# Royal Hospital for Women (RHW)
# BUSINESS RULE
# COVER SHEET

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| **NAME OF DOCUMENT** | POTASSIUM – ADMINISTRATION OF ORAL AND INTRAVENOUS INFUSION: ADULT |
| **TYPE OF DOCUMENT** | Clinical Business Rule |
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| **NATIONAL STANDARDS** | 4 |
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| **FORMER REFERENCE(S)** | Potassium – Administration of Oral and Intravenous July 2016 |
| **EXECUTIVE SPONSOR** | Director of Anaesthetics |
| **AUTHOR** | Pharmacist, RHW |
| **SUMMARY** | To ensure the safe storage, prescribing, administration and monitoring of potassium replacement |

# Royal Hospital for Women (RHW)
# CLINICAL BUSINESS RULE

## POTASSIUM – ADMINISTRATION OF ORAL AND INTRAVENOUS INFUSION: ADULT



## POTASSIUM – ADMINISTRATION OF ORAL AND INTRAVENOUS INFUSION

This is a high-risk medicine, hyperkalaemia can develop rapidly and asymptomatically and is potentially fatal. Extravasation may cause severe complications.

### 1. AIM
- To ensure the safe storage, prescribing, administration and monitoring of potassium replacement.

### 2. PATIENT
- Patients requiring potassium replacement

### 3. STAFF
- Medical officers
- Registered nurses and midwives
- Pharmacists

### 4. EQUIPMENT
- Infusion pump

### 5. CLINICAL PRACTICE

#### 5.1. AVAILABILITY AND SUPPLY
The availability of potassium ampoules in ward areas has been identified as a common root cause of errors associated with preparation and administration of intravenous potassium. Such errors have the potential to cause serious or catastrophic harm to patients.

##### 5.1.1. Oral Preparations

| Type | Amount of potassium | Common trade names |
|---|---|---|
| Potassium chloride slow release tablets | 8mmol per tablet | Span-K® |
| Potassium chloride effervescent tablets | 14mmol per tablet | Chlorvescent® |
| Potassium chloride oral mixture | 20mmol per 15mL | |

##### 5.1.2. Standard Pre-mixed Potassium IV Solutions
MUST be used where possible. The following pre-mixed potassium bags are available at RHW:

10mmol potassium chloride in 100mL sodium chloride 0.29% **(ISOTONIC SOLUTION)**
20mmol potassium chloride in 1000mL sodium chloride 0.9%
30mmol potassium chloride in 1000mL sodium chloride 0.9%
30mmol potassium chloride in 1000mL glucose 4% + sodium chloride 0.18%

Other pre-mixed potassium solutions exist however are not routinely used at RHW.

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Pre-mixed IV potassium solutions are labeled in red and have a pink outer packaging.

***Additional potassium is never to be added to these pre-mixed solutions.***

**5.1.3 Concentrated Potassium Ampoules**
Only use potassium ampoules to make an IV solution if a pre-mixed bag is not available. The availability of potassium ampoules in ward areas has been identified as a common cause of errors associated with preparation and administration of intravenous potassium. Such errors have the potential to cause serious or catastrophic harm to patients.

**Potassium ampoules available in RHW pharmacy:**

- Potassium chloride 10mmol in 10mL
- Potassium dihydrogen phosphate (each 10mL contains 10mmol potassium ions, 10mmol phosphate ions and 20mmol hydrogen ions)

The following wards may store potassium chloride ampoules:

- Acute Care
- Ante Natal Ward
- Neonatal ICU
- Maternal Fetal Medicine
  Operating Theatres

The following wards may store potassium dihydrogen phosphate ampoules:

- Acute Care
- Ante Natal Ward

**Store all potassium ampoules in a container/box separate from other injectable drugs labeled "Concentrated potassium MUST be diluted before use". The aim of this is to alert users to the contents and minimise cognitive mix-up.**

**5.2 PRESCRIBING GUIDANCE**

**5.2.1. Prescription**

- Consider commencing IV potassium replacement only when the oral route is unavailable or will not achieve the required elevation of serum potassium within a clinically acceptable timeframe.
- Use premixed bags when possible.
- Prescribe IV potassium by writing potassium (and salt) in full e.g. "potassium chloride". No chemical abbreviations are acceptable.

