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1.0 INTRODUCTION

Welcome to the Intensive Care Service at Wellington Regional Hospital. We hope that you will find your rotation with us both interesting and challenging. We also hope that you will gain knowledge and experience in caring for critically ill patients that you can use in your future career.

Orientation lectures are held for the first 2½ days of the run. Apart from the orientation to the aeromedical retrieval service (at the Life Flight Base at Wellington Airport), they take place in the Seminar Room, ICU, Level 3, Wellington Regional Hospital. The orientation lectures will take priority over all other activities. All new registrars must attend including those rostered to clinical or after hours duties. The ICU specialists will cover clinical duties during this time. The orientation lectures give you some basic understanding of what we do and how we do it, but will by no means be a comprehensive explanation of everything. Most of what you will learn will occur during the ward rounds and day-to-day clinical activities.

It is important to utilise the resources around you. The senior nursing staff and unit technicians have a wealth of experience and knowledge that you may find helpful. Comprehensive information about our unit can be found on the ICU website at wellingtonicu.com. The most recent Orientation Schedule, Teaching Timetable and Journal Club roster are all linked to here and also available online under the Education section, along with many other resources. Unit and hospital policies can be found on the CCDHB Intranet, accessed through your hospital login.

2.0 REGISTRAR ADMINISTRATION

2.1 General Administration

Leave forms and expense claim forms can be obtained from, and returned for action to the Administrative Coordinator.

2.2 Daily Timetable (Weekdays Only) - SEE APPENDIX 9 ALSO

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8am</td>
<td>Medical Handover (ICU Seminar Room)</td>
</tr>
<tr>
<td>9am</td>
<td>Night Registrars finish</td>
</tr>
<tr>
<td>9-10.30am</td>
<td>Morning Ward Round (North, Central &amp; South)</td>
</tr>
<tr>
<td>10.30am</td>
<td>Radiology Meeting (in Radiology department, Level 2)</td>
</tr>
<tr>
<td>11am</td>
<td>Clinical Duties</td>
</tr>
<tr>
<td>4-5pm</td>
<td>Afternoon Ward Round (North, Central &amp; South)</td>
</tr>
<tr>
<td>9-10pm</td>
<td>Evening Ward Round (Long day registrars handover to night registrars)</td>
</tr>
<tr>
<td>11pm</td>
<td>North End Night Registrar attends Hospital At Night Handover (MAPU Seminar Room)</td>
</tr>
</tbody>
</table>
The 24 bed unit is geographically divided into three pods:

- **Central** pod (Bed nos. 1-7, 17-18 - 9 beds)
- **North** pod (Bed nos. 8-16 - 9 beds)
- **South** pod (Bed nos. 19-24 - 6 beds)

Each pod is managed by a specialist and RMO. The Long Day registrars go to North & South pods; Short Day to Central Pod. Flight Day to whichever other pod is busiest. There is a specialist handover at the 4pm Ward Round. The central pod specialist assumes clinical responsibility for every patient in the unit until the following morning. The long day registrars must maintain continuity in the unit at all times. This means being up to date with all the patients in their respective pod (not just some). It is appropriate for the long day registrar to delegate duties and responsibility to the short day registrar, as they see fit. Activities outside of the unit - medical emergency team (MET) calls, trauma calls, ED or ward referrals - go to the short day or evening registrar in the first instance. These registrars therefore carry the emergency phone.

Appendix 9 contains a more detailed timetable of both weekday & weekend medical staff allocations.

### 2.3 Timesheet Tips

A record of hours worked is submitted electronically using Payroll Kiosk (available on your hospital desktop) on a weekly basis. Your shifts will generally be pre-populated in the Payroll Kiosk system by the ICU administration coordinator in advance, however if this hasn’t been done please enter them yourself. Accuracy in submitting your Payroll Kiosk data is paramount to ensure that ICU registrars continue to receive pay appropriate to the roster intensity.

### 2.4 Remuneration in Intensive Care Services

Registrars in Intensive Care are employed on a salary, according to the Resident Doctors Association Collective Employment Agreement (RDA MECA).

The salary band is defined by an hourly range based on the average hours worked during the run. The present run is calculated and defined in the Run Description which you will find at the end of this manual.

The hours averaged over a complete run are about 44 per week (Category F). However, as the ICU registrar job operates as a full rostered shift system, the RDA MECA states that the job be paid at a category C rate (equivalent to 55-60 hours per week) regardless of the number of hours that you work. This is why there is a disparity between the number of hours you actually work (44 on average) & the number of hours that you are paid for (55-60) i.e. you are paid for 30% more hours than you actually work (on average) to compensate for the inconvenience of shift work.


### Overtime:

On occasions you will work past the end of your shift and this is termed ‘unrostered overtime’. Within the contract, this is not paid additionally, as it is included in the salary you receive for that bracket of hours. However, if you feel that the overtime hours worked would make the averaged hours per week higher than the bracket you are in, then you are able to ask for a ‘run review’ to be carried out. This examines the average number of hours worked over the previous six weeks and is a mechanism to ensure that you are not working large amounts of unpaid overtime.
On-Call:
Ensure the hours you are on-call is recorded on Payroll Kiosk, excluding any call-back. This will be paid at $4 per hour. This is the paid rate for flight on-call from home in addition to your basic salary.

Callback:
This occurs when you are on-call and are then required to return to work - this is almost always only applicable for flight nights or senior registrars (beyond 2200hrs). This is paid at a 4 hour minimum with additional hours paid at the actual number of hours you work (i.e. if you work 2 hours callback, you are still paid for 4 hours work; if you work 5 hours callback, you are paid for 5). This is paid at call-back rates which are detailed in the RDA MECA. The clinical leader will review all call-backs that occur within 10-20 minutes after leaving work to ensure they are justified.

Orientation:
During the first 2½ days of the run we require you to attend the orientation sessions. Due to the mutual benefit gained from your orientation and use of your time to do so, we will pay registrars at the normal rate for the hours they attend if not already rostered to work those days. These should be claimed on Payroll Kiosk as ‘Orientation’.

Teaching:
We provide a comprehensive registrar education programme. Registrars who are rostered on duty at the time of the session will be released to attend, however this does need to take into account urgent clinical work which does take priority. The teaching programme is incorporated into your run category calculation as paid hours, so registrars who are not rostered on clinical duty at the time of the session should still attend. It is very important that you fill in your Payroll Kiosk accurately, so that we can be clear about the hours you are working.

3.0 INFORMATION FOR MEDICAL STAFF

3.1 Accountability

Intensive Care is a specialist led service. Medical care is directed by specialists, but medical responsibilities are delegated to registrars according to their knowledge, abilities, experience and progress. Registrars remain at all times accountable to the on-call specialist for the day (the central pod specialist). **You are not expected to know everything, but are expected to ask.** Patient treatment should only be changed within the agreed parameters which have been discussed with the on-call specialist. Wellington Intensive Care is a ‘closed’ unit in so far as medical treatment is primarily directed by the Intensive Care team, with input from other specialities as appropriate. Patients can only be admitted to our ICU with Intensive Care Specialist (or delegated SR) approval.
3.1.1  Referrals, Communication & When To Call the Boss

General communication rules:
Be respectful and polite at all times; expect the same from your colleagues.

Communication with other units:
If a cardiac surgical patient is bleeding excessively call the cardiothoracic surgical consultant directly (not the registrar); notify the registrar subsequently as a courtesy if you have time. The cardiac surgeons always want to know if their patients are bleeding excessively. The ICU specialist should already have been informed.

Neurosurgery, cardiothoracics, paediatrics, general surgery and haematology services in particular appreciate being closely involved in the day to day management of their shared patients in the Intensive Care Unit. Any management disagreements should be resolved by communication at a specialist level.

Any requests to external teams who not already involved in the patient’s care for review of an ICU patient must be made in consultation with the responsible ICU specialist.

