

Insulin pump therapy

RSS Diabetes Service

Insulin pump therapy is also known as continuous subcutaneous insulin infusion (CSII). Insulin pump therapy can help match your insulin to your lifestyle and minimise the number of insulin injections. When you work closely with your diabetes care team, insulin pump therapy can help keep your glucose levels within your target ranges.

What is an insulin pump?

An insulin pump is a small battery operated electronic device that is worn 24 hours a day. It is worn outside of the body and the insulin pump case can be clipped directly to a waistband or to clothing.

Most insulin pumps are water resistant and some are water proof. However, for showering, bathing, swimming or contact sports, the insulin pump can be temporary disconnected.

Only rapid acting insulin is used. For this reason, it is recommended that an insulin pump is not disconnected nor insulin delivery suspended for more than 1 hour.

What are the components of an insulin pump?

The three components which deliver insulin just under the skin (subcutaneous tissue) are:

1. The **insulin pump** delivers programmed insulin doses that are continuous and customised for you.
2. An **infusion set** (thin plastic tubing) is connected to the insulin pump and the other end of the infusion set is connected to a plastic or steel cannula.
3. A **reservoir** holds the insulin in the pump ready for use.

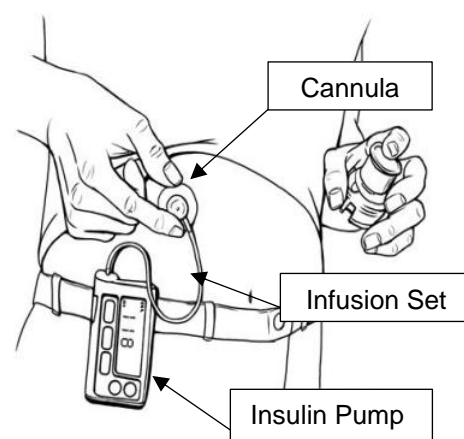
The cannula is held in place by an adhesive dressing. After 2 - 3 days, a new infusion set and cannula should be inserted into a different place on your body.

Additional components can include specific **blood glucose meters** and/or **continuous glucose monitors** that connect wirelessly to insulin pumps and transmit blood or sensor glucose results. Specific insulin pump software can be added to your home computer or smart device which enables you to see your data and share this information with your health care professional, family and/or carer.

What are the benefits of insulin pump therapy?

Provided the suggested management guidelines are followed, insulin pump therapy can reduce hypoglycaemic (low blood glucose) events and improve your glucose time in target range and HbA1c.

Continuous glucose monitors connected wirelessly to insulin pumps can also offer early warnings for higher and lower than target sensor glucose results. These sensor glucose results can then be used by the insulin pump to automatically adjust or suspend insulin delivery.



Are there any disadvantages of insulin pump therapy?

There is minor discomfort at the time of the insertion of the cannula, however, there is no expected discomfort when wearing the insulin pump.

There is a small risk of infection but this risk is reduced by using a sterile technique when inserting the cannula and rotating the cannula insertion site every 3 days as recommended.

Mechanical faults can occur and so it is important to have an **insulin pump failure** action plan, spare insulin and insulin syringes available.

Insulin pumps may be effected by strong magnetic fields which may result in damage. Insulin pumps are to be disconnected from the cannula and removed during X-rays, CT Scans and MRIs.

Of greatest concern is the risk of life threatening **diabetic ketoacidosis** from insulin pump malfunction or problems with insulin delivery. This is because the insulin pump uses only rapid acting insulin and ketones and ketoacidosis can develop more quickly than when using multiple daily injections (that use both rapid acting and long acting insulin). A **sick day** action plan can be developed in consultation with the credentialled diabetes educator, doctor or diabetes specialist.

How does the insulin pump work?

With assistance from your diabetes team, your insulin pump is programmed to deliver rapid acting insulin 24hours a day to cover your specific needs of;

- **Basal insulin** – these settings are needed to keep glucose results within target while sleeping or during the day (e.g. between meals).
- **Bolus doses** - are also known as meal-time insulin and are based on your insulin:carbohydrate ratio (ICR). When you plan to eat, you use buttons on the insulin pump to enter in the carbohydrate food amount and the insulin pump then calculates a bolus dose to match the glucose rise expected after eating and to keep the glucose results in target. You can use the buttons on the insulin pump to take the bolus dose suggested or make a change to that dose.
- **Correction doses** – are used to manage hypoglycaemia, hyperglycaemia and ketosis. The insulin pump is programmed with your blood glucose target and an insulin sensitivity factor (ISF). When an out of target glucose result is entered in the insulin pump, the insulin pump calculates a correction dose to return the glucose result back into target. You can use the buttons on the insulin pump to take the correction bolus dose suggested or make a change to that dose.

What costs are involved?

An insulin pump can cost up to \$9500. However, if you have private health insurance, you may be eligible for some reimbursement of costs.

