

South Australian Neonatal Medication Guidelines

# insulin neutral (soluble)– hyperGLYCAEMIA

## 100units/mL injection

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**Note:**

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

**This is a High Risk Medication** 

Use the term “units” (written in full) as the abbreviation of “U” can be misinterpreted as a “0”

An overdose can be rapidly fatal.

## Synonyms

Neutral insulin, soluble insulin, Actrapid®

## Dose and Indications

### Hyperglycaemia

#### Continuous Intravenous Infusion

0.01 to 0.1 units/kg/hour

#### Subcutaneous Injection

Seek endocrinologist advice



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### Preparation and Administration

#### Continuous Intravenous Infusion

Insulin adsorbs to PVC: new IV tubing should be flushed/primed with 5mL of a diluted insulin solution (use same strength as infused) prior to IV administration (no filter required).

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Insulin Concentration Selection Tables can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

A **double dilution** will be required.

**STEP ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5unit/mL insulin.

**STEP TWO:** Dilute the appropriate volume of the 5unit/mL insulin solution using compatible fluid; and administer by continuous infusion. Diluted preparation is stable for 24 hours at room temperature.

The three standard concentrations to select from are:

Insulin 0.05 units/mL

Insulin 0.1 units/mL

Insulin 0.2 units/mL

#### Formulae

**To calculate infusion rate (mL/hr):**

$$\text{Rate (mL/hour)} = \frac{\text{dose (units/kg/hour)} \times \text{weight(kg)}}{\text{Infusion Strength (units/mL)}}$$

**To calculate the dose (units/kg/hour):**

$$\text{Dose (units/kg/hour)} = \frac{\text{Rate(mL/hr)} \times \text{Strength (units/mL)}}{\text{Weight (kg)}}$$



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### Insulin Concentration Selection Table

#### Double Dilution for Insulin 0.05 units/mL

**To make 25mL syringe:**

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 0.25mL insulin (5 units/mL) with 24.75mL of compatible fluid (total of 25mL)

**To make 50mL syringe:**

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 0.5mL insulin (5units/mL) with 49.5mL of compatible fluid (total of 50mL)

Recommended for neonates weighing <1kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour					Weight (kg)
0.5	0.02	0.04	0.06	0.08	0.1	0.5
1	0.01	0.02	0.03	0.04	0.05	1
1.5	0.007	0.01	0.02	0.03	0.03	1.5
2	0.005	0.01	0.02	0.02	0.03	2
2.5	0.004	0.008	0.01	0.02	0.02	2.5
3	0.003	0.007	0.01	0.01	0.02	3

Discard remaining solution

#### Double Dilution for Insulin 0.1units/mL

**To make 25mL syringe:**

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 0.5mL insulin (5 units/mL) with 24.5mL of compatible fluid (total of 25mL)

**To make 50mL syringe:**

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 1mL insulin (5units/mL) with 49mL of compatible fluid (total of 50mL)

Recommended for neonates weighing 1kg - 3kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour					Weight (kg)
1	0.02	0.04	0.06	0.08	0.1	1
1.5	0.01	0.03	0.04	0.05	0.07	1.5
2	0.01	0.02	0.03	0.04	0.05	2
2.5	0.008	0.02	0.02	0.03	0.04	2.5
3	0.007	0.01	0.02	0.03	0.03	3
3.5	0.006	0.01	0.02	0.02	0.03	3.5

Discard remaining solution



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### Double Dilution for Insulin 0.2 units/mL

#### To make 25mL syringe:

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 1mL insulin (5 units/mL) with 24mL of compatible fluid (total of 25mL)

#### To make 50mL syringe:

**Step ONE:** Dilute 0.5mL of 100unit/mL soluble insulin with 9.5mL of compatible fluid (total of 10mL). The resulting solution contains 5 unit/mL insulin.

**Step TWO:** Dilute 2mL insulin (5units/mL) with 48mL of compatible fluid (total of 50mL)

Recommended for neonates weighing >3kg

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate units/kg/hour					Weight (kg)
2	0.02	0.04	0.06	0.08	0.1	2
2.5	0.02	0.03	0.05	0.06	0.08	2.5
3	0.01	0.03	0.04	0.05	0.07	3
3.5	0.01	0.02	0.03	0.05	0.06	3.5
4	0.01	0.02	0.03	0.04	0.05	4
4.5	0.01	0.02	0.03	0.04	0.04	4.5

Discard remaining solution

### Subcutaneous Injection

Add 0.5mL of 100unit/mL soluble insulin to 9.5mL of sodium chloride 0.9% (to give a total volume of 10mL). The resulting solution contains 5unit/mL insulin.

Dose	0.05 units	0.1 units	0.2 units	0.3 units	0.4 units	0.5 units
Volume	0.01mL	0.02mL	0.04mL	0.06mL	0.08mL	0.1mL

Discard the diluted 5 unit/mL solution.

The vial of insulin may be reused for the same patient for up to 28 days.

### Compatible Fluids

Glucose 5%, glucose 10%, glucose 5%/sodium chloride 0.45%, sodium chloride 0.9%

### Adverse Effects

Hypoglycaemia



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### Monitoring

- > Monitor blood glucose as frequently as guided by the prescriber. It is important that the nursing staff have a documented plan as to the frequency of monitoring the blood glucose level and for glycosuria
- > Electrolytes, particularly potassium

### Practice Points

- > The original vial of insulin may be reused for the same patient for up to 28 days.
- > Unopened vials to be stored in the fridge. Opened vials may be kept at room temperature.
- > If ceasing insulin or changing the strength, be careful to remove and replace the previous line and T-piece to avoid flushing through any insulin remaining in the tubing.
- > Insulin is incompatible with many drugs.

### Document Ownership & History

<b>Developed by:</b>	SA Maternal, Neonatal & Gynaecology Community of Practice
<b>Contact:</b>	<a href="mailto:Health.NeoMed@sa.gov.au">Health.NeoMed@sa.gov.au</a>
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Approval Date	Version	Who approved New/Revised Version	Reason for Change
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03/2015	V4	SA Health Safety and Quality Strategic Governance Committee	Reviewed version
10/2014	V3	SA Health Safety and Quality Strategic Governance Committee	Clarification of type of insulin to be used
02/2013	V2	SA Health Safety and Quality Strategic Governance Committee	Revised version
11/2012	V1	SA Maternal & Neonatal Clinical Network	Original SA Maternal & Neonatal Clinical Network approved version

