SESLHD PROCEDURE COVER SHEET

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SUMMARY	This procedure directs staff to administration requirements for all medicines, including time-critical medicines that carry very significant risks of death or severe patient harm if a single dose is omitted or delayed.

1. POLICY STATEMENT

NSW Health PD2022_032 Medication Handling Section 6.11 Time critical medications.

Time critical medications are those where early or delayed administration by more than 30 minutes may cause harm to the patient or result in suboptimal therapeutic effect.

Drug and Therapeutics Committees must identify a facility specific list of time critical medications. Protocols must include:

- the time critical window in which the medication must be given,
- instructions for managing administration of the time critical medication while the patient is admitted in hospital (administration times must be kept as close as possible to the patient's normal dosing times),
- instructions for managing time periods when the patient is nil by mouth,
- requirements for patient self-administration of the medication.

2. BACKGROUND

NSW Health policy adopts safe and accurate medication administration in the 5 Rights: the right patient, the right drug, the right dose, the right route, and **the right time**.

Medication administration can be associated with errors or harm due to delayed or omitted treatments.

Medicine doses are unintentionally delayed or missed for a variety of reasons. While many of these occurrences can be considered insignificant, there are time-critical medicines and clinical conditions where delays or omitted medicines can cause serious harm (including fatal outcome). Time variations (within a specified range) may be acceptable except for medicines which must be dosed without delay i.e. 'time-critical' medicines.

3. DEFINITIONS

Time critical medicines are defined as medicines where early or delayed administration by more than 30 minutes from the prescribed time for administration may cause harm to the patient or compromise the therapeutic effect resulting in suboptimal therapy.

Non-time-critical scheduled medications are those where early or delayed administration within a specified range of either 1 or 2 hours should not cause harm or result in substantial sub-optimal therapy or pharmacological effect.

Scheduled medications include all maintenance doses administered according to a standard, repeated cycle of frequency (e.g., q4h, QID, TID, BID, daily, weekly, monthly, annually).

Scheduled medications **DO NOT** include:

- *Now* doses
- First doses and loading doses.

- One-time doses (*STAT*)
- Specifically timed doses (e.g., antibiotic for surgical patient to be given a specified amount of time before incision, drug desensitization protocols)
- On-call doses (e.g., pre-procedure sedation)
- Time-sequenced or concomitant medications (e.g., chemotherapy and rescue agents, n-acetylcysteine and iodinated contrast media)
- Drugs administered at specific times to ensure accurate peak/trough/serum drug levels.
- Investigational drugs in clinical trials
- PRN medications.

Administration of first doses and loading doses for specific medicines may be critical, while subsequent maintenances doses are not (e.g., medications prescribed at the time of patient clinical deterioration or medical crisis). See Table 2 for further details.

Most medicines used in hospitals are not time-critical and there should be flexibility and scope for local discretion in how these medicines are safely managed on medication rounds in the hospital. As a general guide, non-time-critical medicines have greater tolerances around the timing of administration.

Table 1: Goals for Timely Administration

Type of Schedule Medication	Goals for Timely Administration
Time-Critical Scheduled Medications (see Table 2)	Administer at the **exact time indicated, when necessary, otherwise, within 30 minutes** before or after the scheduled time.
Non-Time-Critical Scheduled Medications	
Weekly, monthly medications	**Within 6 hours** before or after the scheduled time
Daily medications	**Within 2 hours** before or after the scheduled time
Medications prescribed more frequently than daily, but no more frequently than every 4 hours	**Within 1 hour** before or after the scheduled time

The actual timing used in practice is influenced by a number of variables. The above recommendations may not strictly apply to every clinical situation.