Golden rules for referrals:
- Nullius in verba (trust no-one) but never make anyone feel bad for asking for help
- Review everyone in person if you can
- Tell the ICU specialist/SR about every referral you receive even if it is 4:30am

When to call the specialist:
You MUST notify the ICU specialist or SR as soon as feasible about every admission, every referral and every discharge. Also:

• No patient can be refused admission except by a specialist (or SR)
• If you are faced with a procedure that you are not completely comfortable with and help is not readily available
• If a specialist or specialist registrar from another unit requests you to do something contrary to the ICU plan
• For every retrieval, once you have assessed the patient at the referring hospital
• If a patient requires intubation (even if you are able to perform that procedure yourself)
• If oxygenation or ventilation unexpectedly worsens; in particular if the FiO₂ is >60% or the pH is less than 7.2
• If a patient unexpectedly develops a new inotrope or vasopressor requirement
• If the noradrenaline requirement exceeds 10ml/hr (1mg/hr)

3.2  Medical Cover

Rostered medical cover is provided at specialist and registrar level 24 hours a day, seven days a week. Registrars work shifts according to a regular cycle. Any proposed changes to the published weekly roster must be discussed with the Admin Coordinator and approved by the Clinical Leader. It is important that registrars are available within the unit for immediate patient problems or phone calls. If you need to leave the unit at any time, then you should inform the Associate Charge Nurse Manager (ACNFM) where you are going. You should not leave the hospital except on approved patient transfers unless discussed with the duty consultant.
3.3 Audit and Education Sessions

Departmental meetings and audit are held on Friday afternoons between 1pm and 3pm, after the Journal Club (see below). These meetings are used to review all patients currently in the unit in preparation for the weekend, discuss the patient care we have provided, and to review patients who have died or required readmission to ICU. All registrars are encouraged to attend the departmental meetings. Journal Club is held from 1pm Friday in the Seminar Room. Recent ICU articles are presented and discussed.

Registrar education sessions will be held every Thursday from 12pm in the ICU Seminar Room. There is also in-situ sim sessions approximately every fortnight following the teaching. The topics to be covered are available on the notice-board outside the SMO’s office and available on the ICU website. Links to both the teaching and Journal Club timetable are provided in the Introduction above.

It is understood that non-Intensive Care trainees may have other teaching requirements within their area of specialty. The sessions in our unit are made available for you to gain knowledge in the area of intensive care and so it is requested that you attend. Attendance at teaching sessions run by other departments is supported, but is dependent upon the workload in the unit.

3.4 Leave

There are three registrars available on the roster to provide cover for leave. It is preferable that leave not be taken over night shifts. Preference is given to cover exams, exam courses and then on a ‘first come first served’ basis. Generally, senior registrars will cover senior registrar leave and registrars will cover registrar leave; however, on occasion a senior will need to cover a junior or vice versa. All leave entitlements (annual, sick, parental, study etc.) are as described in the RDA MECA.

3.5 Registrar Duties

The long day registrars are primarily responsible for the coordination of the care of all the patients within the unit. They must attend and complete the morning ward round and preferably should remain in the unit during the day. The short day and evening registrars should be used to attend to patients outside of the unit. The long day registrar is expected to be up to date with the condition of all the patients under their care, and be able to discuss these with the on-call specialist/senior registrar, and to present the case at handover rounds.

The short day registrar is responsible for patients in the central pod. This responsibility is handed over to the evening shift registrar at 4pm.

The evening shift registrar works from 2pm-10pm. They handle responsibility for the central pod from 5pm. After the short day registrars go home at 5pm, they will take the MET phone. Flight retrievals in the late afternoon/early evening which may disrupt the shift times for the flight registrars may be handled by the evening shift registrar. If this is the case, then the flight day registrar will take over the south pod until 7pm, at which time the flight night registrar will take over until the evening registrar is back (or until 10pm).

The flight day registrar is rostered on duty for flight retrievals from 7am until 7pm. If not required to provide flight cover they work on the floor as an additional ‘short day’ registrar from 8am-5pm, primarily responsible for attending MET calls, Trauma Calls and reviewing inpatient referrals - however they must remain available for urgent flight duties (in which case hand the call phone to short day reg). If not required they can choose to go home following the afternoon handover, noting that they are still ‘on duty’ until 7pm, so if required to return this is not considered a callback. If finishing beyond 7pm we will pay additional hours worked at additional duty rates.
The **flight night** registrar is available on call at home from 7pm until 7am. Occasionally they may be required to come in and assist on the unit if it is busy, or is another registrar is absent due to sickness or an overlapping flight.

On the weekends, the **flight day** registrar is on call for flights 7am-7pm, for 9 hours of which they are physically present in the ICU from 8am to 5pm. The **flight night** registrar covers 7pm-7am on call from home and does not have to attend unless requested. Occasionally it may be necessary for the duty specialist to send a registrar off the floor on a flight (e.g a time-critical emergency retrieval, or a complex case that requires an experienced senior registrar) - in this case the flight call registrar may be asked to come in to help cover the unit, and can claim call back for this time.

The workload and hours of work are often unpredictable. If you are required to stay past the usual finish time, you should **not return to work without an eight hour break** without the express permission of the on-call ICU specialist. Please discuss with them if you have concerns over your levels of fatigue or ability to perform to the level required, at all times.

The **senior registrar** who is rostered on to the senior registrar shift will take responsibility for running of the unit under the supervision of the specialist. The senior registrar role is designed as a transition role between registrar and specialist; however, the responsibility for patients in the ICU ultimately rests with the ICU specialist on-call. The senior registrar on this shift is expected to work 'on the floor' from 8am until 5pm but may, at their own discretion, go home between 5 and 9pm. They will then attend the evening ward round at 9pm and will be available as the first port of call for ICU registrars overnight. If the senior registrar needs to return to the hospital overnight, they will be paid call back in accordance with the RDA MECA. Call-back is not paid between 5 and 9pm as they are actually rostered on duty during this time (but allowed to be on-call from home).

### 3.6 Ward Activities

The main formal medical staff activities on a weekday are laid out in section 2.2 above. There are three ward rounds every weekday, and two every day at the weekend.

For weekdays in more detail:

- **8am**  
  Morning handover in seminar room with presentation of all patients by the night registrars. All MET calls & overnight referrals are also presented along with the anticipated (elective) workload of the day & any imminent retrievals.

- **8.30am**  
  Consultant ward rounds with a complete review of every patient's progress and treatment. The long day registrars must remain with the ward round - if there are jobs that urgently need doing these should be delegated to the short day registrar.

- **10.30am**  
  All current radiology and radiology from the previous day are reviewed with a senior radiologist. The long day registrars must attend this meeting to provide brief clinical vignettes of the patients, for continuity of care and their own education.

- **4pm**  
  Handover (to central pod specialist) and review round of all patients including new admissions since morning ward round.

- **9pm**  
  Handover with long day registrars handing over to the night registrars. Includes specialist review of new admissions.

- **11pm**  
  The north base night registrar attends medical handover meeting in the MAPU Seminar Room.
MORNING WARD ROUND

The morning ward round is the most important part of the patient care that we provide. It is important to review all that has happened, the current treatment we are providing and to review the current orders, drug charting, equipment and invasive lines. All issues relative to a patient should be discussed before the ward round leaves each bedspace. It is important that the nurse caring for the patient is present and can actively participate in the discussions.

The method by which the specialists review the patients will vary but it is expected that the review will cover all aspects of the patient’s care. These may be summarised under the headings of neurological status, respiratory, cardiovascular and fluids (including inotrope or vasoressor support), renal function, gastrointestinal function and nutrition, infection and antibiotics, miscellaneous other items, instrumentation and vascular access, documentation and drug prescription, communication and family issues. The acronym ‘FASTHUG’ has been previously proposed and is used here in an adapted form as a reminder of standard ICU cares that may be otherwise overlooked. It stands for Feeding, Analgesia, Sedation, Thromboembolic prophylaxis, Head of bed elevation, gastric Ulcer prophylaxis, & Glycaemic control, and should be done for each patient every day. A plan for the day will be worked out and documented. Every ward round needs to be documented in the patients notes by either the long or short day registrar. It should include a clearly documented plan (replicated on the daily ICU chart) as well as an understanding of the rationale for each action point.

