Victorian Guideline for Replacement of Potassium
(To be replaced upon development of a national guideline)

Prepared on behalf of Victorian Medication Safety Committee by
Melita Van de Vreede, The Alfred Hospital
Mark Lubliner, The Alfred Hospital
Chris O'Callaghan, Austin Health
Bill Thomson, VicTAG
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The impetus for this document stems from work done in Victoria regarding standardisation of intravenous potassium chloride products for safe administration and the survey to investigate the use of intravenous potassium solutions commissioned by VicTAG and NSWTAG. This survey highlighted that 28 of 59 hospitals that responded, did not have a potassium protocol for supplementation available.

This document is a general guideline intended for the use of junior medical, nursing and pharmacy staff

Guideline for Replacement of Potassium	
Title	Guideline for the Replacement of Potassium
Location	
Version No	
Variations from previous version	
GOVERNANCE	
Enactment/Renewal date (strike out as appropriate)	
Expiry: (maximum 36 months from date of original approval)	
Ratification date by Drug & Therapeutics Committee	
Validation	
Chairperson, Drug and Therapeutics Committee	Signature (Name) ……Date……
Process for removal of previous version of Guideline completed	Signature (Name)……Date…….. (Designated authority)
Approved Guideline distributed[#]	Signature (Name)……Date…….. (Designated authority)
[#]Note: Guidelines must be distributed in a format, which prevents modification eg. PDF file	
SPONSOR	
Author	(Name)
Position	
Person Responsible	(Name)
Position	
Department/CSU	
Departmental Contact (For ongoing maintenance of standing order)	
Basis of Guideline (Including sources of evidence, references)	References
Groups consulted	

GUIDELINE	
Background	Oral and intravenous potassium supplements are routinely prescribed to correct electrolyte deficiencies in hospital patients. Intravenous potassium chloride has traditionally been supplied in small volume ampoules. Intravenous injection of concentrated potassium chloride can be fatal if given inappropriately, for example when a bolus injection of potassium chloride has been administered instead of normal saline. This guideline has been developed to facilitate the safe use of intravenous potassium chloride. **See: High Risk Medication Alert - Intravenous Potassium Chloride. From the Medication Safety Taskforce of the Australian Council for Safety and Quality in Health Care. Available at www.safetyandquality.org**
Purpose & scope	To define the safe and efficacious prescribing and administration for potassium chloride supplements.

Prescribing and Storage	**1. Oral potassium chloride supplements**
	Oral potassium chloride should be prescribed whenever possible.
	
	Oral Products
	• Potassium chloride slow release tablets - Slow-K®, KSR® Duro-K® or Span-K®
	8 mmol potassium per tablet
	• Potassium chloride effervescent – Chlorvescent®, K Sol®
	14 mmol potassium per tablet
	• Potassium chloride oral mixture – Orion potassium chloride mixture
	20 mmol potassium per 15mL
	
	2. Intravenous potassium chloride supplements
	If the oral route is unavailable, or it is clinically inappropriate to dose orally, then potassium chloride must be prescribed intravenously.
	
	<u>Key considerations</u>
	• Intravenous potassium chloride must be prescribed in millimoles (mmol) of potassium
	• Pre-mixed potassium solutions are to be used whenever possible.
	• Pre-mixed potassium chloride solutions have red outer packaging and have red print.
	• Extra potassium is not to be added to pre-mixed solutions.
	• If potassium concentrations other than those available in pre-mixed solutions are required for a specific order for a specific patient, this must be clearly prescribed. In this case, Pharmacy will dispense the exact number of potassium chloride ampoules; alternatively the solution will be made up in Pharmacy.
	• Out of Pharmacy hours, there should be an agreed process, which includes who is responsible for preparing potassium chloride solutions.
	• Potassium chloride ampoules should not be available on general wards.
	• Potassium chloride ampoules should not be borrowed from specialty areas, unless in accordance with local guidelines.
	• Other concentrated potassium ampoules should not be stored on the general wards, eg potassium acetate concentrated injection.
	
	Premixed Intravenous products
	• 30 mmol potassium chloride in 1000 mL - available with 4 diluents:
	  • Sodium chloride 0.9%
	  • Glucose 5%
	  • Glucose 4% and sodium chloride 0.18%
	  • Hartmann's solution
	• 10 mmol potassium chloride in 100 mL of isotonic sodium chloride. These solutions have NO additive port.
	
	Potassium chloride ampoules
	• 10 mmol of potassium chloride in 10 mL ampoules.
	• It is strongly recommended that potassium chloride ampoules are not made available in patient care areas. However, ampoules may need to be available in areas such as ICU and other Critical Care Areas.
	• Ampoules must be stored in clearly labelled containers, in one central imprest location and must be physically separated from ampoules containing water or normal saline.

