >30 indicates a compromised respiratory function.

Note the oxygen delivery mode, FiO₂ and humidification.

Palpate: Examine chest wall movement. Is it equal or unequal? Unequal movement may indicate a flail chest, pneumothorax or OETT misplacement.

Auscultate: Is the chest clear? Are sounds decreased or unequal? Can you hear wheeze, crackles, or nothing at all (absent chest sounds)?

Also take note of any chest drains present; check if they are “bubbling” - air leaving a pneumothorax or “swinging” – fluid in tubing moving tidally with respiration.



Anterior lung-field auscultation

CARDIOVASCULAR ASSESSMENT

Inspection: What is the patient’s general appearance? Any immediate obvious abnormalities? If the patient looks acutely unwell consider the need for urgent expert help.

Observe the skin colour, and note if patient pale, dusky, flushed, jaundiced, mottled or blue. Examine the lips and tongue if possible, and the hands and fingers. Peripheral cyanosis is associated with reduced peripheral perfusion; this may be significant but not life threatening. Central cyanosis indicates a serious respiratory or cardiovascular problem.

Check the BP—hyper/hypotensive, Mean Arterial Pressure (MAP), Are they on any inotropes/vasopressors?

Check the telemetry/ ECG monitoring. Is there indication for a 12 lead ECG?

Palpation—Palpate the radial pulse. Is it tachy/bradycardic, sinus rhythm or irregular, weak, full, bounding, thready? Compare the pulse on both sides, new abnormalities will warrant a ECG. A HR >150 and <40 will not generate enough cardiac output, therefore seek urgent help immediately. A difficult to palpate pulse is a sign of low cardiac output and a full bounding pulse can be a sign of sepsis. Check for pedal pulses – if you can't feel them it is likely the patient is peripherally vasoconstricted or there is another problem at foot.

Perform an axilla or tympanic temperature. Also feel the patient's hands and feet—are they cool and vasoconstricted, or abnormally warm and vasodilated? Are they clammy or diaphoretic?

Capillary refill indicates peripheral perfusion and is assessed by pressing on a finger pad or nail bed for 5 seconds; on releasing, blanching should return within 2 secs. Return > 3secs (particularly if in combination with other signs) suggests poor peripheral perfusion and some degree of circulatory failure.

Oedema: assess hands, feet, scrotum, eyes and generalised. This can be indicative of chronic heart, kidney or liver disease, or fluid overload, which many of our ICU patients suffer.

GASTROINTESTINAL ASSESSMENT

Inspect the abdomen: any distension, masses, ascites, discoloration, prominent veins, bruising, scars, surgical sites, stomas?

Palpate: any pain? Is it localised or does it radiate? Is it felt in the abdomen or in the back? Are there any masses, distension, soft, non-tender?

Auscultate bowel sounds. Are they active, hypoactive, absent?

Also check for the presence/absence of NG/NJ tube, feed, gastric residual volumes. What is the BSL? Are they on an actrapid infusion? TPN? Nausea and vomiting?

Bowels: last open, amount, consistency, colour, constipation/diarrhoea.

URINARY/RENAL ASSESSMENT

Do they have a catheter in? If not, are they continent? Are you able to palpate a bladder? When the last time they passed any urine, and what was the volume, colour, consistency, odour and sediment?

Are they on dialysis? What have their creatinine and other markers of renal function been like on recent blood tests?

INTEGUMENTARY ASSESSMENT

Skin condition: Check for any breakdown, redness, blistering, surgical sites, pressure areas, wounds, dressings, rashes.

Are they on an air mattress? Do they need to be? What is their Braden Score?

Check the mouth and the ETT ties. Are there any pressure areas, and when was the last ETT tape changed? Any ulceration, gum bleeding, loose teeth?

Check the eyes. Any scleroderma, dryness, exudate, pus, redness?

Common Medications in the ICU

VASOACTIVE AGENTS

In times of stress the body attempts to maintain adequate blood pressure, to ensure adequate tissue perfusion to the vital organs. A part of this response includes the stimulation of the sympathetic nervous system which releases powerful hormones from the adrenal glands.