LIMITATIONS ON TREATMENT

Some patients will not survive whatever is done for them, or may survive with a quality of life or at a personal cost which we (and they or their surrogates) consider not to be justified. Our default position on all patients is that they are for full active treatment unless a decision is made to limit treatment or to withdraw treatment. Such a decision is usually arrived at as a consensus between the ICU specialists, the patient or their surrogate and the patient’s own medical team. It is inappropriate to half-heartedly provide treatment when a decision to limit treatment has not been made.

Levels of limitation may include:
- Pre-set limits for which support may not be provided beyond e.g. not for intubation or ventilation
- A limit on inotropes/vasoconstrictors (e.g. a noradrenaline infusion up to a maximum rate)
- Not for haemodialysis or invasive ventilation
- Limitation in extremis, e.g. not for cardiac massage or defibrillation in the event of a cardiac arrest
- Withdrawal of specific therapies after discussion between specialists, the patient’s family and usually the admitting team

A form entitled ‘Allow a Natural Death in ICU’ (http://wellingtonicu.com/Data/ANDICU.pdf) is available to improve communication and planning regarding the management of patients on whom treatment has been withdrawn and should be used in these situations.

Due to the nature of the patients we care for, death in the ICU is common. The service admits about 1800 patients every year, with an ICU mortality of 9%. This means that on average 3 patients will die in the ICU every week. Unexpected death in ICU is uncommon - most patients die because ongoing treatment is deemed futile and consequently extraordinary measures have been discontinued. Such patients are entitled to and expected to continue to receive therapy aimed at alleviating distress or pain. For some registrars from specialities where death is uncommon, this can be challenging. Please talk to the responsible ICU specialist or one of the ICU Supervisors of Training if you are having difficulties. Your mental health and wellbeing are important.
The Patient At Risk (PAR) Service

The PAR team consists of senior nurses with advanced skills in assessing & caring for deteriorating patients in a ward environment. Many of them also work as ICU nurses. They visit the wards to share their expertise where and when they are needed. PAR nurses aim to support and educate ward staff in recognising patients who are deteriorating and in initiating appropriate care.

Their role is to:
- Follow up all critical care patients discharged from the intensive care unit to support their continued recovery on the ward & prevent ICU readmission
- Provide extra support for family/whanau of patients recently discharged from intensive care
- Implement the Early Warning Score (EWS) system and protocol in all in-patient wards of the hospital to assist in identifying and treating deteriorating patients
- Support all ward staff in caring for at-risk patients within the ward environment
- Provide teaching to ward staff to improve their skills when caring for the sickest patients in the ward environment.
- Help to facilitate referral and transfer to a higher level of care in a timely manner when necessary.

PAR and the ICU Registrars:

It is important to understand that the PAR nurses cannot refer patients to ICU directly; all referrals must come from the primary team looking after a patient. The PAR nurse may help to facilitate the referral process and may also have a “just to let you know” conversation with you at the end of their day so that you can be aware of potential clinical deterioration overnight.

PAR nurses often work in relative isolation. This can be challenging and the PAR nursing team will sometimes need support from you. The nurses may ask for some advice about a particular clinical scenario, assistance interpreting an X-ray or may just want to have a bit of a chat about something that is happening out on the wards.

If you review an unwell patient on the ward or in ED who doesn’t require ICU admission but may benefit from further follow-up, please discuss the patient with the PAR Team. If they were not already aware of the patient, they can help you in providing a closer eye on anyone you may be worried about.

PAR nurses also respond with you to emergency ‘777’ calls (MET and cardiac arrest calls) 24 hours a day. Their main role is to support the patient and ward staff during the event, but are they also a very useful resource for medical staff (particularly the ICU registrar) in managing deteriorating patients in sometime challenging environments.

Wellington Hospital uses a vital-sign based escalation protocol to ensure that deteriorating patients receive appropriate escalated therapy and that futile measures that don't result in physiological improvement are not perpetuated. Increasing scores are assigned to 7 different vital sign parameters the further they deviate from the norm. It is therefore possible to obtain a 'maximum' system response of a MET call, of which the PAR nurse & the ICU registrar are two key members. The matrix that shows the 7 vital signs (respiratory rate, oxygen saturation, need for supplemental
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oxygen administration, temperature, systolic blood pressure, heart rate, and level of consciousness) and their scored values are shown below:

It is possible to trigger a MET call from either a single extreme vital sign deviation, from a combined score of 10 or more, or because the member of staff is sufficiently worried to call one.

Patients who score 6 or more trigger the algorithm for escalated review beginning with junior ward medical staff & the PAR nurse, escalating to a MET call as shown below. As such, the ward team are given the opportunity to manage patient deterioration themselves before ICU involvement is required. Junior medical and nursing staff are mandated to escalate care if either patients continue to deteriorate or they are unable to get the assistance they require.

Part of your orientation program includes a session on the PAR service, Early Warning Scores & the Medical Emergency Team responses system. More information, statistics relating to & details of the escalation pathway can be found in the EWS library here: ews.wellingtonicu.com

Wellington Hospital has been instrumental in developing the Health Quality and Safety Commission’s national patient deterioration programme. The national New Zealand Early Warning Score and the national vital signs chart, now implemented in every New Zealand hospital, is based on that developed by Wellington ICU.

<table>
<thead>
<tr>
<th>SCORE</th>
<th>MET</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>MET</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE</td>
<td>BLUE</td>
<td>RED</td>
<td>ORANGE</td>
<td>YELLOW</td>
<td>WHITE</td>
<td>YELLOW</td>
<td>ORANGE</td>
<td>RED</td>
<td>BLUE</td>
</tr>
<tr>
<td>Resp Rate</td>
<td>&lt;5</td>
<td>5-8</td>
<td>9-11</td>
<td>12-20</td>
<td></td>
<td>21-24</td>
<td>25-35</td>
<td>&gt;35</td>
<td></td>
</tr>
<tr>
<td>SpO₂</td>
<td>≤91</td>
<td>92-93</td>
<td>94-95</td>
<td>≥96</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Temp</td>
<td>≤35.0</td>
<td>35.1-36.0</td>
<td>36.1-38.0</td>
<td>38.1-39.0</td>
<td>≥39.1</td>
<td></td>
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<tr>
<td>Sys BP</td>
<td>&lt;70</td>
<td>70-90</td>
<td>91-100</td>
<td>101-110</td>
<td>111-219</td>
<td></td>
<td>≥220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate</td>
<td>&lt;40</td>
<td>40-50</td>
<td>51-90</td>
<td>91-110</td>
<td>111-130</td>
<td>131-140</td>
<td>&gt;140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Consciousness</td>
<td>Alert</td>
<td>Voice or Pain</td>
<td>Unresponsive or fitting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New Zealand Early Warning Score Escalation Pathway

<table>
<thead>
<tr>
<th>ZONE</th>
<th>Indicator</th>
<th>Mandatory Action</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Total EWS 1-5</td>
<td>Manage pain, fever or distress. Increase frequency of vital sign monitoring</td>
<td>1</td>
</tr>
<tr>
<td>ORANGE</td>
<td>Total EWS 6-7</td>
<td>Discuss with nurse in charge and inform PAR nurse. Increase frequency of vital signs monitoring.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Acute illness or unstable chronic disease</td>
<td>Registrar review within 20 minutes &amp; consider ICU referral. Inform PAR nurse, house officer and nurse in charge. Increase frequency of vital signs monitoring.</td>
<td>3</td>
</tr>
<tr>
<td>RED</td>
<td>Any vital sign in the red zone or total EWS 8-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Likely to deteriorate rapidly</td>
<td>Dial 777, state ‘Medical Emergency Team’ &amp; give your location. Support Airway, Breathing &amp; Circulation</td>
<td></td>
</tr>
<tr>
<td>BLUE</td>
<td>Any vital sign in the blue zone or total EWS 10 or more</td>
<td></td>
<td>MET</td>
</tr>
<tr>
<td></td>
<td>Immediately life threatening critical illness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to contact PAR
For general information & patient referral, please contact the PAR Nurse on duty by ringing **#6785** from any internal hospital phone (available 24 hours per day, 7 days per week).

