

# INSULIN DEXTROSE INFUSION for pregnancy



## **INSULIN IS A HIGH-RISK MEDICINE**

**USE WITH CAUTION AND ENSURE THE DIRECTIONS WITHIN THIS PROTOCOL ARE FOLLOWED CAREFULLY**

<b>Areas where Protocol/Guideline applicable</b>	Royal Hospital for Women
<b>Authorised Prescribers:</b>	Supervision/advice from the on-call endocrinology/obstetric medicine team is mandatory when considering an insulin/dextrose infusion
<b>Important Safety Considerations</b>	<p>The half-life of IV insulin is only a few minutes, and a woman with type 1 Diabetes Mellitus (T1DM) needs to always have some insulin in her system - otherwise she is at risk of diabetic ketoacidosis.</p> <p>Most women will be receiving long-acting insulin (Protaphane®, Lantus® or Levemir®) which reduces these risks. Long-acting insulin should be given concurrently as a dosage prescribed by the endocrinology/obstetric medicine team.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Care must be taken not to accidentally disconnect the insulin or dextrose infusions. Where possible, the insulin should be given through a dedicated cannula, and the capillary Blood Glucose Level (BGL) should be collected from the opposite hand.</b></p> </div>
<b>Indication for use</b>	<p>Women with <b>type 1 diabetes mellitus during pregnancy, birth, and the immediate postpartum period</b> who require tighter blood glucose level (BGL) control and is not eating, when their usual subcutaneous insulin regime is not appropriate.</p> <p><i>An insulin/dextrose infusion is only used in exceptional circumstances for woman with Type 2 Diabetes Mellitus (T2DM) or gestational diabetes mellitus (GDM).</i></p> <p><b>THIS PROTOCOL IS NOT FOR A WOMAN WITH DIABETIC KETOACIDOSIS.</b></p>
<b>Proposed Place in Therapy</b>	When usual subcutaneous insulin regime is not appropriate.
<b>Adjunctive Therapy</b>	Long-acting insulin should be given concurrently as a dosage prescribed by the endocrinology/obstetric medicine team.
<b>Contra-indications</b>	<ul style="list-style-type: none"> <li>• Hypoglycaemia</li> <li>• Allergy to Insulin (Actrapid®)</li> <li>• Diabetic Ketoacidosis</li> </ul>

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<b>Dosage</b>	<b>Insulin</b> is administered intravenously at a <b>variable</b> rate. <b>Glucose (Dextrose)</b> is infused intravenously at a <b>fixed</b> rate. <b>Confirm rates with Obstetrics Medicine / Endocrinology Team</b>																													
<b>Insulin</b>	Determine the initial insulin infusion rate using the table below. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Commencement Rate for Insulin Infusion</th> </tr> <tr> <th style="text-align: center;">Capillary BGL (mmol/L)</th> <th style="text-align: center;">mL/hour (= units insulin/hour)</th> <th style="text-align: center;">Comments</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">&lt;4.0</td> <td style="text-align: center;">No insulin.</td> <td>Refer to <a href="#">Management of Hypoglycaemia</a>. Call a clinical review / rapid response. Check BGL every 15 minutes.</td> </tr> <tr> <td style="text-align: center;">4.0-5.0</td> <td style="text-align: center;">Nil</td> <td></td> </tr> <tr> <td style="text-align: center;">5.1-7.0</td> <td style="text-align: center;">1</td> <td></td> </tr> <tr> <td style="text-align: center;">7.1-9.0</td> <td style="text-align: center;">2</td> <td></td> </tr> <tr> <td style="text-align: center;">9.1-11.0</td> <td style="text-align: center;">3</td> <td></td> </tr> <tr> <td style="text-align: center;">11.1-13.0</td> <td style="text-align: center;">4</td> <td></td> </tr> <tr> <td style="text-align: center;">≥ 13.1</td> <td style="text-align: center;">Escalate</td> <td>Call endocrinology/obstetric medicine team</td> </tr> </tbody> </table>			Commencement Rate for Insulin Infusion			Capillary BGL (mmol/L)	mL/hour (= units insulin/hour)	Comments	<4.0	No insulin.	Refer to <a href="#">Management of Hypoglycaemia</a> . Call a clinical review / rapid response. Check BGL every 15 minutes.	4.0-5.0	Nil		5.1-7.0	1		7.1-9.0	2		9.1-11.0	3		11.1-13.0	4		≥ 13.1	Escalate	Call endocrinology/obstetric medicine team
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<b>Glucose / Dextrose</b>	Dextrose 5% infusion rate 75 – 125 mL/hr																													
<b>Duration of therapy</b>	Cease infusion as soon as possible after birth i.e., when the woman can eat and take her normal insulin.  Liaise with endocrinology/obstetric medicine team to create an individualised plan about when and how to cease infusion																													