These hormones (called catecholamines) include dopamine, adrenaline and noradrenaline, which we use in concentrated doses on patients to improve cardiac output. Other drugs have been artificially made (dobutamine) and others are copied from other parts of the body (vasopressin, milrinone) to supplement the body’s attempts to ensure adequate tissue perfusion.

These drugs that boost cardiac output are given the collective term “vasoactive agents”. These powerful drugs need to be carefully infused and monitored by nursing staff. Having a broad knowledge of how these drugs work and the effect they have on patients is important in our daily care.

As a student you will not be changing or titrating these infusions—they are dangerous drugs and can cause serious harm if administered incorrectly. However, you can draw them up and prime lines.

Vasoactive agents can be broken down into further categories:

- ❖ **Inotropes** are agents that affect myocardial contractility. *Positive inotropes* increase the force of contraction — e.g. adrenaline, dobutamine, isoprenaline, ephedrine, noradrenaline – increasing cardiac output and BP. *Negative inotropes* decrease the force of contraction, and are used to decrease cardiac workload – e.g. beta blockers and calcium channel blockers.
- ❖ **Vasopressors** are agents that cause vasoconstriction leading to increased systemic and/or pulmonary vascular resistance (SVR, PVR). We use these to increase BP in critically ill patients who are hypotensive.
— e.g. noradrenaline, vasopressin, metaraminol, vasopressin, methylene blue
- ❖ **Inodilators** are agents with inotropic effects that also cause vasodilation leading to decreased systemic and/or pulmonary vascular resistance (SVR, PVR) — e.g. milrinone, levosimendan
- ❖ some agents don’t fit these categories easily! — e.g. dopamine

Adrenaline	Inotrope and vasopressor. Stimulates beta and alpha receptors, increases heart rate, cardiac conduction and contractility. Causes vasodilation of bronchioles at moderate doses. Inotrope and vasopressor. Used in anaphylaxis, states of low cardiac output, as a local vasoconstrictor to control some bleeding, nebulised for upper airway obstruction. Causes lactate rise and decreases potassium
Noradrenaline	Strong vasopressor, inotrope - Stimulates alpha and beta receptors leading to increased blood pressure by vasoconstriction. (Increases SVR → increased afterload; increased DBP and coronary perfusion – increased vasoconstriction → increased venous return → increased preload. Less effect on heart rate than adrenaline. Must only be given

	through central venous catheter as damaging to small veins. Used to increase BP.
Milrinone	Phosphodiesterase inhibitor. Phosphodiesterase prolongs cardiac and coronary artery contraction. By inhibiting this milrinone increases ventricular filling, improves myocardial oxygenation, and vasodilates (reducing afterload). We generally measure the effect via central venous oxygen saturation levels. Used when myocardial contractility is impaired and cardiac output is low. Inotrope and vasodilator
Dobutamine	Synthetic Catecholamine. Inotrope. Stimulates: β_1 receptors - strong β_2 receptors - weak Dobutamine is used to increase cardiac output, increase coronary blood flow, increase myocardial oxygen consumption and reduce peripheral resistance. Causes a drop in BP but increases cardiac output when BP already adequate.
Dopamine	Natural catecholamine. Dopamine and adrenoreceptor agonist. Inotrope, causes vasoconstriction. Neurotransmitter in the nervous system
Vasopressin	Vasopressin is secreted from the posterior pituitary gland. Stimulates V1 receptors (vascular smooth muscle) and V2 (renal collecting duct system). Used in severe shock. Powerfully increases BP; roughly 10x as strong per ml as norad.
Phenylephrine	Increases blood pressure by stimulating alpha receptors. It is synthetically made. Indications include hypotension and decreasing MAP – weaker than norad but can be given through a peripheral IV cannula.
Glyceryl trinitrate (GTN)	Antihypertensive agent; acts as a vasodilator on the arterial system. Indications include control of hypertension in cardiac surgery and also for treatment of myocardial infarction.
Metaraminol (Aramine)	Acts directly on alpha receptors, causing peripheral vasoconstriction. Can be given through peripheral IV lines. Often bolussed for quick increase in BP.