The PAR Team is led by a Clinical Nurse specialist, Sarah Imray (sarah.imray@ccdhb.org.nz) with support from the PAR Clinical Liaison, ICU specialist Dr.Alex Psirides (alex.psirides@ccdhb.org.nz). Both should be contacted in the rare event you have any concerns or issues about the PAR service. The PAR nurses are an excellent resource to help you look after patients in the ward environment.

3.8 Tracheostomy Review And Management Service (TRAMS)

TRAMS ([http://www.wellingtonicu.com/AboutUs/Services/TRAMS/](http://www.wellingtonicu.com/AboutUs/Services/TRAMS/))

TRAMS are a multidisciplinary team based in ICU set up to manage patients discharged to the ward with tracheostomies in-situ. The service is led by Tom Andrews & Lynsey Sutton (ICU Clinical Nurse Specialists) & consists of the North Pod ICU specialist of the day, a Speech & Language therapist and a physiotherapist. TRAMS visit every patient with a percutaneously inserted tracheostomy until they are decannulated (the tracheostomy is removed) or the patient is discharged from Wellington Hospital. The service makes decisions along with the patient’s primary team around tracheostomy weaning and provides an education resource for the ward staff who may be unfamiliar with looking after patients with tracheostomies. The service does not follow up patients with tracheostomies inserted for ENT purposes as these are looked after by their own team. Most tracheostomies in ICU are removed before the patient is discharged but particular patient groups (patients with traumatic brain injuries for example) may require prolonged insertion. The service currently reviews about 20-30 patients per year with each patient requiring multiple reviews.

All TRAMS visits occur during office hours, usually after the morning X-ray meeting. Although they are attended by senior medical staff, registrars have the opportunity to join the team to learn about tracheostomy management if they wish to do so. Any emergency issues that arise are usually dealt with by the MET team.

3.9 Hand hygiene

Nosocomial infection is a reality in intensive care. We have a large number of sick patients in an open environment and cross infection is a significant risk.

*The single most important thing you can do to reduce this risk is to maintain excellent standards of hand hygiene.* Doctors grossly overestimate how often and how well they clean their hands.

Our policy is simple:
- Alcohol hand gel should be used before and after every patient or bedspace contact
- Hands must be cleaned before every sterile procedure
- Eye protection should be worn for all procedures (including intubation)

ICU staff are regularly audited for hand hygiene compliance. Results can be seen on the [ICU dashboard](http://www.wellingtonicu.com/AboutUs/Services/TRAMS/). Alcoholic hand gel and hand washing facilities are available by every bedspace.
Your behaviour and safety with infectious diseases (measles, influenza, tuberculosis, meningococcus, MRSA) is predicted by your usual behaviour. Intensive care staff are at risk because you don't know prospectively which patient will be the index case in an outbreak.

### 4.0 TRAINING AND ASSESSMENT

The Intensive Care Service is recognised for formal training in intensive care.

Registrar positions are recognised by the following Colleges:

- College of Intensive Care Medicine (CICM)
- The Australian & New Zealand College of Anaesthetists (ANZCA)
- The Royal Australasian College of Physicians (RACP)
- The Royal Australasian College of Surgeons (RACS)
- The Australasian College of Emergency Medicine (ACEM)

At the beginning of your run you will be interviewed by one of the ICU supervisors of training to gain some background information about yourself, your past experiences, your training requirements and your expectations of the run.

All registrars will be informally assessed mid-run and interviewed to see how their initial period has gone and if there are any issues that need addressing.

All registrars will have a formal assessment at the completion of their run with an interview during the last few weeks.

The practice of intensive care is such that everything you do will be able to be observed by the specialists the following day. This peer assessment is an important part of intensive care practice and ensures that everybody practices to a high standard. You will undoubtedly make errors of judgement and errors of management during your time here; this is how we learn. It is quite likely these will be brought to your attention in a constructive way so that you can learn. In particular electrolyte, fluid management and circulatory management will become clearer as the run progresses.

Intensive care and high dependency patients frequently have input from multiple teams. An important part of our practice is being able to coordinate patient management and discuss patient care with multiple other specialists and patients’ families. In particular this will test your interpersonal and communication skills.

We expect a lot from our registrars and will make a large effort to identify areas of your practice or performance that can be improved. We do this to teach you and help you to become better doctors. Please do not be offended if you are spoken to about areas of your practice that can be improved.
These are admissions which have been notified to us and entered in the admission diary. They can be separated from acute admissions in that we can postpone or cancel the admission if we do not have enough vacant beds.

We provide high dependency care as well as intensive care and there is a policy of general acceptance of most patients for elective high dependency care allowing for bed availability. All requests for elective admissions must be discussed with the senior medical staff and written in the admissions book.

It is the responsibility of the referring team to check we have a bed available before starting their planned procedure. All elective admissions are also discussed at the morning handover meeting each day. In the even of number of requested beds exceeding those available in ICU, priority on which cases proceed is determined by the theatre teams, not ICU staff. Please do not get involved with attempting to resolve potential conflicts; if in doubt, escalate to the on-call specialist.

All requests for acute admissions must be discussed with and approved by the on-call ICU specialist or SR. Admissions can come from in-patient wards, ED, theatres/PACU, or other hospitals (usually within our tertiary catchment area).

WARD/ED/THEATRES/PACU
You can either see the patient first or discuss the request with the specialist. Always document your review in the patient notes, especially if we do not transfer the patient to the unit.

INTERHOSPITAL
These patients vary from referrals for tertiary medical/surgical care, referrals for tertiary intensive care, or referrals because another unit is full or they don't provide intensive care (resource referrals).

The mechanism for accepting patients will vary:

(a) Tertiary medical/surgical referrals should be accepted by the Wellington specialist team concerned. We may get the first phone call or it may be the second or third. We will take responsibility for coordinating the referral to help minimise the number of outside phone calls to the referring team (who are often also directly involved in looking after the patient) has to make.

(b) Tertiary intensive care referrals are accepted by us but we must ensure that a primary team is also found within Wellington Hospital to manage them (e.g. a patient who develops multi organ failure post laparotomy will require acceptance by the local surgical team on-call even if their reason for transfer is not for further surgery).

(c) Resource intensive care referrals are managed as (b).

(d) Acute trauma referrals may be a combination of (a), (b) and (c). It is often appropriate to accept the patient, begin organising the transfer, call the on-call ICU specialist and then
discuss with other surgical teams. Where possible call the surgical specialist yourself, present the details and ask them to call the referring doctor.

All interhospital retrievals by aeromedical means mostly use aircraft provided by Life Flight. Coordination will be conducted either by the flight coordinator (during weekday office hours), or by the on-call flight nurse. Please do not get involved with this process unless specifically requested to do so as this is likely to hinder established communication channels. No transfer occurs without mandatory notification to the on-call ICU Specialist who must approve every transfer. All road retrievals (typically from Hutt, Kenepuru, Wakefield and sometimes Wairarapa Hospital) are performed using vehicles provided by Wellington Free Ambulance.

DECLINED REQUEST FOR ADMISSION

Admission can only be declined by an ICU specialist or SR (in consultation with the specialist). Even if the unit is 'full' the specialist will take responsibility for declining admission or arranging alternate placement; rarely this may involve moving a stable non-tertiary patient to another ICU. Please liaise with the PAR team if you feel a declined admission would benefit from follow-up.

IMPORTANT: All admissions must have a primary team. Remember to call an appropriate registrar about patients that come from ED or another hospital. Some patients may be admitted under the ICU specialist on-call (usually medical patients admitted directly from ED or transferred from another hospital). All patients admitted to ICU from a Wellington hospital ward are admitted under their named hospital admitting team. The on-call paediatrician must be notified of all children admitted to ICU (if they are not the referring service).

5.2 Discharges and Transfers

DISCHARGES

All patients to be discharged from the Intensive Care Unit must be discussed with the on-call specialist or SR first. Once the patient is medically well enough to be discharged the registrar will discuss this with the primary team. The primary team must accept the patient before they are able to be moved from the unit. Once medical acceptance has been gained, then the nursing staff will discuss with the nursing staff of the ward to ensure they have enough resources to look after the patient. Please see the orientation manual section with regard to the documentation that must be completed before discharge.