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## Prescribing Instructions

### Prescribe in eFluids.

#### Search and Select:

Enter name to create sequence:

Search:  Type:

Folder:  Search within:

- Actrapid units, Subcut, Solution-Inj, morning (with breakfast), BGL lower limit (mmol/L): 4
- Actrapid units, Subcut, Solution-Inj, midday (with lunch), BGL lower limit (mmol/L): 4
- Actrapid units, Subcut, Solution-Inj, evening (with dinner), BGL lower limit (mmol/L): 4
- Actrapid units, Subcut, Solution-Inj, TDS (with breakfast, lunch and dinner), BGL lower limit (mmol/L): 4
- Actrapid units, Subcut, Solution-Inj, ONCE only, BGL lower limit (mmol/L): 4
- Actrapid units, Subcut, Solution-Inj, morning (with breakfast), BGL lower limit (mmol/L): 3.5, Indication: Gestational diabetes
- Actrapid units, Subcut, Solution-Inj, midday (with lunch), BGL lower limit (mmol/L): 3.5, Indication: Gestational diabetes
- Actrapid units, Subcut, Solution-Inj, evening (with dinner), BGL lower limit (mmol/L): 3.5, Indication: Gestational diabetes
- Actrapid units, Subcut, Solution-Inj, TDS (with breakfast, lunch and dinner), BGL lower limit (mmol/L): 3.5, Indication: Gestational diabetes
- Actrapid units, Subcut, Solution-Inj, ONCE only, BGL lower limit (mmol/L): 3.5, Indication: Gestational diabetes
- Actrapid 10 units in glucose 50% 50 mL [Hyperkalaemia], IV infusion, over 30 minutes
- Actrapid 50 units in sodium chloride 0.9% 50 mL [Labour Type 1 Diabetes], IV infusion**
- Actrapid Penfill

#### Prescribe initial rate of insulin infusion.

Order Name	Status	Start	Details
Birthing Unit RHW; -: OV07 Admit: 10/12/2023 13:00			
IV Solutions			
Actrapid additive 50 units + Sodium Chloride 0.9% 50 mL	Order	21/06/2024 16:26	50 mL, IV Continuous Infusion, mL/hr, Indication: Labour Type 1 Diabetes, 1 bag(s)

#### Details for Actrapid additive 50 units + Sodium Chloride 0.9% intravenous solution 50 mL

Details | Continuous Details | Diagnoses

Base Solution	Bag Volume	Rate	Infuse Over	
Sodium Chloride 0.9% intravenous solution	50 mL	mL/hr	hr(s)	
Additive	Additive Dose	Normalized Rate	Delivers	Occurrence
Actrapid additive	50 units			EB
Total Bag Volume		50 mL		

Weight:  kg Weight Type:  Result dt/tm:  BSA:

Infusion instructions

#### The order will appear on MAR as:

Medications	21/06/2024 16:26
<b>Continuous Infusions</b>	
Actrapid additive 50 units Sodium Chloride 0.9% intravenous solution 50 mL 50 mL, IV Continuous Infusion, 25 mL/hr, Indication: Labour Type 1 Diabetes, 1 bag(s)	<b>Pending</b> Not given within 5 days.
<b>Administration Information</b>	
insulin neutral	
Sodium Chloride 0.9% intravenous solution	

Each order in eFluids corresponds to **ONE Syringe** only. Prescribers must ensure that new infusion orders are available in a timely manner, enabling nursing staff to continuously administer the drug infusion, where required. The number of syringes prescribed at any one time should be considered in the context of:

- Stability of dose at the time of prescribing
- Predicted duration of one bag

**Note:** A Insulin infusion must be recharted and replaced at least every 24 hours.

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<b>Administration Instructions</b>	<p><b>MUST be administered by a category 1 or 3 accredited registered nurse (RN) or registered midwife (RM)</b></p> <p><b>Preparing infusions</b></p> <ul style="list-style-type: none"> <li>Determine the initial insulin infusion rate using Table <i>Commencement rate for Insulin Infusion</i> e.g. if the BGL is 5.2mmol/L, start the infusion at 1mL/hr (= 1 unit/hr).</li> </ul> <p><b>Administration</b></p> <ul style="list-style-type: none"> <li>Requires one dedicated intravenous (IV) cannula to administer both infusions concurrently through an infusion pump.</li> <li>Connect to the IV cannula with a 3-way tap.</li> </ul>
<b>Insulin</b>	Load 50 units insulin in sodium chloride 0.9% made up to 50 mL total volume (1 unit of insulin/ mL) in a syringe driver
<b>Glucose / Dextrose</b>	Prepare bag of 5% dextrose solution to be run concurrently at a fixed rate of 75-125mL/hr as prescribed by the endocrinology/obstetric medicine team.  Occasionally 10% dextrose will be substituted if fluid restriction is required.
<b>Monitoring requirements</b>	<p>Provide 1:1 nursing/midwifery care</p> <p><b>Nursing staff are responsible for:</b></p> <ol style="list-style-type: none"> <li>checking capillary ketones fourth-hourly in labour using finger prick KetoStix®. Notify endocrinology/obstetric medicine team if ketones &gt; 0.6</li> <li>monitoring capillary BGL one hour after infusion commenced and then as frequency recommended below. Nursing staff <b>MUST</b> request a medical officer review when if &gt; 2 consecutive BGL levels &gt; 8.0 mmol/L or BGL ≥ 15.1 mmol/L.</li> <li>reviewing the insulin infusion rate every hour and adjusting accordingly. All infusion rate changes are to be checked by two RN/RMs.</li> </ol> <p>If the woman is not responding to increasing the insulin infusion, consider errors relating to:</p> <ul style="list-style-type: none"> <li>the insulin infusion preparation</li> <li>IV tubing</li> <li>IV cannula</li> <li>blood glucose monitor</li> </ul> <p><b>Contact the endocrinology/obstetric medicine team if this occurs.</b></p> <p>Nursing staff <b>MUST</b> document the administration of rate changes in MAR. If no adjustments are required, document this and other details relevant for the infusion in the progress notes. See Quick Reference Guide: <a href="#">Rate Change Documentation via MAR (Nurse Led Titration)</a></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Notify endocrinology/obstetric medicine team immediately if the insulin infusion needs to be turned off for any reason.</b></p> </div> <p>Be aware insulin requirements decrease after the birth of the placenta, and the woman is at increased risk of hypoglycaemia postpartum. Target BGL of 5-10 mmol/L are adequate.</p> <p><b>Check BGL every 30 minutes for the first two hours postpartum, and then hourly as usual.</b></p>

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Adjusting Insulin Infusion			
BGL (mmol/L)	Immediate action	Repeat capillary BGL	Next steps
< 4.0	<ol style="list-style-type: none"> <li>1. Stop insulin infusion</li> <li>2. Notify endocrinology/obstetric medicine team</li> <li>3. Treat hypoglycaemia</li> </ol>	every 15 mins until BGL > 4.0	<p>Once BGL 4.0-6.0, leave insulin infusion off and repeat BGL in 1 hour.</p> <p>Once BGL &gt; 6.0, recommence infusion at HALF the previous rate.</p>
4.0 - 5.0	Halve insulin infusion rate	In 1 hour	
5.1 - 7.9	<i>If NO increase to insulin infusion rate in the last hour:</i> Maintain infusion rate	In 1 hour	
	<i>If recent increase to insulin infusion rate in the last hour:</i> Reduce insulin rate by 1 mL/hr	In 1 hour	
8.0 – 15.0	Increase insulin rate by 1 mL/hr every hour until < 8.0 mmol/L	In 1 hour	Check capillary ketones and notify endocrinology/obstetric medicine team if > 2 consecutive BGL levels > 8.0 mmol/L
≥ 15.1	<ol style="list-style-type: none"> <li>1. Give 4 mL bolus of insulin stat.</li> <li>2. Increase insulin infusion rate by 1 mL/ hr</li> <li>3. Notify endocrinology/obstetric medicine team</li> </ol>	In 1 hour	Check for capillary ketones

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<p><b>Management of Hypoglycaemia</b></p>	
<p><b>Basis of Protocol/Guideline:</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">Diabetes - Management of Pre-gestational Diabetes in Pregnancy Policy SESLHDGL/116</a></li> <li>• <a href="#">Diabetes - Gestational Diabetes Mellitus (GDM) Screening and Management Policy SESLHDGL/117</a></li> <li>• Australian Commission on Safety and Quality in Health Care User guide to the National Subcutaneous Insulin Chart: acute facilities. Sydney: ACSQHC; 2017 <a href="#">Guidelines for Treating Hypoglycaemia</a></li> </ul>
<p><b>Groups consulted in development of this guideline</b></p>	<p>Royal Hospital for Women Medication Safety Committee Royal Hospital for Women Maternity Clinical Business Rule Committee</p>

AUTHORISATION	
Author (Name)	A/Prof Helen Barrett Dr Wendy Hawke
Position	Director of Obstetric Medicine, Consultant Obstetrician
Department	Obstetrics Medicine
Position Responsible (for ongoing maintenance of Protocol)	Director of Obstetric Medicine

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## GOVERNANCE

Enactment date <i>Reviewed</i> (Version 2) <i>Reviewed</i> (Version 3)	July 2024
Expiry date:	July 2025
Ratification date by SESLHD DTC Committee	4 <sup>th</sup> July 2024
Chairperson, DTC Committee	Dr John Shephard
Version Number	1