Table 2: Examples of time-critical medicines and reasons for inclusion in this list

Clinical Situation	Rationale for inclusion and examples.
Medications prescribed at the time of patient clinical deterioration or medical crisis	**Any drug that is used in a resuscitation or clinical emergency. For example, atropine, metaraminol, noradrenaline (norepinephrine), and adrenaline (epinephrine).**
STAT doses of any drug if prescribed outside of a scheduled drug round	**Any drug that is deemed urgent enough to be prescribed "STAT". For example, loading doses or first dose antibiotics.**
Adverse Reactions	
Emergency treatment of anaphylaxis/allergy	When used for the treatment of acute anaphylaxis and angioedema. For example, adrenaline (epinephrine) and C1-esterase inhibitor. .
Poisoning, overdose, or toxicity	To reverse toxicity of drugs with risk of patient harm. For example, vitamin K for warfarin toxicity, naloxone for opioid toxicity, and acetylcysteine for paracetamol overdose. This category also includes antivenoms.
Extravasation injury	When used to enhance permeation of subcutaneous or intramuscular injections following extravasation. For example, hyaluronidase.
Infection	
Sepsis with or without organ failure	Potential worsening of systemic infection and deterioration of condition. First doses of injectable drugs should be given immediately. For example, systemic antimicrobials (antibiotics, antivirals, antifungals or antimalarials)
Diabetes and glycaemic control	
Diabetic ketoacidosis (DKA)	Deterioration in clinical condition. For example, insulin infusion.
Diabetic	Poor glycaemic control and potential for symptomatic hyperglycaemia. For example, subcutaneous insulin.
Moderate to severe hypoglycaemia	Deterioration in clinical condition. For example, glucose 10% or 50% infusions and glucagon injections
Bleeding and gastroenterology	
Drugs for active bleeding	Medical emergency. For example, terlipressin injection, tranexamic acid, intravenous pantoprazole, and octreotide infusion.
Management of alcohol related emergencies, including withdrawal and variceal bleeding	Deterioration in clinical condition. For example, diazepam, thiamine, terlipressin, argipressin, and octreotide.
Cardiac	
Injectable antiarrhythmics	Failure to treat arrhythmia with risk of patient harm. For example, injections or infusions of digoxin, amiodarone, beta blockers and adenosine.
Hypertensive crisis	Potential worsening of clinical condition. For example, sodium nitroprusside, glyceryl trinitrate, esmolol, labetalol, hydralazine.
Pulmonary hypertension	Potential worsening of clinical condition. For example, iloprost, sildenafil, calcium channel blockers (e.g. amlodipine, diltiazem, nifedipine).
Septic or cardiogenic shock	Potential worsening of hypotension and deterioration of condition. For example, dobutamine, dopamine, metaraminol, noradrenaline (norepinephrine), and adrenaline (epinephrine).
Thrombosis and Embolus	

Clinical Situation	Rationale for inclusion and examples.
Management of acute coronary and neurological events	Progression of thrombus and risk of serious embolic episode (e.g., stroke/PE). For example, loading dose antiplatelets (aspirin, clopidogrel, ticagrelor), and antithrombotics (alteplase, tenecteplase).
DVT/PE and ACS	Risk of thrombus and serious embolic episode associated with ACS. Treatment of DVT/PE. For example, warfarin, heparin, enoxaparin, dabigatran, rivaroxaban, apixaban.
Reversal of excessive anticoagulation	Risk and/or treatment of bleeding. For example, vitamin K, and protamine.
Respiratory	
Management of respiratory emergencies, including respiratory depression or acute failure, acute asthma attack or COPD exacerbation	Deterioration in clinical condition. For example, nebulized salbutamol or ipratropium, oxygen, nebulized steroids, and intravenous magnesium.
Respiratory distress syndrome in neonates and premature neonates	Deterioration in clinical condition. For example, beractant, and poractant alpha.
Neurology and Mental Health	
Antiepileptic agents, including management of status epilepticus.	Prevention and treatment of seizures. For example, midazolam, diazepam, phenytoin, levetiracetam, carbamazepine, sodium valproate, lamotrigine, and phenobarbital.
Antiparkinsonian agents and drugs used in related disorders	Loss of symptom control (e.g., freezing). For example, levodopa with benserazide or carbidopa, and rotigotine.
Antipsychotics	Loss of symptom control. For example, lithium, quetiapine, risperidone, and olanzapine. If clozapine dosing has been interrupted for 48 hours or more, re-titration is required.
Analgesia	
Opioids particularly in moderate to severe pain, and peri-operative setting	Loss of pain control and increased need for intermittent analgesic doses. For example, morphine, fentanyl, and oxycodone.
Fluids and electrolytes	
Hypovolaemic shock	Deterioration in clinical condition. For example, Sodium chloride, glucose 5%, and Hartmann's.
Severe electrolyte deficiencies	Deterioration in clinical condition. For example, calcium, potassium, and magnesium.
Management of hyperkalaemia	Deterioration in clinical condition or ECG changes. For example, calcium gluconate, sodium bicarbonate, insulin, and/or glucose 10% or 50%.
Management of hypercalcaemia	Deterioration in clinical condition. For example, bisphosphonate infusions and salcatonin.
Endocrine	
Long-term corticosteroid use	Risk of acute adrenal insufficiency with abrupt withdrawal after a prolonged period of corticosteroid use (Addisonian crisis). For example, methylprednisolone, hydrocortisone, dexamethasone, and prednisolone.
Oncological emergencies, including impending spinal cord compression, airway obstruction due to small cell lung cancer, high grade lymphomas etc.	For example, methylprednisolone, hydrocortisone, dexamethasone, and prednisolone.

