# SODIUM CHLORIDE (concentrated solutions)

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| **Indication** | • Treatment of hyponatraemia[1] |

## ORAL

| **Sodium chloride 6%** | |
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| **Presentation** | • Oral solution (sachet): 1 mmol in 1 mL |
| **Dosage** | • Daily requirement 2–6 mmol/kg/day<br>o Divide into 4 or more doses to reduce gastric upset[2] |
| **Preparation** | • Nil required |
| **Administration** | • Draw up prescribed dose into oral/enteral syringe<br>• Oral/OGT/NGT with feed |

## ORAL

| **Sodium chloride 23.4%** | |
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| **Presentation** | • Compounded oral solution: 4 mmol in 1 mL<br>o Available: Mater Pharmacy Production Services<br>• Vial (solution): 23.4% (40 mmol in 10 mL)<br>o If glass ampoule, use a filtered needle (due to risk of glass shard contamination) |
| **Dosage** | • Daily requirement 2–6 mmol/kg/day<br>o Divide into 4 or more doses to reduce gastric upset[2] |
| **Preparation** | • Nil required |
| **Administration** | • Draw up prescribed dose into oral/enteral syringe<br>• Oral/OGT/NGT with feed[2] |

## INTRAVENOUS

| **Sodium chloride 23.4%** (*must be diluted before administration*[3]) | |
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| **Presentation** | • Vial (solution): 23.4% (equivalent to 40 mmol in 10 mL) |
| **Dosage** | • Daily requirement 2–6 mmol/kg/day |
| ***Burette*** *(100 mL)* | |
| **Dilution** | • Add prescribed dose of sodium chloride 23.4% to compatible 24-hour maintenance fluid |
| **Administration** | • Calculate infusion rate/hour to deliver prescribed daily dose volume over 24 hours<br>• Refer to worked example for 100 mL burette calculation below |
| ***Concentrated infusion*** *(via CVL recommended) requires sufficient volume of maintenance fluid* | |
| **Dilution** | • Preparation is according to weight<br>• Refer to Quick Guide for CVL below |
| **Administration** | • Prime the infusion line and reduce total syringe volume to prescribed dose<br>• IV infusion via syringe driver pump at prescribed rate<br>• On completion, disconnect syringe and infusion line<br>• Flush access port at same rate as infusion<br>• Refer to worked example for concentrated infusion |

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| **Contraindication Caution** | • Contraindication<br>o Nil known<br>• Caution<br>o Nil known |
| **Special considerations** | • Dosage varies according to degree of hyponatraemia[2]<br>• Manage doses above 6–8 mmol/kg/day cautiously (refer to side effects) in consultation with SMO or NNP<br>• CVL recommended for administration of any hypertonic solution greater than 0.9 %[4] with consideration of catheter placement |

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| **Monitoring** | • Electrolytes, 6–24 hourly to evaluate rate of sodium level rise (or as requested by SMO)[2]<br>• Extravasation risk, if administered via PIVC[5] |
| **Compatibility** | • 5% glucose[5], 10% glucose[6], 0.9% sodium chloride[6] |
| **Incompatibility** | • No information: check individual drug or solution[3] |
| **Interactions** | • Nil known |
| **Stability** | • Oral solution (sachet)<br>o Store below 25 °C[7]<br>• Oral solution (compounded)<br>o Store in refrigerator 2–8 °C<br>o Discard 4 weeks after opening or as per local infection control policy (limited evidence)<br>• Vial<br>o Store at room temperature below 30 °C[3] |
| **Side effects** | • Appropriate parenteral use for electrolyte replacement is unlikely to result in adverse effects[3]<br>• Mild hypernatraemia symptoms include[3]:<br>o Reduced salivation and lacrimation, fever, tachycardia, hypertension, restlessness, irritability and weakness<br>• Excessive administration may lead to hypernatraemia, causing[3]:<br>o Organ dehydration and dysfunction, hypokalaemia and acidosis<br>o Congestive heart failure and pulmonary oedema particularly if cardiovascular disease or receiving corticosteroids or drugs that give rise to sodium retention<br>o Loss of bicarbonate with an acidifying effect due to excessive chloride ions<br>• Inadvertent administration of concentrated sodium chloride solutions[3]:<br>o May result in sudden hypernatraemia and potential complications (e.g. somnolence, confusion progressing to convulsions, cardiovascular shock, CNS disorders, extensive haemolysis, respiratory failure and cortical necrosis of the kidney)<br>• Rapid administration (a change in serum sodium of more than 12 mmol over 24 hours) may cause osmotic stress and subsequent demyelination injury to the brain[1] |
| **Actions** | • Sodium is the principle cation of extracellular fluid and chloride is the principle anion of extracellular fluid<br>• Sodium content normally determines the volume of extracellular fluid, and is important in the regulation of osmolarity, acid-base balance, and the membrane potential of cells |
| **Abbreviations** | CNS: central nervous system, CVL: central venous line, IV: intravenous, NGT: nasogastric tube, NNP: neonatal nurse practitioner, OGT: orogastric tube, PIVC: peripheral intravenous catheter, SMO: senior medical officer |
| **Keywords** | electrolyte, hyponatraemia, hypernatraemia, hypersal 6%, neonatal medicine, neonatal monograph, sodium chloride, strong salt, sodium chloride 23.4% |