ANAESTHETICS, SEDATIVES AND OPIOIDS

ICU patients are often kept asleep in order to facilitate care. The most commonly used drug to do this is **propofol**, a short acting general anaesthetic. It is used for the maintenance of general anaesthesia and to sedate ventilated ICU patients. It is the preferential drug used due to its short acting nature. It is not to be given to non-ventilated (or imminently intubated) patients as it causes respiratory depression. Also monitor for hypotension and bradycardia.

Midazolam is a benzodiazepine sedative, which also acts as an amnesic drug preventing the patient from remembering the time spent on it. It is used as an infusion in long-term sedated ICU patients as well as during induction for intubation. Monitor for respiratory depression and hypotension.

Morphine is a strong opioid analgesic, providing symptomatic relief in moderate to severe pain, and is commonly used for this purpose within the ICU. It is also used as an adjunct to maintain a comfortable sedation for our ventilated patients. It is important to remember that propofol and midazolam do not have any analgesic properties. Morphine is not to be

given to patients with renal failure; consider **fantanyl** instead, another opioid with similar effects that is not cleared renally. Monitor for respiratory depression and hypotension.

ARTERIAL BLOOD GASES

Arterial blood gases are important in monitoring the respiratory function and acid base balance of the critically ill patient. They indicate how well the patient is compensating for illness and provide fast, useful data such as haemoglobin, blood glucose and electrolytes. Understanding blood gases helps the nurse assess the success of interventions and the priorities of caring for that patient.

ABGs should not be taken until 20 - 30 minutes after any changes to ventilation or any intervention that affects respiratory function. Indications for taking a blood gas include:

- When the arterial line is first inserted
- Post intubation
- Any acute significant deterioration in patients respiratory function
- To monitor haemoglobin, electrolytes or glucose

Not all patients will have normal blood gases when well. Patients such as COPD sufferers will have abnormal ABGs (often with high CO₂ and high Bicarb) which may in fact be normal for them. Like any measurement, your ABG result needs to be interpreted in context.

The Values

There are normal physiological values for arterial blood gases, however “normal” figures can differ between texts and machines.

The “normal values” on our blood gas print reports are as follows:

Value	'Normal' Range	Measures
pH	7.350 – 7.450	Measurement of acidity or alkalinity, based on the hydrogen (H ⁺) ions present.
paCO ₂	35.0 – 45.0 mmHg	The partial pressure of the carbon dioxide dissolved in the blood.
paO ₂	80.0 – 100.0 mmHg	The partial pressure of oxygen is dissolved in the blood.
HCO ₃ ⁻	20.0 – 30.0 mmol/L	The amount of bicarbonate calculated to be in the blood.
Base Excess	-2.0 – +2.0 mmol/L	The base excess indicates the amount of excess bicarbonate in the system. - Greater than +2 is abnormal and is seen when the bicarbonate is high. - A negative base excess is referred to as a “base deficit”. A negative base excess (base deficit) is seen when the bicarbonate is low (metabolic acidosis).
SaO ₂	95.0 – 98.0 %	The oxygen saturation is the percentage of the haemoglobin that has oxygen bound to it. A patient with severe chronic lung disease may have saturations in the 80s- 90s normally; aiming higher may be unrealistic. Similarly, in a patient with severe acute respiratory failure it may be appropriate to aim for a SaO ₂ of 88-94%.

STUDENT WORKBOOK

This is a workbook for you to work through during your ICU placement. It is to be completed *during* your time here in ICU if you have downtime. It is not intended as homework for you to complete in your own time. If you are busy in your shifts and don't have time, that's fine!

CARDIAC

Describe sinus rhythm

Describe the pathway of electrical current through the heart

Now relate that to the PQRST

How many chambers does the heart have?