TRANSFERS TO OTHER HOSPITALS

Patients may be transferred to a different hospital for two reasons. Firstly they may be returning to the hospital they were transferred in from or, on occasion, we may transfer a patient to a different intensive care unit (usually beginning with the geographically closest) when we do not have sufficient resources to provide safe care.

TRANSFERRING TO A WARD IN ANOTHER HOSPITAL

The registrar should discuss the patient with the registrar or specialist who will look after the patient at their hospital. Once the patient has been accepted by the medical staff, then the transport arrangements can be put in place. It is still appropriate for the intensive care nurses to communicate with the ward nurses to ensure that they have sufficient information about the patient. In general, patients referred in from another hospital will be transferred to a ward in Wellington Hospital before being transferred back to the ward area of the referring hospital. Patients being transferred to a ward in another hospital are sometimes transferred to that hospital’s ICU/HDU (if they have one) pending assessment prior to a final transport to the ward.
TRANSFERRING TO ANOTHER INTENSIVE CARE UNIT

All patient transfers to intensive care units in other hospitals will be arranged by the on-call specialist. They will firstly discuss arrangements with the doctor responsible for the intensive care unit in the other hospital. The patient may be transferred because they are returning to the hospital they were referred from, or on occasions they may be transferred because we do not have sufficient resources in Wellington Hospital or require specialist care (such as the regional spinal unit in Christchurch or the national burns unit in Middlemore). In general, the patient will be accepted by the doctors responsible for the intensive care unit, but the patient must also be accepted by a primary team in the other hospital as well. This referral can either be done by our intensive care staff or by the primary team within Wellington Hospital.

ADMISSION

All patients admitted are to have a written admission note, printed from the ICU clinical database (WICCID). This forms part of the patient's paper medical records. It should cover:

- Prior health status
- Sequence of events leading up to ICU admission
- Assessment of vital systems
- Diagnosis
- Injury list (for trauma patients)
- Treatment already undertaken
- Treatment and investigations being planned
- Social: what the family have been told, what needs to be covered with the family in subsequent meetings and any other relevant points

All trauma patients should have a Major Trauma Admission Form completed on admission (available in ED or in Flight Nurses packs).

DAILY UPDATE NOTES

A daily entry in the written medical notes will be made. These should describe:
- Changes and events of the last 24 hours
- Problems and plans for the next 24 hours
- An organ systems-based assessment of current progress

All invasive procedures need to be fully documented in the clinical notes and in WICCID (the latter allows a centralised record & also provides registrars with personal procedure summaries available at the end of the run).

Long Day Registrar responsibilities:
The long day registrars must note the plans of the day on each patient. These should be documented on the 24 hour ICU flow chart. The long day registrars will also note procedures to be done or booked, consultations to be sought and information acquired etc. The long day registrars will also update the remainder of the 24 hour ICU flow charts, in particular the fluid and electrolyte prescription for the day and the desired physiological parameters, for example mean arterial pressure, ICP etc.
Short Day Registrar responsibilities:
The short day registrar should record a daily progress note in the clinical record as noted above.

Night Registrar responsibilities:
The night registrars should ensure that patients who require a morning chest x-ray have this ordered before 7am (please ensure clinically relevant information and/or a clinical question is included in the request to allow the radiologists to provide a useful report); all patients who have been in the unit for over 24hrs should have their APACHE data entered into the ICU database; any patients who are likely to be discharged the following day (e.g. straightforward cardiacs or HDU admissions) should have their discharge summary prepped to improve efficiency the following day. Blood tests on MAP should be signed off and results acted on as appropriate.

DATA QUALITY

Much of the audit data that allows us to run the unit, contribute to the ANZICS database, and conduct high quality research will be collected from the clinical database. As such, it is important that all data entry be of high quality and as accurate as possible. Training will be provided for you during orientation.

DRUG CHART

All drugs are to be charted on the National Medication Chart. This is a standardised record of the patient’s drug prescription and administration. To avoid the risk of medication errors it is essential that medications are charted legibly using block letters and units. Avoid extraneous zeroes following the dose. Allergy status must be filled in for all patients. Intravenous fluids and feeds are charted on the 24 hour ICU flow chart. Use generic names, not proprietary names for all medications (e.g. prescribe metoclopramide not ‘Maxolon’). If no convenient generic name exists, use the trade name in quotes, for example ‘Augmentin’.

For all postoperative cardiac surgical patients use the pre-printed cardiac drug chart. It contains all the routine medications a patient will likely require with us. As for any other prescription, you need to ensure there are no contraindications for each of the drugs. Fill in the dosage and sign each drug separately. Ensure that there are no duplications with pre-existing drug charts. On discharge from ICU you must cross off all the drugs which are only applicable to ICU and chart oxygen and maintenance fluids if required.

The Intensive Care Unit Drug Manual is available in printed form and as an electronic version on both the Intra & Internet (https://drug.wellingtonicu.com/)

Intensive Care patients are often on multiple medications which change on regular basis - good housekeeping and adherence to medication charting standards is essential to prevent medication error in these patients who are particularly vulnerable to harm.

DISCHARGE SUMMARY

A printed medical discharge summary from WICCID is required for all discharges, transfers and deaths. The ventilation hours information must be completed as it is used to determine coding and funding.

The ICU discharge summary is heavily relied on by other teams inheriting the care of our patients, and is especially important for specialists at other hospitals when patients are transferred. Essential elements to include on the discharge summary (especially important for complex or long-stay patients) include:

- A summary of what the key problems were, how we investigated them, how we managed them, and which other speciality teams were involved (named consultants where possible)
- A clear statement of the final diagnosis
- Any complications during the admission (e.g. VAP, AKI)
• Any followup still required (e.g. an incidentaloma found on imaging that needs further investigation, or an investigation result still pending)
• Whether repeat ICU admission should be encouraged or entertained - i.e. if there was a discussion on limitations on care then this should be clearly documented
For long stay and complex patients you are encouraged to ask a senior registrar or specialist to review the discharge summary you have prepared before it is finalised.

6.2 Death

Whenever a patient dies you will need to:

• Complete the ICU electronic clinical database record and file the discharge summary in the patient’s notes
• Complete both a death certificate & cremation form only if the patient is not a Coroner’s case. All death certificates must be accompanied by a cremation form even if the patient is not for cremation; some families may change their mind later & the paperwork cannot be subsequently completed by another doctor who did not view the body after death
• Use the form letter to notify the general practitioner and send an ICU Discharge Summary
• Complete details on the patient death task checklist (included in the ‘Death Pack’ along with all other required paperwork)
• Complete a ‘Deceased Patient Hospital Discharge’ using the Concerto patient data system - many of the details can generally be cut & pasted from the ICU database discharge note. Remember this is primarily going to the GP, so they will be interested in what happened to the patient, and they may be a point of contact for the patient’s family if they have questions.

Note:
Should the case be accepted by the Coroner, do not complete a death certificate or cremation form as these will be completed by the Coroner or their officers. This documentation is kept in pre-packed folders (the ‘Death Pack’) in the unit - please ask the Ward Clerk or ACNM if you can’t find it. CCDHB does not provide RMO remuneration for the completion of cremation forms.

CORONER’S ACT
A copy of the criteria for referral to the coroner is attached (Appendix 3). If there is any doubt about whether a patient should be referred or unusual circumstances, then the coroner should be contacted directly. If there is any uncertainty, please discuss this with the on-call specialist who should be informed of all deaths on the Unit anyway.

It is recommended that all ICU doctors read the New Zealand Ministry of Health guide to Death Certification. It contains helpful information & examples of what can & can’t be written on a death certificate. Death certificates are audited at the Friday audit meeting.

ORGAN DONATION & CONVERSATIONS WITH FAMILIES

Organ Donation is a core part of ICU work and something we hope you will get some exposure to during your time here. In our ICU we have approximately 10 organ donors per year and we believe that every opportunity for donation should be recognised and for families to have this offered to them if it arises.

We are careful to only offer donation once we have had staged conversations with families and there is absolute certainty that the family understand that the patient has died by brain death, or is going to die due to the nature of their injuries/illness and we plan to stop active treatment.