The Queensland Clinical Guideline *Neonatal medicines*[8] is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

## 100 mL burette: worked example calculation

To calculate volume of intravenous sodium chloride 23.4% (mL) to add to each burette for 24 hours

| | Worked example scenario | 100 mL burette example |
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| Step 1 | Identify<br>• Baby weight=2.5 kg<br>• Sodium dose required in 24 hours =4 mmol/kg in 24 hours | 2.5 kg × 4 mmol=10 mmol/day |
| Step 2 | Calculate required daily dose of sodium chloride 23.4% in mL<br>$\frac{\text{calculated dose (mmol)}}{\text{stock strength (mmol)}}$ | $\frac{10\ \text{mmol/day}}{4\ \text{mmol/mL}}$ =2.5 mL per day |
| Step 3 | Identify total maintenance fluid volume (*e.g. glucose 10% and usually excludes drug/lipid/arterial and venous catheter patency infusion)*<br>*Example:* 12.5 mL/hour of 10% glucose | 12.5 mL/hour × 24 hours =300 mL in 24 hours |
| Step 4 | Calculate number of 100 mL burettes required in 24 hours | $\frac{300\ \text{mL}}{100\ \text{mL}}$ =3 burettes in 24 hours |
| Step 5 | Calculate the volume (mL) of sodium chloride 23.4% to add to each burette | $\frac{2.5\ \text{mL}}{3\ \text{burettes}}$ =0.83 mL |
| Step 6 | Add 0.83 mL of sodium chloride 23.4 % to each 99.17 mL (total 100 mL) of 10% glucose until requirement change | |

## Quick Guide for CVL

Sodium chloride 23.4% via CVL according to weight to achieve a concentration of less than 0.5 mmol/mL.

| Weight of baby | Draw up sodium chloride 23.4% | Make up to total volume | Rate of infusion | Delivers (mmol/kg/day) |
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| **Less than1.5 kg** | 10 mmol/kg (2.5 mL/kg) | 30 mL | 0.5 mL/hour | 4 mmol/kg/day |
| **1.5–3 kg** | 5 mmol/kg (1.25 mL/kg) | 30 mL | 1 mL/hour | 4 mmol/kg/day |
| **More than 3 kg** | 2.5 mmol/kg (0.63 mL/kg) | 30 mL | 2 mL/hour | 4 mmol/kg/day |

## References

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## Document history

| ID number | Effective | Review | Summary of updates |
|---|---|---|---|
| NMedQ21.070-V1-R26 | 20/07/2021 | 20/07/2026 | Endorsed by Queensland Neonatal Services Advisory Group (QNSAG) |
| NMedQ21.070-V2-R26 | 13/08/2021 | 20/07/2026 | • Amended to clarify use of glass ampoule for oral route |
| NMedQ26.070-V3-R31 | 24/02/2026 | 24/02/2031 | Full review. Endorsed by QNSAG<br>• Added: Sodium chloride 6% oral<br>• No change to dose or frequency<br>• Amended: if glass ampoule use filter<br>• Added: worked example for burette preparation<br>• Updated compatibility, incompatibility, references, presentation |

## QR code