Clinical Situation	Rationale for inclusion and examples.
Management of hypothyroid coma	Deterioration in clinical condition. For example, liothyronine, and levothyroxine.
Haemodynamic instability in multiorgan donors	Organ retrieval. For example, liothyronine, and levothyroxine.
Obstetric agents	
Oxytocics	Deterioration in clinical condition i.e. post-partum haemorrhage. For example, oxytocin, ergometrine, carboprost, and tranexamic acid.
Tocolytics	Consequences of premature delivery. For example, terbutaline.
Others	
Immunosuppressants for transplant	Risk of rejection due to sub-therapeutic concentrations. For example, tacrolimus, mycophenolate, sirolimus, azathioprine, and ciclosporin.
Emergency ophthalmic situations, including severe eye infections, acute glaucoma, acute uveitis and chemical burns to the eye.	Deterioration in clinical condition. For example, corticosteroid eye drops, and mannitol.
Cancer care treatment	Delay in treatment/disruption of chemotherapy regimen scheduling and risk of treatment failure.
Prophylactic agents to reduce toxicity/side effects (including 'Pre-meds') ¥	Increased risk of adverse drug events with known toxic medicines. For example, hydrocortisone, acetylcysteine, and bowel preparation.
Anaesthetic agents and drugs for management of anaesthetic emergencies	Delay in treatment/disruption. For example, dantrolene, atropine, and midazolam.
Cranial diabetes insipidus	Risk of life-threatening dehydration and hypernatraemia. For example, desmopressin.
Pre-eclampsia	Deterioration in clinical condition. For example, magnesium infusion.
¥ Pre-medications should be administered as per protocol. This may be at variable times prior to treatment or procedure. If not otherwise specified, contact the prescriber to confirm administration time.	

4. RESPONSIBILITIES

4.1 District Managers/ Service Managers / Line Managers will:

- Provide support for the implementation of these procedures.

4.2 Medical staff will:

- Notify nursing / midwifery staff promptly when a new medication is prescribed.
- Respond to nursing / midwifery / pharmacy concerns about possible missed or delayed doses of medicines (e.g., switch to alterative route / formulation if required).

4.3 Nursing / Midwifery staff will:

- Obtain and administer medication promptly (this may require use of patient's own medicine in certain circumstances).
- Inform and / or liaise with Medical or Pharmacy staff as necessary if a dose cannot be given (e.g., patient declines, intended route of administration is unavailable).
- Document delayed or omitted doses of critical medicines in the patient's clinical record.
- Communicate early, delayed or omitted doses during clinical handover.