Research shows these conversations should be held by staff trained and experienced in having them, for that reason in Wellington ICU donation conversations are only held by ICU consultants and senior ICU trainees (with SMO involvement).
It is not expected that you have these conversations and there is a chance that mentioning organ donation at the wrong time could reduce a family's confidence in the process and could make further conversations more difficult.

These conversations can almost always be conducted during the daytime hours by the consultant on for the day. If a family was to bring donation up for a patient then by all means acknowledge this and thank them for raising it. If this is something that could be on the cards for a patient you can defer this by saying something like, “thank you for raising this. We might still need to have those conversations in the future but at the moment we are still trying to manage their (brain injury). Should we reach a point where donation can be offered we will certainly discuss this with you”.

If a patient looks like they have coned in the middle of the night then it is okay to express concern that this may be the case but clarify that formal testing will be required to confirm this in the daylight hours. In this instance again, it is advised not to mention organ donation unless you need to acknowledge this because the family have raised it.

In the event that someone may be potentially offered the opportunity to donate, blood tests are sent to Auckland. For pragmatic reasons these can be sent before formal assent from the family has occurred. This reduces the timeframe to donation if and when family agree and the bloods are not tested until such point as donation assent has been attained.

Any referrals to ODNZ should be made either by the ICU consultant or with their knowledge and guidance. Both the ODNZ guidelines (in the green folder in the Fishbowl), and the ODNZ app (access code 6369) contain all you need to know about physiological management of a braindead patient. Looking after a patient’s physiology allows us to preserve the opportunity for donation until discussions can be held.

In the event that someone dies and organ donation is not possible, they may still be able to be a tissue donor, which is something worth being aware of.

We do appreciate you keeping organ donation in mind for our patients as it is an important part of ICU care that we encourage you to be involved in with senior guidance and support.

If you have any questions feel free to contact Dr Colin Barnes (ODNZ Link Doctor) or Cherie Watts (ODNZ Clinical Nurse Specialist).

### 7.0 PROCEDURES IN ICU

#### GENERAL

Procedures are a routine part of intensive care practice but can be hazardous. It is important that all lines are inserted carefully, safely and in a sterile manner. If you are not sure of your own ability to carry out the procedure, please ask. We have had significant morbidity from complications and we take these procedures seriously.

There is a place in the clinical database to record procedures you perform so they can be summarised to add to your training record at the end of your ICU run. Ensure all invasive procedures you carry out are documented in the patients notes, including the name of the proceduralist (and supervisor if required), indication, procedure note, any medications administered (must also be charted on drug chart), complications and further plans (e.g. a chest x-ray).

#### 7.1 Central Venous Lines (CVL)

All CVLs are to be inserted using the CLAB (Central Line Associated Bacteraemia) prevention packs.
By default we use quad-lumen central lines which are all chlorhexidine free. Use **16cm lines** for right IJV cannulation (preferred), and **20cm lines** for left IJV or femoral cannulation. All lines are inserted under ultrasound guidance. All lines are to be secured with a dressing covering the line from the skin insertion site to the StatLock™. Femoral venous line insertions should be avoided unless no other route is possible. The CLAB documentation should be completed after every line insertion. The bedside nurses will check your compliance with the insertion bundle; this includes donning both a disposable hat & face mask before insertion. Lines should be inspected daily, and removed when no longer required. If unsure, ask a specialist or SR.

Haemodiaysis catheters, or Vascaths (for continuous renal replacement therapy or plasmapheresis): preferentially we use 15cm Vascaths for right internal jugular insertion & 20cm for the left. They should not be inserted via the subclavian route. Further details will be given as part of orientation. As with central lines, femoral venous insertion should be avoided where possible.

No patient is able to be discharged from ICU with a femoral central line in-situ. All central venous lines are removed by nursing staff at medical request. All internal jugular or subclavian central venous line insertion must be checked with a chest X-ray as soon as possible. Even (especially) if the insertion attempt was unsuccessful, a chest X-ray should be performed to exclude damage to the lung or surrounding structures (pneumo- or haemothorax). This is especially the case in patients receiving positive pressure ventilation.

### 7.2 Arterial Lines

For estimated stays less than 48 hours a short peripheral cannula (20 gauge) is acceptable. If the patient is expected to stay more than 48 hours, this short cannula should be replaced using a long soft arterial line. This must be inserted using a sterile technique with gloves. A sterile pack with drapes must be used and not a small dressing pack. Do not cut corners; a subsequently infected arterial line will require surgical excision of the artery. Leave 10 cm of these long lines external and looped towards the elbow, not around the thumb. No suturing is required when long lines are used. The lines should be secured with a transparent Tegaderm and the site inspected daily as for central venous lines.

### 7.3 Pulmonary Artery Catheters

As for central lines. Do not routinely send catheter tips unless a catheter-related bloodstream infection is suspected. Be certain you are in a vein before you dilate to insert the sheath. It is large and may need surgical removal if it is in an artery. If you dilate an artery in error, notify the ICU specialist on-call & call a vascular surgeon. **DO NOT attempt to remove the line.**

### 7.4 Intercostal Drains

Intercostal drains must be inserted using a sterile technique with gown and gloves. We have two types of intercostal drains - both are multi-holed drains & neither have a trocar. Insert drains using a blunt dissection technique. If required for drainage of a pneumothorax insert a 24-28Fr sized drain. For drainage of blood or empyema, size 28 - 32Fr drain is preferred. These drains are not changed routinely and are sutured in place using nylon. Do not insert a purse-string suture. Place all intercostal drains on 10 - 20 cm of water suction.

For simple pleural fluid it is recommended to use a smaller drain (6-7 Fr) inserted by Seldinger technique, from a blunt 16G needle/guidewire method. This is a tidy, safe method with minimal morbidity but is not suitable for blood, air or pus.
7.5 Urinary Catheters

These will be changed when blocked but not generally as a routine. In renal failure patients that are totally anuric it is reasonable to remove the catheter, however in all others accurate measurement of urine production is needed.

7.6 Endotracheal Tubes (ETT)

INTUBATION
Capnography must be used for all intubations in the Emergency Department and Intensive Care. There is capnography available in every bed space. Intubation is recognised as being a very good way to expose yourself to any respiratory infections present. Wear a visor and/or mask. Continuous capnography is mandatory for all ventilated patients. This includes a real-time end-tidal CO₂ trace as well as the value derived from this. Displaying the number alone is not acceptable.

If you need urgent airway assistance and there is not an ICU specialist immediately available, the telephone numbers for the duty anaesthetist (#6899) and anaesthetic technician (#6345) are printed on top of the ICU airway trolley. Video laryngoscopes are available on all airway trolleys within the ICU along with supraglottic airways, a bougie, direct laryngoscopes, a variety of endotracheal tubes, and a CICO (Can't Intubate Can't Oxygenate) kit.

POSITIONING
This is assessed clinically with the cuff of the tube placed just below the cricoid ring and this needs to be verified radiologically. The tip of the endotracheal tube should be around 2-3 cm above the carina opposite the second or third thoracic vertebra. A chest X-ray is mandatory after every intubation.

CHANGING
Unless occluded or another mechanical problem, for example a cuff leak, endotracheal tubes are not routinely changed. Shortening the endotracheal tube by cutting it should not be performed unless directed by a specialist. In patients requiring prolonged ventilation, the tube must be reviewed with consideration of tracheostomy. Reinforced tubes (typically used in neurosurgical or spine procedures) are not acceptable in the ICU as, if bitten down on, they may completely occlude & not re-open when the patient relaxes. As such, they must be changed for a standard tube in theatre prior to the patient returning to the unit. It is unit practice to ask any patient arriving with a reinforced tube in-situ to return to theatres for the tube to be changed to a standard endotracheal tube.

