Intravenous injection of concentrated potassium can cause fatal cardiac arrhythmias. As such intravenous injections of potassium (chloride only) may be given only during cardiac arrest, via a peripheral line, according to ARC (Australian Resuscitation Council) Guidelines and are not covered in this guideline. Potassium chloride ampoules required for resuscitation situations must be stored in red/orange bags (supplied by Pharmacy) that are clearly labelled for this use.

Potassium use in diabetic ketoacidosis management is complex and not covered in this guideline - see CPP0540 Management of Diabetic Ketoacidosis.

Potassium supplementation in Haemodialysis (see CPP0414 Dialysis Procedures/Processes) and Haemofiltration (see CPP0415 Haemofiltration - Prismaflex) are not covered in this guideline.

For Critical Care Area patients see Potassium - intravenous infusion and enteral (Critical Care Areas) DRG0043.

BRAND NAMES
See table of potassium preparations available under Dosage and Administration.

PHARMACOLOGY AND PHARMACOKINETICS
Potassium ion is the principal intracellular ion of most body tissues, being involved in a number of essential processes, including maintenance of intracellular tonicity, nerve impulse transmission, contraction of cardiac, skeletal and smooth muscle, and maintenance of normal renal function. Enteral potassium is usually well absorbed from the gastrointestinal tract (sustained release potassium releases slowly over 3-4 hours). Potassium is predominantly excreted by the kidneys.

INDICATIONS
- For the treatment or prevention of hypokalaemia.

CONTRAINDICATIONS
- Hyperkalaemia.
PRECAUTIONS

- Renal impairment with oliguria or azotaemia.
- Ventricular fibrillation.
- Extensive tissue breakdown (e.g. severe burns).
- Hyperadrenalism associated with adrenogenital syndrome.
- Acute dehydration or heat cramps.
- Chronic renal disease, adrenal insufficiency or any other condition which impairs potassium excretion - requires particularly careful monitoring of the serum potassium concentration and appropriate dosage adjustment.
- Cardiac disease, heart block or acidosis - requires careful attention to acid/base balance and appropriate monitoring of serum electrolytes, the ECG and the patient’s clinical status.
- For sustained release oral potassium only:
  - All conditions in which passage through the digestive tract is retarded or obstructed (e.g. compression of the oesophagus, gastrointestinal stenosis or atony).
  - Acute peptic ulcer or gastritis.
  - Patients with ostomies - may have an altered intestinal transit time and are better treated with soluble potassium.

PREGNANCY AND BREASTFEEDING
Seek specialist advice before prescribing, information may update regularly.

PAEDIATRICS & NEONATAL
For paediatric or neonatal patients refer to a paediatric reference or the Paediatric team for dosing information. Refer to the Paediatric Injectable Guideline for information regarding administration.

DRUG INTERACTIONS
- Drugs that increase potassium levels (e.g. ACE inhibitors, spironolactone, potassium sparing diuretics) - increased risk of hyperkalaemia with potassium administration. Monitor potassium levels.
- NSAIDs - increased risk of hyperkalaemia (as well as reducing renal function further increasing the risk of hyperkalaemia) with potassium administration. Monitor potassium levels and serum creatinine.
- Anticholinergics (with oral sustained release potassium only) - may reduce gastrointestinal motility increasing the risk of gastrointestinal ulceration or perforation (see Contraindications).
Information for prescribing and administering potassium (GENERAL WARDS):