4.4 Pharmacy staff will:

- Supply time-critical medicines as a priority, once notified of the need.
- Assist in identification of suitable alternatives as required.

4.5 All clinical staff will:

- Report via IMs+ delay or omission of time-critical medicines (for inpatients, on admission, and discharge from hospital) where outside the period of tolerance (see Table 1) and where patient care has been compromised.

5. PROCEDURE

4.1. What to do if a dose of medicine is omitted or significantly delayed

Where medication cannot be or is not administered within the appropriate time-frame for that medication, refer to the following circumstances:

4.1.1 Nurse or midwife unable to administer medication due to resource issues/work pressures or patient is not on the ward for an extended period (imaging test etc.):

- Liaise with colleagues/unit manager to seek advice.
- For time-critical medications (see Table 2), contact the medical team.
- Administer medications as soon as time allows if appropriate (do not double dose if near the next administration time). This may include making a plan for patients to receive medications in recovery or radiology.
- Clearly document on medication chart the time at which medications were given (see Section 5.3) and documented in the patient clinical notes.
- When handing over to the nurse or midwife who will undertake the next drug round – ensure they are aware that drugs were given late and the need to ensure safe time intervals are achieved between doses.
- Contact pharmacy for advice and support where any concerns remain, or timing of subsequent doses is unclear and inform the medical team.
- Complete an IMs+ as appropriate.

4.1.2 Inappropriate to administer medication at that time:

- Decision not to administer medication is made by the nurse or midwife caring for the patient in liaison with medical team where necessary. For example, when a patient's regular medicines are contraindicated due to patient factors (e.g. antihypertensive medication contraindicated when a patient's BP low)
- Consideration should be given to the risks of not administering the medication and the benefit to the patient.
- Clearly record on the medication chart that the medication was not administered at the prescribed time and the reason why in the patient's clinical notes.
- Ensure arrangements are in place for the medication to be given when appropriate or withheld for a further period of time.
- Ensure safe time intervals are achieved for following doses.
- Complete an IMs+ as appropriate.

4.1.3 Medication not available on ward:

- If during Pharmacy opening hours, place a medication request via eMEDs for supply. If a time-critical medication, contact Pharmacy directly for advice on timely access. For time-critical medications outside of Pharmacy opening hours see Section 5.2 or refer to SESLHDPR/758 Patient's Own Medications (POMs) – Handling and Storage in Hospital.
- Pharmacy will advise if there are issues with availability.
- Notify medical team if the medication is not available in a timely manner (see Table 1).
- Prescriber to consider alternative treatments.

- Complete an IMs+ if appropriate when unavailability compromises patient care.

4.1.4 Newly admitted patient:

- Occasionally it may be necessary to use patient's own medication until the next business day. Refer to SESLHDPR/758 - Patient's Own Medications (POMs) – Handling and Storage in Hospital.

4.1.5 Clinical trial medications:

- Use patient's own medication. Refer to SESLHDPR/758 - Patient's Own Medications (POMs) – Handling and Storage in Hospital. If unable to source, contact the clinical trials coordinator during business hours.

4.2 Sourcing a medicine after-hours

The Medication Location Search provides information as to which wards have a particular medication on their imprest. When using the Medication Location Search the generic name or any part of the generic name of the drug must be entered and it must be spelt correctly.

If medication is obtained from another ward, either take a single dose and confirm the 5 Rights at the point of removal, as well as at the point of administration, or if taking more than a single dose, ensure that medication includes the batch number and expiry date e.g. strip / bottle of tablets.

If repeated requests are made by a ward to obtain a specific medication, please advise the NUM to revise that ward's pharmacy imprest list in conjunction with ward pharmacist.

Only the AHNM may initiate contact with the On-Call Pharmacist. For medications that are clinically indicated for administration after hours and are not available from another ward or through the AHDR, nursing staff are to contact the AHNM/NUM staffing or APN. It is the responsibility of the AHNM to initiate contact with the On-Call Pharmacist and authorise nursing staff to liaise with the On-Call pharmacist.

