

Insulin Pump Workbook

Local Phone Numbers:

Pump manufacturers helpline:

Developed by Joan Everett and Dr Helen Lockett on behalf
of Diabetes Education Network

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About This Workbook

Welcome to this workbook. It aims to offer background information to support you starting on insulin pump therapy and it is designed to be used by both health professional and patients.

Some of the topics in the workbook are addressed using a question and answer technique and these sections try to cover the most frequently asked questions. You will also see symbols at various points and these are designed to encourage you to think about the way you manage your diabetes. If you are part of a group, you may want to discuss the issues

What do the symbols mean?



This symbol indicates something for you to think about, or a question



This symbol indicates something you may wish to discuss in your group

This symbol represents frequently asked questions

This is your own personal and private booklet; no one will ask to look at it, so you can keep it private or share it as you wish.

Introduction

The aim of this workbook is to provide you with the information necessary to enable you to manage your diabetes using insulin pump therapy.

Thinking about the following questions may help you get the most from starting pump therapy.



What are your reasons for starting insulin pump therapy?

What frustrates you now about your diabetes?



What are your expectations about pump therapy?

What do you hope to achieve by converting to an insulin pump?

What are your fears or worries you have about starting pump therapy?

My personal goal for pump therapy is:

If you are part of a group please remember that everything discussed should be considered confidential to the group.



What are the advantages of insulin pump therapy?

What are the disadvantages of insulin pump therapy?

Possible Reasons to Convert to an Insulin Pump



Please tick the boxes that you feel are relevant to you:

- Repeated episodes of hypoglycaemia despite high self-care
- Reduced awareness of hypoglycaemia
- Rise in blood glucose in the early hours of the morning, called the “dawn phenomenon”
- Wide fluctuations in blood glucose level despite intensive multiple injection insulin regime
- Pre-conception or pregnancy
- Requiring very small amounts of insulin or Insulin sensitivity
- HbA1c over 8.5%

I feel that I am(tick all boxes relevant to you)

- Motivated to succeed
- Able to self-manage and problem solve
- Willing to test blood sugars at least 4 times a day
- Competent at carbohydrate counting
- Competent at insulin adjustment for carbohydrate, blood sugar and lifestyle
- Willing to work with the multi-disciplinary team
- Aware of the insulin pump agreement

Insulin Pump Therapy Agreement

Benefits of Insulin Pump Therapy - General

Although insulin pump therapy can be successful, this form of treatment is time-consuming and expensive. Therefore, it is important that people on pumps continue to benefit in the long-term. The potential benefits are:

- Less frequent severe hypoglycaemia
- Return of early warning symptoms of hypoglycaemia
- Improved glucose control
- Better quality of life

The reduction in HbA1c level should be at least 0.5% less than your average level before starting on the pump (unless your HbA1c is less than 7.5%)

Also, in order to benefit from the pump, it is important that you are confident in:

- Using the technical features of the device
- Altering the amount of insulin depending on the carbohydrate content of meals, exercise etc
- Measuring blood glucose levels to use correction doses

We anticipate that you will see the benefits after 3-6 months of starting the pump. These need to be maintained in the longer term. It will be necessary to measure the benefits by checking your HbA1c level, awareness of hypoglycaemia and quality of life (using questionnaires) at regular intervals.

Benefits of Insulin Pump Therapy – Patient Specific

We recognise that there may be other reasons why pump therapy may benefit you.

1. ...
2. ...
3. ...

If, however, the pump does not prove to be successful based on the above, it may be necessary to look at alternatives.

Terms of agreement

I, the undersigned, recognise that it is important that there should be demonstrable benefits to me with continuing use of insulin pump therapy. I agree to the above being measured on a regular basis and used to evaluate the benefits of insulin pump therapy.

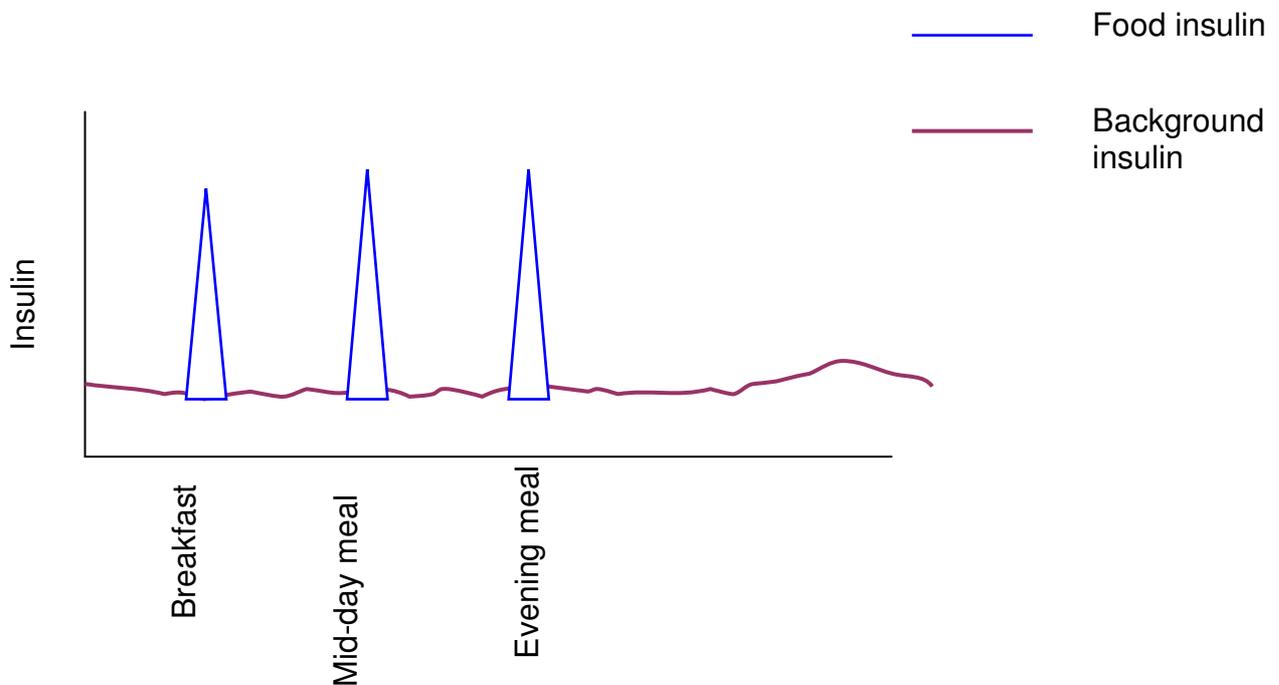
I understand that continued funding for the pump (including consumables) is dependant on my active participation in on-going education and by demonstrating measurable improvements in my diabetes control.

