South Australian Neonatal Medication Guidelines

insulin - hyperGLYCAEMIA

100 units/mL injection

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

Government of South Australia
SA Health

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Endorsed by: South Australian Maternal & Neonatal Clinical Network
Contact: South Australian Neonatal Medication Guidelines Workgroup at:
NeoMed@health.sa.gov.au

Dose and Indications

Hyperglycaemia

Continuous Intravenous Infusion

0.01 to 0.1 units/kg/hour

Subcutaneous Injection

Seek endocrinologist advice

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 5 unit/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):

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

Insulin Concentration Selection Table for 25mL syringes

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)

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Weight (kg)	Approximate units/kg/hour								Weight (kg)
Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)			
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)

Weight (kg)	Approximate units/kg/hour								Weight (kg)
Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)			
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)

Weight (kg)	Approximate units/kg/hour								Weight (kg)
Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)			
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

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)

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Weight (kg)	Rate (mL/hr) 0.2	Approximate units/kg/hour 0.4	0.6	0.8	1 Rate (mL/hr) 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)

Weight (kg)	Rate (mL/hr) 0.2	Approximate units/kg/hour 0.4	0.6	0.8	1 Rate (mL/hr) 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)

Weight (kg)	Rate (mL/hr) 0.2	Approximate units/kg/hour 0.4	0.6	0.8	1 Rate (mL/hr) 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.

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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	current	Original version

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