Contra-indications	Patients with complex alterations in electrolyte balance, acid base status, renal function or disturbance of other components of plasma will require individualised care. These guidelines may not be operative in such cases.
Monitoring requirements	If potassium concentrations are outside the **therapeutic range (3.5-5.0 mmol/ L),** patients treated with intravenous potassium chloride will usually require at least daily monitoring of serum potassium levels.

<table>
<tr><td>Procedure</td><td>Administration of intravenous potassium chloride regimens that differ from these guidelines should be approved by the treating specialist.

Intravenous Administration
• A rate-limiting device must be used to prevent unintentional bolus doses of solutions containing potassium chloride.
  • When infusing 30 mmol potassium chloride in 1000 mL, it is ideal to use a rate controlled infusion pump, however a burette is an acceptable alternative.
  • When infusing solutions at concentrations >30 mmol of potassium chloride per 1000 ml, an infusion pump must be used.
• Where potassium chloride solutions are prepared using potassium chloride ampoules, the solution must be inverted at least 10 times to ensure that potassium chloride is thoroughly mixed throughout the solution.

Peripheral Administration
• Maximum rate of potassium chloride administration via peripheral lines is 10 mmol potassium per hour.
• Maximum potassium chloride concentration for administration via peripheral lines is 10 mmol potassium per 100mL (i.e. 100 mmol / 1000 mL).

Central Administration
• Critical care areas may require higher doses at faster rates of administration of intravenous potassium chloride (see dosage table below).</td></tr>
<tr><td>Routes & doses of potassium for acute potassium deficiency</td><td>
<table>
<tr><td></td><td colspan="3">Potassium level</td></tr>
<tr><td></td><td>Moderate- severe hypokalaemia (< 3 mmol/L)</td><td>Mild hypokalaemia (3.0-3.5 mmol/L)</td><td>Low- normal (3.5-4.0 mmol/ L)</td></tr>
<tr><td>Maintenance IV therapy</td><td>Intravenous
5-10 mmol K^+/ hour[1]</td><td>Intravenous
90 mmol K^+/ 24 hours</td><td>Intravenous
60 mmol K^+/ 24 hours</td></tr>
<tr><td>Acute coronary syndrome</td><td>Intravenous
10 mmol K^+/ hour[1,2]
and Oral
1-2 effervescent tablets
(14-28 mmol K^+) statim</td><td colspan="2">Oral
1-2 effervescent tablets
(14-28 mmol K^+) statim</td></tr>
<tr><td>Life threatening hypokalaemia</td><td>Intravenous
20-40 mmol K^+/ hour[1,2]</td><td></td><td></td></tr>
<tr><td>Surgical Pre-op elective on planned day of surgery</td><td>Consider deferring surgery</td><td>Oral
1-2 effervescent tablets
(14-28 mmol K^+) statim</td><td></td></tr>
<tr><td>Surgical Pre-op emergency</td><td>Intravenous
10 mmol K^+/ hour depending on circumstances</td><td>Intravenous
10 mmol K^+/ hour</td><td></td></tr>
<tr><td>Diabetic ketoacidosis</td><td colspan="3">This is an extremely complex area, and expert advice and management in a high-intensity area is almost always required.</td></tr>
<tr><td>Renal impairment</td><td colspan="3">Extreme caution is required, as these patients are prone to severe, life-threatening hyperkalaemia.</td></tr>
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	Note: These recommendations are based upon a patient weighing 70 kg, who is not already receiving potassium supplements and who has normal renal function and acid base status except where stated. They should be individualised for each patient. [1] 10 mmol K^+/ hour for 2 hours is usually sufficient, however potassium levels should be monitored at the end of that time. [2] Cardiac monitoring, frequent serum potassium levels and renal function assessment are indicated in addition to strict fluid balance monitoring with infusion rates >10 mmol K^+/ hour
Resuscitation use	Potassium chloride boluses (pushes) may be given only during cardiac arrest in the setting of recurrent ventricular fibrillation or electro-mechanical dissociation, and via a peripheral line according to specific clinical unit protocols.
Precautions; Other Potassium products	Parenteral phosphate preparations contain varying amounts of potassium always check the amount of potassium contained, before use. These guidelines should be applied to all preparations containing potassium.
REFERENCES	
References	This document has been prepared using potassium chloride guidelines developed by the Alfred and Austin Health with reference to the potassium chloride guidelines developed by Victorian, South Australian, Western Australian, Tasmanian and NSW hospitals supplied for the survey. O'Callaghan CJ, Premaratne E. Potassium replacement therapy in hospitalised patients. (manuscript submitted)
Keywords	