1.) Important safety information regarding INTRAVENOUS infusion use

- Potassium is a high risk medication. It is only to be administered by intravenous infusion - ampoules are concentrated and rapid intravenous administration can result in serious patient outcomes, including death.
- Potassium chloride is only to be administered using premixed bags on the General Wards. Ampoules are NOT to be supplied to the General Wards.
- In rare circumstances (e.g. hyperchloraemia) other salts of potassium (potassium acetate OR potassium dihydrogen phosphate and dipotassium hydrogen phosphate) may be required. These salts of potassium must be approved by the Specialist/Consultant responsible for the patient, with the inpatient order including the name of the consultant giving approval. These intravenous infusion solutions will be prepared by the Pharmacy. Ampoules are NOT to be supplied to the General Wards.
- Careful monitoring of the serum potassium level is advised, during intravenous administration, as hyperkalaemia and cardiac arrhythmias can occur quickly and without apparent warning, especially with too rapid administration, impaired renal function or other electrolyte disturbances.
- Intravenous potassium infusions may cause pain if given peripherally via a small vein, use a large vein (or central line if available) wherever possible.
- Maximum rate of potassium administration on the General Wards is 10 mmol/hour via peripheral or central line.
- Maximum concentration for potassium administration on the General Wards is 10 mmol/100 mL or 30 mmol/1000 mL (using premixed solutions) via peripheral or central line.
- Maximum usual dose of potassium for administration on the General Wards is 90 mmol/24 hours. Doses above this require Specialist/Consultant advice and documentation of this advice by Medical Staff in the medical record.
- If serum potassium levels are outside the therapeutic range (3.5-5.0 mmol/L), patients treated with intravenous potassium will usually require at least daily monitoring of serum potassium levels. Those receiving higher doses will require more frequent monitoring as per the Dosage table (e.g. serum potassium should be rechecked 30-60 minutes following the administration of two sequential minibags of potassium chloride 10 mmol in 100 mL over 1 hr each).
- Information in this guideline is for peripheral or central venous administration.

2.) Information for Prescribers

- Patients with complex alterations in electrolyte balance, acid base status, renal function or disturbance of other components of plasma will require individualised care. This guideline may not be appropriate in such cases.
- Prescribe premixed or Pharmacy prepared potassium solutions ONLY for intravenous infusion as described above.
- Lignocaine is not be added to intravenous potassium solution, as it will only mask the underlying phlebitis.
- Consider ongoing potassium losses (e.g. from diarrhoea, stoma and drain sites) when determining replacement therapy.
- In treatment resistant hypokalaemia, ensure serum magnesium is checked and corrected if necessary.
- Potassium is to be prescribed enterally wherever possible unless clinically inappropriate (e.g. severe hypokalaemia, unable to tolerate enteral potassium).
- Intravenous potassium must be prescribed in millimoles (mmol) of potassium and include...
the salt required (not abbreviated e.g. write potassium chloride), diluent, volume and duration/rate of infusion.

- When calculating the dose of potassium required by a patient take into account other sources of potassium e.g. intravenous phosphate also has potassium, as does compound sodium lactate solution (Hartmann’s).

- To correct moderate to severe potassium deficiency (i.e. less than 3 mmol/L) it may be necessary to commence intravenous infusion using the 10 mmol in 100 mL sodium chloride 0.29% bag(s) (at a rate no greater than 10 mmol/hour), then followed by a maintenance intravenous infusion using the 30 mmol in 1000 mL premixed bag(s). Potassium levels should be closely monitored during this time. Refer to the Dosage table below.

- See tables below for information regarding dosing information and potassium preparations available. The doses apply to the amount of potassium in mmol, regardless of the salt used.

3.) Information for Nursing staff

- Caution: Extravasation may cause severe complications - check any peripheral line with potassium running carefully. Pain or phlebitis may occur during administration of potassium solutions. Check any lines immediately if the patient complains of pain. Phlebitis can be minimised by using a large vein, reducing the rate or the concentration - contact the Prescriber if an issue. Change to enteral potassium where appropriate. Lignocaine is not be added to intravenous potassium solutions, as it will only mask the underlying phlebitis.

- Use premixed or Pharmacy prepared potassium solutions ONLY for intravenous infusion as described above.

- Nothing is to be added to premixed or Pharmacy prepared potassium bags.

- An Alaris PC infusion pump with Guardrails must be used to administer potassium containing solutions to ensure inadvertent larger doses are not administered.