How does the blood move through the heart – describe the cycle

Name 4 sites of peripheral pulses

Describe how you would assess a patient's capillary return

What is the function of the heart valves?

What are three life threatening cardiac rhythms?

What does a defibrillator do?

RESPIRATORY

List words used to describe breath sounds

What accessory muscles are used when someone is having difficulty breathing?

Show a nurse the different components of an Ambubag and what you need to check, prior to use

What is the purpose of PEEP and what does it stand for?

Name 3 types of O2 delivery systems that are used in ICU (besides nasal prongs & Hudson mask)

NEUROLOGICAL STATUS

What is the quickest way to check someone's level of consciousness?

What assessments are made in the GCS?

What will assessing the patient's pupils indicate (think of dilation vs pinpoint)

What is the purpose of an EVD?

What does ICP stand for?

EMERGENCIES

What is a respiratory arrest and what are the possible causes?

A respiratory arrest will require the patient to be intubated. What does this mean?

Identify the process of intubation and list the equipment required

What is a cardiac arrest?

Describe the roles of the RN in an “arrest situation”

ENTERAL CARE

How do you assess bowel sounds?

How would you insert a nasogastric tube?

How do you check for patency and position of the NG tube?

What is the difference between nasogastric and nasojejunal?

What would you use to flush the NG tube?

How often do you measure gastric residual volumes? What is the normal range?

What is the normal range of blood sugars for an adult?

What is an insulin sliding scale used for?

PRESSURE AREA CARE

Describe how to use a sliding sheet

How would you direct a log roll and why is it done?

When looking at your patient's skin, what are signs of pressure areas?

How would you prevent a pressure area becoming worse?

How would you know if a wound was infected?

RENAL

What is oliguria? Polyuria? Anuria?

What is considered sufficient urine output in mls per hour?

What is dialysis?

Give 3 reasons why a patient would receive dialysis?

COMMON DRUGS

Give the uses of and side effects for the following:

Midazolam

Morphine

Propofol

Clexane

Metoprolol

Adrenaline

Noradrenaline

What are the 5 rights of drug therapy?

What observations should be done when giving blood?

What is the difference between an adverse effect and anaphylaxis?

What are different ways to manage a patient's pain?

Resources

For general information on our ICU and questions to commonly asked questions, please see our website www.wellingtonicu.com. For information about our commonly used medications, see our own drug manual, wellingtonicu.com/Data/Wellington%20ICU%20Drug%20Manual%20v2013.pdf

An assessment textbook, such as Jarvis's Physical Examination and Health Assessment, can be very useful to hone in your assessment skills.

Useful free websites for getting your head around ICU include:

- www.lifeinthefastline.com - This website contains a number of resources & links related to Emergency Medicine & Critical Care. The Clinical Cases section provides a useful Question/Answer approach to scenarios common to both specialties
- www.icuqa.org – This website is a collection of FAQ files written for new nurses starting in a Medical ICU
- www.wilkes.med.ucla.edu/inex.htm - A website of different lung sounds heard through auscultation

A journal article I thoroughly recommend reading (if you have the time!) is Atul Guwande's "The Checklist" – It's a short essay from his book "The Checklist Manifesto". It's written more like a story and it's a great read.

<http://www.newyorker.com/magazine/2007/12/10/the-checklist>

It talks briefly about ICU treatment, then talks more in depth about Central Venous Lines. The reason I recommend it so highly is because it explains the history and rationale for all the checklists and paperwork we go through – incredibly relevant and gave me a new respect for all the tick boxes!