| EXAMPLE | NOT |
|---|---|
| Potassium chloride | KCl |
| Potassium dihydrogen phosphate | $KH_2PO_4$ |

- Prescribe potassium in millimoles (mmol)**,** not in milligrams (mg) or as a percentage (%).
- Never deliver IV potassium as a bolus. All prescriptions should include an infusion rate or period of time.

| EXAMPLE | NOT |
|---|---|
| Potassium chloride 10mmol in 100mL sodium chloride 0.29% IV over one hour | Potassium chloride 10mmol IV stat |

- Order all infusions on the Adult Fluid Order Chart as appropriate in accordance with the DOH and RHW medication administration policy.
- Prescriptions for IV potassium salts must have the rate, route, dilution and administration instructions fully specified.
- Prescribe new orders for IV potassium daily after review of serum potassium levels. Multiple day orders will not be recognised.
- Transfer the patient to Acute Care if requiring concentrations greater than 10mmol in 100mL of potassium chloride; 10mmol in 250mL of potassium dihydrogen phosphate or potassium acetate; or a serum potassium level < 2.7 mmol/L for continuous cardiac monitoring, more regular observations, frequent serum potassium measurements and assessment of renal function. See Acute Care admission policy.
- Do not delay potassium replacement while awaiting a bed in Acute Care. The patient is to have an IV cannula inserted and have oral potassium and a potassium infusion commenced as per the admitting doctor.

**5.2.2. Concentration of IV potassium chloride**

- Prescribe commercially available potassium pre-mixed solutions when clinically feasible (Listed in 5.1.2).
- Ensure concentrations greater than 40mmol/L (equivalent to 10mmol/250mL) are delivered via a central venous catheter or PICC line EXCEPT when the potassium chloride 10mmol in 100mL sodium chloride 0.29% pre-mixed bag is used (isotonic). The potassium chloride 10mmol in 100mL sodium chloride 0.29% pre-mixed bag can be delivered peripherally over a minimum of 1 hour via a large cannula.

**5.2.3. Infusion Rate**

- **Ensure the maximum rate of IV potassium infusion on a general ward is 10mmol/hour.**
- Transfer the patient to Acute Care for more regular observations and cardiac monitoring if infusion rates faster than 10mmol/hour are required. Do not administer two solutions containing potassium simultaneously with the exception of TPN and Hartmann's solution.

**5.3. ADMINISTRATION PROCEDURES**

**5.3.1 Administration**

- Deliver all IV potassium infusions via an infusion pump
- Check infusion prior to administration. This must be completed by two Registered Nurses/Midwives/Medical Officer (RN/RM/MO) or pharmacist.
- Check the infusion rate and volume to be infused settings on the pump. This must be completed by two RN/RM/MO's at the commencement of the infusion and with any rate or volume to be infused change.
- Prepare IV potassium solutions immediately prior to administration (only if pre-mixed bag is not available).
- Any IV potassium solutions prepared by nursing staff must be adequately mixed by **inverting the bag at least 10 times** otherwise the patient may receive a lethal potassium bolus.
- Never add potassium to a burette as the potassium ions may not be mixed adequately and may be delivered as a bolus.
- Ensure that no extra IV potassium is added to any pre-mixed solutions as this may lead to confusion regarding final concentration.
- Ensure the rate of additives in a side line is not altered.
- Check compatibilities (see 5.5) of additives to IV potassium infusions.
- Assess infusion site frequently for pain and phlebitis which occur more frequently with higher concentrations of potassium and when administered via a small vein. The rate may need adjusting.

**5.3.2 Monitoring of Serum Potassium Levels**

- The normal range of serum potassium is 3.5 to 5.2mmol/L.

- Monitor daily serum potassium levels on all patients requiring intravenous potassium.
- Repeat serum potassium level if it is below the desired range. Repeat measurements must be taken after interventions, until the serum potassium level is corrected.
- The MO is responsible for ensuring appropriate pathology request forms are completed and results checked.
- Cease IV potassium administration and notify MO if serum potassium ≥5.2mmol/L.
- Collection of the specimen from the same arm as the infusion must be avoided. If drawn from a central line the first 10mLs are to be discarded.
- Ensure the specimen is not collected from the same arm as the infusion. If drawn from a central line the first 10mL should be discarded.