- If a patient receiving sustained release potassium tablets develops pronounced nausea, severe vomiting, severe abdominal pains or flatulence, diarrhoea or gastrointestinal haemorrhage, contact the Prescriber as these signs and symptoms may indicate ulceration or perforation in the gastrointestinal tract (see Adverse Effects).
### Enteral potassium preparations available

<table>
<thead>
<tr>
<th>Generic name and form</th>
<th>Brand name</th>
<th>Amount of potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium chloride 600 mg SR tablet*</td>
<td>Slow K®, Span K®, Duro K®</td>
<td>8 mmol per tablet</td>
</tr>
<tr>
<td>Potassium chloride (and other salts) effervescent tablet</td>
<td>Chlorvescent®</td>
<td>14 mmol per tablet</td>
</tr>
</tbody>
</table>

*SR tablets release slowly over 3-4 hours and are not usually appropriate for acute hypokalaemia

### Intravenous potassium preparations available to the General Wards & Paediatrics

#### Premixed potassium chloride bags available
- Red outer packaging with red print. Further potassium is not to be added to these bags.

<table>
<thead>
<tr>
<th>Amount of potassium</th>
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</thead>
<tbody>
<tr>
<td>10 mmol in 100 mL</td>
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<tr>
<td>30 mmol in 1000 mL</td>
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<td>30 mmol in 1000 mL</td>
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<tr>
<td>20 mmol in 1000 mL</td>
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<tr>
<td>10 mmol in 500 mL</td>
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</tbody>
</table>

#### Potassium bags available prepared by Pharmacy
- Further potassium is not to be added to these bags.

<table>
<thead>
<tr>
<th>Amount of potassium</th>
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<tbody>
<tr>
<td>10 mmol added to 250 mL compatible fluid</td>
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<tr>
<td>25 mmol added to 1000 mL compatible fluid</td>
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<tr>
<td>10 mmol added to 250 mL compatible fluid</td>
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<td>25 mmol added to 1000 mL compatible fluid</td>
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</tbody>
</table>
**SUGGESTED POTASSIUM DOSES (ADULTS)**

These dosage recommendations are based on the needs of 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. Treatment should be individualised for each patient’s situation, with any deviation from these guidelines approved by the treating medical specialist. See above for maximum hourly and 24 hourly doses. All intravenous doses are infusions using premixed bags or bags prepared by the Pharmacy.

### POTASSIUM LEVEL

<table>
<thead>
<tr>
<th>Patient type</th>
<th>Moderate-severe hypokalaemia (less than 3 mmol/L)</th>
<th>Mild hypokalaemia (3.0-3.5 mmol/L)</th>
<th>Low normal (3.5-4.0 mmol/ L)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maintenance intravenous infusion therapy</strong></td>
<td>Intravenous infusion 5-10 mmol potassium/hour&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Intravenous infusion 90 mmol potassium/24 hours given in divided doses using premixed or Pharmacy prepared bags (Close Monitoring of potassium levels recommended)</td>
<td>Intravenous infusion 60 mmol potassium/24 hours given in divided doses using premixed or Pharmacy prepared bags (Close Monitoring of potassium levels recommended)</td>
</tr>
<tr>
<td><strong>Acute coronary syndrome</strong> (Patients may require telemetry)</td>
<td>Intravenous infusion 10 mmol potassium/hour&lt;sup&gt;1&lt;/sup&gt; and enteral 1-2 effervescent tablets (14-28 mmol potassium) stat – as a single dose. Dissolve in water and take after food.</td>
<td>Enteral 1-2 effervescent tablets (14-28 mmol potassium) stat – as a single dose. Dissolve in water and take after food.</td>
<td></td>
</tr>
<tr>
<td><strong>Surgical Pre-op elective on planned day of surgery</strong></td>
<td>Consider deferring surgery</td>
<td></td>
<td></td>
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<tr>
<td><strong>Surgical Pre-op emergency</strong></td>
<td>Intravenous infusion 10 mmol potassium/hour depending on circumstances</td>
<td>Intravenous infusion 10 mmol potassium/hour</td>
<td></td>
</tr>
<tr>
<td><strong>Diabetic ketoacidosis</strong></td>
<td>This is an extremely complex area, and expert advice and management in a high-dependency/critical care area is almost always required. See CPP0540 Management of Diabetic Ketoacidosis.</td>
<td></td>
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</tr>
<tr>
<td><strong>Renal impairment</strong></td>
<td>Extreme caution is required, as these patients are prone to severe, life-threatening hyperkalaemia.</td>
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</tbody>
</table>