Some Abbreviations used in ICU

1°HB	1 st degree heart block
ABG	Arterial blood gas
Af	Atrial fibrillation
AF	Atrial flutter
AR	Aortic regurgitation
AS	Aortic stenosis
ASD	Atrial septal defect
ASV	Most common ventilator mode – Adaptive Support Ventilation
AVM	Arterio veno malformation
AVR	Aortic valve replacement
BBB	Bundle branch block
BiPAP	Biphasic positive airway pressure
CABG	Coronary arterial bypass grafting
CO	Cardiac output
Coags	Coagulation profile
CPAP	Continuous positive airway pressure
CPP	Cerebral perfusion pressure
CPOT	Critical care pain observartion tool
CRRT	Continuous renal replacement therapy
CVP	Central venous pressure
CVVHDF	Our most common dialysis mode (Continuous Veno-Venous Haemo-DiaFiltration)
DDD	Pacing mode (dual sensed, dual paced, demand)
DECRA	<u>Decompressive craniectomy</u>
EDH	Extra-dural haematoma
EtCO₂	End tidal carbon dioxide
ETT	Endotracheal tube
EVD	Extraventricular drain
FBC	Full blood count
FiO₂	Fraction of inspired oxygen
GCS	Glasgow coma score
HFNP	High flow nasal prongs
HM	Hudson mask
IABP	Intra-aortic balloon pump
ICD	Intercostal drain
ICH	Intracerebral haematoma
ICP	Intracerebral pressure
ICT	Intercostal tube

IDC	Indwelling catheter (urinary)
LFT's	Liver function tests
M&M	Morphine and midazolam
MC&S	Microbiology, culture and sensitivity
MR	Mitral regurgitation
MS	Mitral stenosis
MVR	Mitral valve replacement
NGT	Nasogastric Tube
NIV	Non-invasive ventilation
NP	Nasal prongs
OETT	Oral endotracheal tube
PaCO₂	Partial pressure of arterial carbon dioxide
PaO₂	Partial pressure of arterial oxygen
PCV	Pressure control ventilation
PEEP	Positive end expiratory pressure
PS	Pressure support
RASS	Richmond agitations and sedation score
SAH	Subarachnoid haemorrhage
SB	Sinus bradycardia
SDH	Subdural haematoma
SIMV	Synchronized intermittent mandatory ventilation
SpO₂	Saturation pressure oxygen
SR	Sinus rhythm
ST	Sinus tachycardia
SVT	Supraventricular tachycardia
TR	Tricuspid regurgitation
TV	Tidal volume
U&E'S	Urea and electrolytes
VF	Ventricular fibrillation
VT	Ventricular tachycardia
VVI	Pacing mode (ventricular sensed, ventricular paced, inhibited)

Wellbeing

Things can sometimes get intense here.

In the ICU, there are many rewarding moments of accomplishment and satisfaction watching patients recover. However there are also moments of emotional distress, frustration, and feelings of defeat. You may experience things here that are new to your developing practice – such as death and experiencing the emotional impact of critically unwell people and their families. Seeing patients in pain or hearing traumatic stories can also be very distressing.

We hope you will share the joy we experience from working together in a positive team environment, no matter the outcomes. However, if you are feeling overwhelmed or see something that distresses you, please come to us and we will do our best to help. We are always happy to chat or debrief during your shift, or we can meet at another time to talk things through if you prefer. Give Andy, Eilis or Rebecca an email or catch us in person. We are happy to meet together with your Clinical Tutor too if you would like.

Outside of your time with us here, it is important you look after yourself by sleeping enough, eating well, getting the occasional bit of fresh air, and connecting with those close to you. If you need to take a morning or a day off to look after yourself that's okay.

It may help to keep perspective that this ICU holds up to 24 of the sickest people from a catchment area of over 1 million!

If you are really struggling, you can also get in touch with the free student counselling and support available through your school.

Lifeline are also reachable 24/7 to talk on 0800 LIFELINE or free text HELP (4357)

Student Feedback

Please place completed form in pigeon hole “S”

To make sure your precious time in the clinical setting is beneficial to your learning; please spend a few minutes to give us some feedback. This is completely confidential and anonymous, and your honesty is appreciated.

Thanks for your time.

Did you find your time here helpful?

Did you learn what you thought you would?

What did you find unhelpful?

Is there anything we can do to make your time here easier?

Was your orientation day valuable?

Do you think the ICU is a valuable place to learn?

How does this placement compare to your other ones?

Any other comments?