The AHNM may also contact the Pharmacist On-Call for further advice and information if clinically indicated.

4.3 Documenting administration and non-administration of medicines

Documentation and communication about the administration of medicines on an approved medication chart or electronic equivalent is essential. It is recommended that for time-critical medicines or medicines administered outside their period of tolerance, that the person administering the medicine(s) record the exact time of administration.

A blank record provides no information about the reason for non-administration but may also indicate that the medicine was given but not signed.

It is recommended that the reason for non-administration is documented and communicated in the patient's clinical notes. In the event of non-administration of a medicine;

- for electronic medication management systems, utilise the dropdown menu.

- For paper-based medication charts, standard abbreviations must be used in a consistent manner and circled to avoid confusion between the code and the nurse/midwife's initial (See Table 3).

Table 3: Documenting administration and non-administration of medicines

	Reason	Action
Ⓐ	Patient **Absent**	Ascertain reason (e.g. off ward for investigations or of own free will). Remind patient of drug round times and ask them to be present if appropriate. Give medications when patient returns to ward. Refer to prescriber for review of treatment regimen.
Ⓕ	Patient **Fasting** (e.g., Nil by Mouth)	Refer to prescriber and/or pharmacist for advice. Be aware that most medicines can be given orally when nil by mouth up to 2 hours before surgery and can be administered by giving with enough water to swallow. Medications likely to be withheld include anticoagulants, clopidogrel and diabetes medications.
Ⓡ	Patient **Refused**	Identify any patterns in refusal. Refer to prescriber immediately for an omitted critical medicine or if two consecutive doses of other medicines are omitted. Discuss with the patient alternative routes/ formulations or drug choice and potential outcomes of not taking medicines as prescribed.
Ⓥ	Patient **Vomiting**	Refer to Prescriber to review the patient's medication regimen if situation is ongoing for more than two doses or immediately if a dose of a critical medicine is missed.
Ⓛ	Patient **On Leave**	Record this in the patient record.
Ⓝ	Medication **Not Available**	*Attempt to obtain medicine* 1. Identify if medication available from ward stock. **If not:** 2. During pharmacy opening hours: order medication from pharmacy. Mark the request as urgent 3. When the pharmacy is closed: identify if patient has brought a suitable supply in with them **OR** following instruction for sourcing a medicine after-hours (Section 5.2)**.** *Inform prescriber responsible for the patient:* 1. After one omitted dose for a critical medicine 2. After two omitted doses for other medicines They should be informed of the progress of attempts to obtain the medicine.

Ⓦ	Medication **Withheld**	This might occur in situations when a patient's regular medicines are contraindicated due to patient factors (e.g. antihypertensive medication contraindicated when a patient's BP low*)* Monitor patient's condition and give medicines when patient's condition allows. Refer to Prescriber to review the patient's medication regimen if situation is ongoing for more than two doses or immediately if a dose of a critical medicine is missed. The reason for omission should be recorded in the patient record.
Ⓢ	**Self-administered** or	Generally patient self-administration of medications is not permitted at public health facilities. In circumstances where patients on medication regimens requiring strict adherence to a schedule where delays in dosing may adversely affect patient care, use of patient's own medicines may be appropriate. Refer to SESLHDPR/758 - Patient's Own Medications (POMs) – Handling and Storage in Hospital. Examples include, but are not limited to, adrenaline (epinephrine), medications for Parkinson's disease and medications for diabetes including insulin.
Ⓟ	**Parent / Carer administered**	
	Route unavailable / no access	IV Access unavailable Immediately refer to prescriber for replacement of IV access or prescribing via alternative route
		NG/NJ/PEG/PEJ Tube unavailable Immediately refer to prescriber for replacement of tube or prescribing of medicines via alternative route
		Swallowing difficulties If no speech pathology plan documented, refer Immediately. If medicines not prescribed in accordance with speech pathology plan, refer to prescriber/pharmacist to assess whether the medication is still indicated and required. If the medication is required prescriber/pharmacist to identify an alternative route for medicines, alternative drugs, or alternative formulations. Some tablets and capsules can be harmful if crushed or opened. If the patient is unable to swallow a capsule or tablet, liaise with the pharmacist or prescriber to discuss alternative options.
	Patient asleep	For critical medicines awaken the patient and give medicine. Get prescriber to review timing of dose and alter if appropriate. For non-critical medicines omit the dose and refer to prescriber for a review of need for medicine or for alternative medicine/timing.
	Unsuitable due to allergy / intolerance	If patient has a documented allergy to the prescribed drug refer to prescriber immediately and record as a patient safety incident.
	Drug awaiting medical review	Refer to prescriber immediately. Two consecutive doses delayed or omitted for this reason should be reported immediately as a patient safety incident. Record this in the patient record.
	Other reason	Record reason in the patient's nursing notes and refer to prescriber for review, if appropriate