If you are under 18years of age, you can apply to the Type 1 Diabetes Insulin Pump Subsidy Program established by Diabetes Australia and the Juvenile Diabetes Research Foundation. For more information on eligibility for the insulin pump full subsidy, or to apply for the subsidy, go to www.jdrf.org.au website.

The consumables (e.g. infusion sets and cannulas) are subsidised by the National Diabetes Service Scheme (NDSS) at a reduced cost.

What can I do now?

If you would like to use an insulin pump, you must first discuss this with your credentialled diabetes educator, doctor or diabetes specialist. Your diabetes team will work with you and assist in learning more about:

- your closest insulin pump service
- choosing the right pump for you
- costs involved
- NDSS changes required
- ordering the pump and consumables
- education plan
- insulin pump start up appointment
- and ongoing requirements.

Where can I get more information?

- Health Direct Australia (24hr health advice line)
- Diabetes Australia
- National Diabetes Services Scheme
- Juvenile Diabetes Research Foundation
- My D (for under 25s)
- Australian and Medical Scientific Limited
- Medtronic
- Ypsomed Australia Pty Ltd
- Roche Diagnostics Australia Pty Limited

Phone: 1800 022 222

www.diabetesaustralia.com.au

www.ndss.com.au

www.jdrf.org.au/

www.ndss.com.au/MyD/

www.amsl.com.au/

www.medtronic-diabetes.com.au/

<https://www.mylife-diabetescare.com/en-AU/>

www.roche-australia.com/

For more information

Rural Support Service

Diabetes Service

PO Box 287, Rundle Mall

ADELAIDE SA 5000

Telephone: (08) 8226 7168

Email: Health.DiabetesService@sa.gov.au

www.chsa-diabetes.org.au

www.sahealth.sa.gov.au/regionalhealth

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SA Health

My 'Insulin Pump Failure' Action Plan

Emergency contact details Ambulance: 000 Hospital: _____ Ph: _____ Doctor: _____ Ph: _____ Diabetes Educator: _____ Ph: _____ Family / Carer: _____ Ph: _____ 24hr Health Direct Phone: 1800 022 222		My contact details U.R. No: _____ Surname: _____ Given Name: _____ DOB: _____ Sex/Gender: _____	
Insulin pump failure is to be assumed until proven otherwise		Action must be taken if you have: <ul style="list-style-type: none"> • high glucose (e.g. blood or sensor glucose greater than 15.0mmol/L) • high ketones (e.g. blood ketone greater than 0.6mmol/L) • nausea and or vomiting. 	
A rescue injection of rapid-acting insulin <i>Given using an insulin syringe or pen.</i>		The rescue rapid acting insulin dose is based on your total daily insulin dose of _____ units, your blood glucose level and your blood ketone level.	
Blood glucose	Blood ketone	Rapid acting insulin rescue dose	
greater than 15.0mmol/L	less than 0.6mmol/L	_____ units 5% of your total daily dose	
greater than 15.0mmol/L	between 0.6 - 1.5mmol/L	_____ units 10% of your total daily dose	
greater than 15.0mmol/L	greater than 1.5mmol/L	_____ units 20% of your total daily dose	
Troubleshoot to confirm failure of your insulin pump		Check if: <ul style="list-style-type: none"> • the battery needs replacing or the insulin pump needs charging • there is adequate insulin in the reservoir • the infusion set or cannula is kinked, damaged or dislodged. 	
Change your infusion set and cannula		Monitor blood or sensor glucose and blood ketones 1-2 hourly until targets are reached.	
Replacement insulin pump <i>Contact the technical 24hour helpline to report your fault and arrange a replacement.</i>		Long acting insulin and rapid acting insulin will be required via basal bolus multiple daily injections.	

<p>My basal / long acting insulin</p> <p>Trade name: _____</p> <p>Generic name: _____</p> <p><i>Long acting insulin concentration: 100unit per mL (regular insulin) 300unit per mL (high strength insulin)</i></p>	<p>Device: _____ disposable / non disposal.</p> <p>Initial dose: _____ units at _____ hours (am) _____ units at _____ hours (pm)</p>
<p>My bolus / meal related insulin</p> <p>Trade name: _____</p> <p>Generic name: _____</p> <p><i>Rapid acting insulin concentration: 100unit per mL (regular insulin)</i></p>	<p>Device: _____ disposable / non disposal.</p> <p>Insulin:carbohydrate ratio (ICR): _____ unit per _____ grams OR</p> <p>Initial dose: _____ units at breakfast _____ units at lunch _____ units at dinner</p>
<p>My correction insulin</p> <p>Trade name: _____</p> <p>Generic name: _____</p> <p><i>Rapid acting insulin concentration: 100unit per mL (regular insulin)</i></p>	<p>Device: _____ disposable / non disposal.</p> <p>Insulin sensitivity factor (ISF): _____ unit lowers blood glucose by _____ mmol/L.</p> <p>Duration of Insulin Action (IOB): _____ hours.</p>