TRACHEOSTOMY TUBES
Portex or Shiley tracheostomy tubes are most commonly inserted in our ICU by the ICU specialists using a percutaneous (rhino dilator) technique. All patients with tracheostomies in-situ must have end tidal capnography monitored at all times (even if breathing spontaneously). It is routine to insert a tracheostomy inner tube in all ICU patients. Any patients discharged to the ward must also have a tracheostomy with an inner cannula in-situ. They will be followed up routinely by the Tracheostomy Review And Management Service (TRAMS - see section 3.8)

7.7 Gastric Tubes

All intubated patients should have a gastric tube unless a strict contraindication exists. In patients in whom duration of intubation and mechanical ventilation are expected to be less than 12 hours, for example a postoperative cardiac surgical patient, it is reasonable to not insert a nasogastric tube. Size 12 - 16 French tubes are acceptable and these are inserted either orally or nasally if there is no contraindication. They are not changed as a routine. Gastric tubes are secured in place with Elastoplast or similar. ‘Bull-ring’ devices are placed in patients in whom nasogastric tubes are recurrently removed but still required.
7.8 **Echocardiography**

The ICU is equipped with both a Philips Sparq machine & two procedural ultrasound machines. The Sparq has transthoracic, transoesophageal and vascular access probes with needle detection software to aid line insertion. Ultrasound is used routinely to insert lines, diagnose & tap pleural effusions etc. A number of the ICU specialists are trained & credentialed in echocardiography and can help provide this service to guide treatment. It is important to receive training on the use of this machine from one of the specialists prior to use & some familiarisation will be provided during orientation. Proper care and cleaning will help prevent the expensive probes from damage. Due to the high cost and potential risk of the oesophageal probe, transoesophageal echocardiograms (TOE) should only be carried out by ICU specialists, cardiac anaesthetists, or SRs specifically trained in their use.

8.0 **ORIENTATION LECTURES**

Please see the orientation timetable described previously for what is covered during orientation. No pre-reading is expected prior to beginning your ICU run although it is not discouraged.

8.1 **Emergencies**

We need to be prepared for a variety of emergencies and system failures. You are expected to know what to do, so please make sure you ask if you don’t. Generally the ICU ACNM (Associate Charge Nurse Manager) on duty will manage the situation and it is wise to follow their directions.

The situations you need to consider are:

**Fire:** Phone number to call & location of alarm & fire extinguishers. Evacuation plan for staff and patients

**Earthquake:** Safe evacuation zones, safety for yourself, other staff members & patients

**Power, phone system or oxygen loss:** What to do

Ensure you know the location of the following items: Defibrillator, central lines, chest drains, ventilators, portable ventilator, capnograph module, portable monitors, bronchoscope, intravenous fluids, cardiothoracic folder, policy folders, emergency management folder, ultrasound machines, chest re-opening trolley. These will be shown to you during your physical orientation to the unit.

9.0 **MEDICAL POLICIES**

9.1 **Blood Testing in Intensive Care Patients**

**REGULAR BLOOD TESTS**

‘Routine’ blood tests in ICU consist of those sent to the laboratory and those processed on the ICU blood gas analyser. The former consist of two groups - Panel A and Panel B. These are:

**Panel B:** Sodium, Potassium, Urea, Creatinine, Glucose, Calcium, Phosphate & Magnesium

**Panel A:** as above plus Albumin, Bilirubin, ALP, ALT, Full Blood Count & Coagulation Profile

The ICU gas analyser provides a standard profile with basic electrolytes, haemoglobin, lactate & chloride. All bloods processed by the analyser are automatically added to the patient’s electronic clinical lab record.

The nursing staff will collate any results onto the daily ICU blood sheet which is kept by the patient's bedside. Any additional tests are performed at the request of the medical team and can be added retrospectively to previous blood tests after discussion with the laboratory.
NON REGULAR
Arterial blood gases
Use continuous SpO$_2$ monitoring to adjust inspired oxygen concentration. Confirm PaO$_2$ with the regular timed blood gases. Measure when ventilation has been adjusted. PaCO$_2$ can be compared to the end-tidal reading and used to adjust minute volume on the ventilator without the need to repeat arterial sampling. Do not routinely measure blood gas during ventilatory weaning but wait for the next regular test. Check if there is clinical evidence of difficulty breathing.

Urea, Creatinine & Electrolytes
May be four hourly (between regular tests) for very sick patients but basic electrolytes (sodium & potassium) are available from the gas machine.

Glucose
This is measured by the unit gas machine with the regular gases but can also be measured with a bedside glucometer in patients without arterial or central venous access.

Liver Function Tests
There are no indications for more than once daily testing except in paracetamol overdose or fulminant hepatic failure.

Laboratory Full Blood Count
The haemoglobin is measured by the unit gas machine and will be measured as part of the routine eight hourly gases. A lab FBC will only be needed where we want to check the platelet count.

Coagulation Profiles
May be needed each morning for very sick patients or patients on heparin or warfarin. Other times are as requested. If the patient is actively bleeding, frequent repetition may be needed to guide appropriate blood product replacement.

9.2 Medications

REGULAR MEDICATIONS
The following medication should be charted for all patients who are expected to stay more than two days.

Enoxaparin: 40mg subcut daily at 1800 hrs (this is always administered in the evening to minimise bleeding during invasive procedures that may be performed during the day). The dose is decreased to 20 mg subcut daily in renal impairment.
**ORAL THRUSH**

If the patient has oral thrush give Nilstat 1ml QID orally.

**GASTRIC STRESS ULCERATION PROPHYLAXIS**

Following the recent publication of the PEPTIC study, we have decided to change our approach to stress ulcer prophylaxis in the ICU. Ideally, we would now use histamine-2 receptor blockers routinely but neither ranitidine nor alternatives are readily available right now. As a consequence, we have decided that the best approach, on balance, is to not use stress ulcer prophylaxis at all routinely.

Here is the summary of how to proceed:

1. Don’t routinely start omeprazole for stress ulcer prophylaxis
2. If you suspect a patient has a GI bleed, start treatment with omeprazole immediately.
3. If a patient is usually taking omeprazole, you can continue it (please note that it is a regular medicine on the chart)

**THE ICU DRUG MANUAL**

The recommended indications, dosage & administration of all medication commonly used in Wellington ICU is available in printed & electronic form. There are several copies of the the manual available in two volumes at all times. The latest version of the manual can also be downloaded as an indexed, searchable PDF & is also available online as a website specifically designed for use by the bedside on handheld mobile devices (optimised for iPhone & iPad screen sizes) at http://drug.wellingtonicu.com

9.3 Medical Orientation to the Flight Retrieval Service

“You can’t beat Wellington on a good day” but even on a good day, given we are the windiest city in the world, the approach into Wellington airport is generally turbulent.

Please let us know if you are not a traveller, we need to be aware of this. We do carry oral anti-emetics but these need to be taken ideally one hour before flight. If this isn’t satisfactory then you need to make arrangements for someone else to cover for you. There is no shame in deferring a flight to a colleague & there always seems to be someone around who will happily fly back into a 100km/hr southerly.

Please ensure that you are fit to fly; it is extremely uncomfortable and even dangerous to fly with upper respiratory tract infections including the common cold, blocked ears, sinus, or the ‘flu. You will be of no help to yourself or the patient. Please make arrangements with your colleagues to replace you, as you will not be allowed to fly.

LifeFlight Trust, our main provider, operates a Bell 117 helicopter (twin engine) and a two British Aerospace Jetstream pressurised aircraft. Occasionally we may be required to use other aircraft but always pressurised. We fly at a cabin pressure of sea level to 4000 feet maximum depending on the patient’s condition.

The flight nurses have been well trained in this environment and will be of great assistance. Please remember to communicate your intent at all times as they will make things easier for you.

**Safety Orientation**

Your safety is our concern. It is an CAA requirement that you are given a thorough safety briefing. You will be taken out to the Life Flight base to be orientated to both aircraft. You will be given a form to be signed off by the operation manager, or senior crew person once this has been done including:
- Role of the crew and responsibilities
- Safety zones around the aircraft
- When to approach
- How to use the communication equipment
- Placement of emergency equipment in the aircraft
- Use of emergency exits
- Loading and unloading of the patients
- Securing of self and equipment during flight

Hotline
There is a toll free 0508 direct phone line into ICU to allow people to easily contact us. This is primarily for organising flights but it may be used for patient referrals and questions. You can use it to contact ICU when out doing a transfer. The number is 0508 935 535 (0508 WELLFLT).