Clinical handover and documentation should be implemented using the iSoBAR format to communicate a patient's time-critical medicines during the transition of care.

4.4 Meals and medicines

Generally, all medicines should be taken at a consistent time in relation to meals. However, for pharmacological or clinical reasons, some medicines have a specific requirement to be taken before, after or with meals (e.g., short-acting insulin, phosphate binders). The nature of any meal/medicine interaction varies depending on the medicine formulation, and may be influenced by certain food types. Clinical pharmacists can provide more specific advice about when to take a medicine in relation to meals or possible interaction with food types.

As a guide:

- Taking a medicine with meal means taking the dose within 30 minutes of a meal.
- Taking a medicine on an empty stomach means taking the dose at least one hour before or two hours after a meal

5. DOCUMENTATION

Delay or omission of time-critical medicines (for inpatients, on admission, and discharge from hospital) outside the period of tolerance can impact on patient safety. Where patient care has been compromised reported via IMs+.

6. AUDIT

- An audit of Critical Omitted Doses to be completed at least annually targeting high-risk medicines or in response to incidents. Results must be reported to the facility Safe Use of Medicines Committee and the SESLHD Drug and Therapeutics Committee.
- Continual monitoring and review of IMS+ notifications

eHealth Cerner Report - EM004 – Meds Scheduled-Doses Admin Audit
This report will show all medication doses for a facility that were scheduled to be administered during the report date range and then retrieve information about the documented administration such as the date time administered and whether the dose was given on time, early, late, not done, not given etc. The report can be filtered by selecting sub-therapeutic categories (e.g., dopaminergic antiparkinsonism agents), primary synonyms (e.g., levodopa-carbidopa) or specific medication orders (e.g., Sinemet CR).

For medications not prescribed in Cerner eMM (e.g., intravenous heparin infusions), a manual audit should be undertaken. An example audit tool is provided below.

AUDITOR:
WARD:
Date:

Critical Omitted Doses Audit Tool

Patient number	Patients admitted > 24 hours *(EXCLUDE first 24 hrs of admission)*		Medicines prescribed on regular, variable (including warfarin), once only & telephone sections of chart											
	Patient identifier	Team Medical (M) Surgical (S) Paed (P)	Total prescribed doses (excluding PRN)	Number of doses missed		Missed doses of Critical Medicines		ONLY CONTINUE FOR CRITICAL MEDICINES	Medicine name	Number doses missed	Route	Time Day (D) Evening (E) Night (N)	Regular Variable STAT Telephone Warfarin	Comments / Patient outcome as a result of missed critical medicine.
				Not available Ⓝ	Unapproved code, unclear, not signed ?, NA, X	On Critical list? Y / N	Critical for this patient? Y / N							

7. REFERENCES

- NSW Health Policy Directive PD2022_032 Medication Handling.
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8. VERSION AND APPROVAL HISTORY

Date	Version	Version and approval notes
20 June 2024	1.0	New document. Approved at SESLHD Drug and Therapeutics Committee and SESLHD Clinical and Quality Council.