

South Australian Neonatal Medication Guidelines

insulin – 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"

Synonyms

Neutral insulin, soluble insulin

Dose and Indications

Hyperglycaemia

Continuous Intravenous Infusion

0.01 to 0.1 units/kg/hour

Subcutaneous Injection

Seek endocrinologist advice

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NeoMed@health.sa.gov.au

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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 for **25mL** syringe

Double Dilution for Insulin 0.05 units/mL

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)

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

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)

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

Double Dilution for Insulin 0.2 units/mL

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)

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

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Insulin Concentration Selection Table for **50mL** syringes

Double Dilution for Insulin 0.05units/mL

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)

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/mLs

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)

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

Double Dilution for Insulin 0.2units/mL

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)

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

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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

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.

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	November 2012	February 2013	Original version
2.0	February 2013	current	Revised version

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