**5.4 INFUSIONS OF INTRAVENOUS CONCENTRATED POTASSIUM FOR SEVERE HYPOKALAEMIA -ONLY FOR ADMINISTRATION IN ACUTE CARE**

- Consult the physician on call, anesthetist or medical registrar for guidance in prescribing concentrated IV potassium infusions.
- Prescribe potassium 5-10mmol/hour for moderate to severe hypokalaemia (< 3 mmol/L)
- Prescribe up to 20mmol/hour of potassium for severe hypokalaemia (<2.5 mmol/L) with ECG changes or other risk factors
- Use pre-mixed bags of potassium where possible; however if required, potassium ampoules can be added to a compatible fluid bag.
- Administer potassium solutions with a concentration greater than 40mmol/L (equivalent to 10mmol/250mL) via a central or PICC line.
- Check serum potassium levels regularly (6-8 hourly) depending on the serum level and amount of potassium delivered.
- **Print pathology request forms at the time of prescribing.**
- Checks of the order and reconstitution must be completed by two RN/RMs who both sign the additive label and together check that the correct rate/ VTBI on pump/syringe driver has been entered. **If using a syringe driver, record the amount infused each hour on the fluid balance chart.**
- Ensure continuous cardiac monitoring is in place.
- Ensure only permanent RN/RMs working in Acute Care are caring for patients on concentrated IV potassium infusions. Whilst receiving concentrated IV potassium infusions these patients must be cared for as 1:1 ratio.
- Ensure the infusion of IV potassium chloride is delivered via its own lumen with no other infusions or connections in the line.
- Attach a label to the syringe driver and intravenous line stating **"Potassium do not bolus".**

**5.5 COMPATIBLE FLUIDS**:
Glucose 5%; Glucose 10%; Glucose 4% with Sodium Chloride 0.18%; Sodium Chloride 0.9%; Sodium Chloride 0.45%.
For full details refer to the Australian Injectable Drug handbook (via CIAP).

**5.6 INCOMPATIBLE DRUGS**: Refer to the Australian Injectable Drug Handbook (via CIAP)

**5.7 EDUCATION & TRAINING**:
Orientation to RHW potassium policy must be documented as part of medical staff, nursing, midwifery and pharmacy staff orientation programs.

**5.8 AUDIT**
An audit of the safe storage of concentrated potassium ampoules on wards/clinical areas at RHW will be conducted on an annual basis. For each area where concentrated potassium ampoules are found to be present, the storage will be assessed to ensure the potassium ampoules are stored separately and are readily identifiable from

preparations with similar packaging. Where breaches are identified, comments and action to be taken will be provided. Results will be tabled at the Medication Safety Committee.

**6. DOCUMENTATION**

- Integrated Clinical Notes
- Medication Chart
- NSW Health Fluid Chart
- High Acuity Chart

**7. EDUCATIONAL NOTES**

Potassium is the main intracellular cation. It regulates cell excitability and permeates cell membranes thereby affecting the electrical status of cells. It is essential for the conduction of impulses, and therefore affects heart rhythm as well as contractility of muscle. Normal serum potassium concentration is 3.5-5.2mmol/L. When serum levels are outside this range a number of physiological changes can occur with potentially serious results.

Potassium acetate (25mmol in 5mls) is indicated for hypokalaemia without the addition of chloride.
Potassium dihydrogen phosphate (each 10ml ampoule contains 10mmol potassium ions, 10mmols phosphate ions and 20mmols hydrogen ions) is indicated for hypokalaemia and hypophosphataemia

**8. RELATED POLICIES/ PROCEDURES/ CLINICAL PRACTICE LOP**

Phosphate intravenous replacement
Hyperkalaemia- management of
Acute Care: Admission criteria, Process, Management and Escalation

**9. RISK RATING**

High

**10. NATIONAL STANDARD**

Medication safety

**11. REFERENCES**


- NSW Health PD2022_032 Medication Handling
- High Risk Medication Alert Project-Change Management Case Study-Austin Health Victoria, August 2003
- Medication Alert-Medication Safety Taskforce of the Australian Council for Safety and Quality in Health Care, 1 October 2003.
- MIMS online accessed via CIAP 03/08/2021.
- Australian Injectable Drugs Handbook. The Society of Hospital Pharmacists of Australia, 8th edition. Accessed 03/08/2021.


**REVISION & APPROVAL HISTORY**

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Approved Quality Council 16/8/04

**FOR REVIEW: JULY 2018**