<sup>1</sup>10 mmol potassium/hour for 2 hours is usually sufficient, however potassium levels should be monitored, and requirements for further maintenance doses assessed at the end of that time.
**General Administration Information**

- **Infusion preparation:** Use premixed bags or Pharmacy prepared bags only
- **Infusion pump:** Alaris PC smart pump with Guardrails
- **Routes of administration:**
  - IV injection: Only in cardiac arrest according to ARC Guidelines
  - IV intermittent infusion: Yes
  - IV continuous infusion: Yes
  - IM injection: No
  - Subcut injection: No
- **Compatible/incompatible IV drugs/fluids:**
  Consult the Australian Injectable Drugs Handbook (‘Yellow book’) in your ward area. **Assume all unlisted drugs and IV fluids are incompatible** – contact Pharmacy for further advice.

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**MONITORING (INCLUDING BLOOD TESTS)**

- See 'Information for prescribing and administering potassium' under Dosage and Administration.

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**NURSING PRACTICE POINTS**

- See 'Information for prescribing and administering potassium' under Dosage and Administration.

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**ADVERSE EFFECTS**

- **Hyperkalaemia** - caused by excessive potassium supplementation. Signs and symptoms include hypotension, cardiac abnormalities (arrhythmias, heart block, disappearance of the P wave, widening and slurring of QRS complex, changes of the ST segment, tall peaked T waves), nausea, vomiting, diarrhea and abdominal discomfort, paraesthesias of the extremities, flaccid paralysis, listlessness, mental confusion, weakness and heaviness of the legs.
- Intravenous administration: Pain or phlebitis may occur with potassium given peripherally.
- Oral administration (sustained release):  
  - Common - nausea, vomiting, diarrhea and abdominal discomfort. These side effects occur more frequently when the medication is not taken with food.
  - Rare - gastrointestinal bleeding, obstruction or ulceration.
- Enteral administration (effervescent):
  - Common - nausea, vomiting, diarrhea and abdominal discomfort. These side effects occur more frequently when the medication is not taken with food or if effervescent potassium is not diluted properly or dissolved completely.

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**DRUG PRESENTATIONS, LOCATION AND STORAGE**

- **Potassium chloride** - multiple premixed bags as described above.
- Imprest locations (at the time of guideline development): too varied to list.
- Note: potassium chloride 30 mmol/1000 mL in Hartmann's solution or 5% glucose are only kept in CCU and the Pharmacy.
- **Potassium acetate bags** - prepared by Pharmacy only.
- **Potassium dihydrogen phosphate and dipotassium hydrogen phosphate bags** - prepared by Pharmacy only.
- Store below 25°C.
RELATED DOCUMENTS

Internal
SOP0001 Clinical Care.
DRG0043 Potassium - intravenous infusion and enteral (Critical Care Areas).
CPP0222 Labelling of Injectable Medicines and Lines.
CPP0414 Dialysis Procedures/Processes
CPP0415 Haemofiltration - Prismaflex
CPP0509 Hyperkalaemia Management
CPP0540 Management of Diabetic Ketoacidosis
CPP0549 High Risk Medications

External

REFERENCES

See BHS Intranet for current version