Online Tracking
All retrieval aircraft can be tracked live online using the Wellington ICU website here: http://www.wellingtonicu.com/AboutUs/Services/Flight/Track/
This page also provides details of all the hospitals within our tertiary retrieval area as well as expected transit times by helicopter, fixed wing and road.

Non-ICU Transfers
If a call comes in on the hotline, it is answered by the ICU ACNM and is passed on to the flight coordinator during office hours. After hours this is organised by the flight nurse on call. Always discuss with the ICU specialist on for the day if you are asked to help on a flight. It is useful to discuss potential pitfalls and anticipated clinical course with the specialist before you leave for the retrieval.
Do not leave the unit without the specialist's permission

ICU Transfers
Follow guidelines and complete the assessment sheet with all the information. Liaise with the ICU ACNM who will page the flight coordinator to activate the flight team. Check appropriate services are notified and happy to accept care for this patient.
If you are discussing a transfer you can save time and make your job easier by getting the referring team to prepare the patient as much as possible. This may be by intubating if required, inserting an arterial line and/or central line, NG tube, getting blood results or repeating blood tests, giving anti-emetics and getting X-rays so that these are available on our arrival.

Your Role
Although we average 60-80 transfers per month, doctors are usually only required on half of these. Doctors accompany patients that may require airway management and/or critical circulation treatment.

Retrieval/transfers are categorised according to the acuity of the patient into the following:-

Category A: ventilated or requiring advanced life support or unstable - always accompanied by a doctor
Category B: acute incident, generally non-ICU patients often require a doctor depending on condition, need for airway management and intervention
Category C: stable returning to home hospital or palliative care - do not require a doctor

The patient category decision is made by the flight coordinator or flight nurse, in conjunction with the ICU specialist on-call.

Please note that your role is as part of a team. Although you are usually the most medically experienced, the flight nurse & crew member who accompany you are more experienced in the aviation environment and their knowledge should be collectively utilised for the benefit of the patient. Please do not feel the need to take over simply because you are the flight doctor.
Similarly, when you arrive at the referring hospital, whatever the quality of care that has been provided, always be polite & professional with the referring team (see ‘Relationships’ below).
key to safe timely transfers is good communication both with the referring & home team. On many occasions you may be bringing the patient back to Wellington for urgent surgical intervention; be aware that the more notice you give to them, the better prepared they will be. If the patient’s condition necessitates it, or they deteriorate in-transit, it may be appropriate to transfer straight to theatres; if this is the case is should be discussed with the ICU specialist as soon as possible.

Preparation of the Patient Prior to Transfer
- Do it on the ground, not in the air
- More is missed by not looking than not knowing
- Responsibility for the patient is gradual until hand-over is complete
- No airport runway hand-overs (except the Chatham Islands for stable patients)

General Aims for Safe Patient Transfer are:
Stable ABC Primary and Secondary survey
If in doubt – intubate (generally if GCS<12)
Trauma films if possible – do not delay, take necessary precautions
All head injuries are neck injuries unless already radiologically cleared (by CT)
Stable vital signs
Maintain oxygen saturation >94%
Adequate IV access, two large bore IV lines for acute patients – CVP if it will not delay
Arterial lines preferable for monitoring in flight as BP cuffs are not accurate – do not delay
Adequate Hb >70g/L
Adequate hydration
No active bleeding
Be aware of mechanism of injury and undiagnosed complication, communicate concerns to the flight team so necessary precautions and adjustments can be made

You must discuss every patient with the on-call ICU specialist before leaving the hospital

Relationships
Remember that the referring team have been looking after the patient and are responsible for the patient when you arrive. They will gradually hand over that responsibility to you, as you discuss the patient. Be patient, listen, and thank them for the care they have provided. Explain why you are changing the infusions, putting in new lines or altering what they have done.

You work as part of a small team and your input is vital to ensure the best outcome for the patient. Communicate clearly with the flight nurse and crew. Please be aware that your interactions with your colleagues form part of your overall assessment & the opinions of the flight team are sought and incorporated into this.

Documentation
Please write a flight report on the last page of the Transport Record, this is then photocopied and left in the patient’s notes. All difficult or problematic flights are audited regularly & you will have an opportunity to discuss them with the ICU specialists if you so wish. Similarly if you have any concerns with the care provided at other hospitals, flight nurses or crew members, you should discuss them with the flight service ICU specialist (Dr Alex Psirides)

Dress Code
We expect you to represent Wellington ICU in a professional and courteous manner that includes the correct attire. The dress code required for all those on the flight team, is a flight suit which is stored in the transit lounge & available from the flight nurse. You may wear your own clothing underneath it. Please keep a pair of boots or solid closed shoes at work, as it is unsafe to have slip ons or unprotected toes for retrievals. Much of the equipment we need to transport is heavy. A broken toe from a dropped oxygen cylinder is very painful.

Stethoscope should be taken at all times
Hair to be neat and tied back if long
Facial hair to be trimmed
Please remember deodorant – body odour is unpleasant in a hot confined space
Insurance
If undertaking any activity for Wellington Regional Hospital which invalidates your own personal life insurance, C&CDHB will cover staff up to a maximum of $500,000.

Whilst travelling in or on any vehicle or aircraft as part of CCDHB business, staff are covered up to 5 times their personal salary for death or a lesser amount for injury to a maximum of $250,000. This is over and above your own personal life insurance.

Website
More information on the service, types of patients transferred, aircraft & College of Intensive Care Medicine Minimum Standards for Transport can be found on our website.
http://www.wellingtonicu.com/AboutUs/Services/Flight/

Contacts
If you have any concerns over any flight retrieval, please discuss them with the ICU specialist on-call immediately. If you have any procedural or organisational issues, please discuss them with Dr Alex Psirides, the Clinical Leader of the Flight Retrieval Service on #6137.

9.4 Advanced Analgesia

Patient Controlled Analgesia (PCA) Prescriptions

Usual drugs and dosage for PCA

Morphine 100 mg in 100ml saline (1mg/1ml)
- Bolus dose: 1mg (1ml)
- Lockout: 5 minutes
- Hourly limit: 12 mg (12ml)
- Background infusion zero

Fentanyl 1000 micrograms in 100ml saline (10 micrograms/ml)
- Bolus dose: 1ml (10 micrograms)
- Lockout: 5 minutes
- Hourly limit: 12 ml (120 micrograms)
- Background infusion zero

Prescribe dose and hourly limit in volume as the PCA cannot be set in mcgs.

Ketamine infusion: 400mg in 100ml saline (4mg/ml), run at 0-4ml/hr

Droperidol: 2.5 mg may be added for the treatment of nausea and vomiting

For prescriptions outside these parameters please discuss with the Acute Pain Management Service (APMS) - #6449 (answered after-hours by the duty anaesthetist or anaesthetic registrar)

Background infusions may be prescribed, in discussion with APMS, for patients with constant pain not being well managed with PCA boluses alone. Continuous infusions are also useful for patients who are opioid tolerant and require opioid maintenance.

Please chart the PCA on an advanced analgesia form, as well as on the national medication chart

Epidural Catheters
We rarely insert epidural catheters in ICU, but postoperative patients often come from theatres with an epidural catheter in situ.

The usual solution used is 0.125% Bupivacaine with 2 mcg/ml Fentanyl. The rate depends on the level of insertion (lumbar / thoracic), the size of the patient and the type of surgery. Check the block level with sensation to ice on admission and adjust the rate accordingly. Epidural infusions will cause sympathicolysis to some degree. The resulting hypotension should be treated with intravenous fluids and/or vasopressors (Phenylephrine/Metaraminol/Noradrenaline), depending on the patient.

The insertion site and the neurological function mainly of the lower limbs needs to be regularly assessed. The catheters are routinely removed not later than day 4, as infection risk will increase. Please ensure that the coagulation is normal and enoxaparin has not been given in the last 12 hours before removal of the catheter (and will not be given in the 2 hours following removal). If there are any concerns, questions or problems, please contact the ICU specialist or liaise with the Acute Pain Management Service.
APPENDICES