Signed	
Please print name	
Date	

Why is Insulin Necessary?

The diagram below represents what happens in someone without diabetes. Background insulin is necessary to maintain blood glucose levels whether people are eating or not. The pancreas produces a small amount of insulin continually to maintain normal blood glucose levels. The pancreas automatically increases or decreases insulin production according to the blood glucose level.

When food containing carbohydrate is eaten, the pancreas produces exactly the right amount of insulin to keep blood glucose levels within the normal range. The insulin that is secreted after breakfast, lunch and the evening meal is shown by the three peaks in the diagram below.



Daily insulin requirements vary from person to person. The aim of insulin pump treatment is to mimic the pancreas by using short acting insulin to give a background (basal) rate which is pre-programmed in and delivered in small pulses. In addition you can press buttons to deliver a bolus to cover carbohydrate eaten or give a correction dose.

Blood Glucose Monitoring

Measuring blood glucose is a way of monitoring your diabetes. By using the blood test results you can learn how different things can affect your diabetes, such as the food you eat, the exercise you take, or illness and stress.

Blood glucose monitoring will give you information about YOUR response to all of the above. It should help you see what's working and what's not. Each blood glucose reading is a learning experience.



What are the benefits to you of blood glucose monitoring at the moment?

What may stop you doing blood tests?

What is your target blood glucose level?

How many blood tests will you expect to do on the pump?

Calculating Your Basal Rate

You may need approximately 25 - 30% less insulin on a pump than your present requirements because of the way the insulin is delivered

Working it out:

1. On average, how much short acting insulin are you injecting in 24hours? e.g. 24 units
2. How much long acting insulin do you inject in 24 hours? e.g. 20 units
3. Add both together to give your pre-pump total daily dose e.g. 44 units
4. Take 30% off pre-pump total daily dose. This is now your total daily pump dose e.g. 70% of 44 units = 30 units
5. Divide your total daily pump dose by 2 to give your total basal rate in 24 hours e.g. $30 \div 2 = 15$ units
6. Divide by 24 to give an hourly basal rate e.g. $15 / 24 = 0.6$ units per hour

Now calculate your basal rate

Short acting insulin =

Long acting insulin =

Total =

-30% =

Divide by 2 =

Divide by 24 =

My starting basal rate is.....



It is usual to start with a flat basal rate but you and your team may decide differently. The pump has the ability to deliver different basal rates during the 24 hour period. These will be determined according to your individual needs over the next few weeks. Most people have between 1 – 6 different basal rates

Calculating Your Insulin to Carbohydrate (CHO) Ratio

You may be using an insulin to carbohydrate ratio that is based on the number of units of insulin for each 10g of carbohydrate or CP (carbohydrate portion). When using a pump it is more common to have a ratio where 1 unit of insulin is given for a calculated amount of carbohydrate. This allows more accurate bolus dose calculation. Use the equation below to calculate your pump insulin to carbohydrate ratio. Alternatively your diabetes team may decide to continue your present insulin to carbohydrate when you commence pump therapy. If this is the case please move on to the next section.

Working it out:

1. Calculate your total daily pump dose as above e.g. 30 units
2. Divide this into 500 e.g. $500 \div 30 = 16.6$ rounded to 15: This means you will need approx 1 units of insulin for every 15g CHO

Now calculate your insulin to carbohydrate ratio

Total daily pump dose =
 $500 \div \text{total daily pump dose} =$

I need to take 1 unit of insulin forg of carbohydrate



Compare this with your previous ratio and decide with your team what you will use

Calculating Your Correction Dose

This is how much 1 unit of insulin will reduce your blood glucose level by.

Working it out:

1. Calculate your total daily pump dose as above e.g. 30 units
2. Divide this into 100 e.g. $100 \div 30 = 3.3$. This means that 1 unit of insulin will reduce your blood glucose level by approx 3mmol/l

Now calculate your correction dose

Total daily pump dose =
 $100 \div$ total daily pump dose =

1 units of insulin will reduce my blood glucose bymmol/l



How much insulin would you give, as a correction bolus, if your blood glucose is 10 mmol/l pre meal and your target blood glucose level is 6mmol/l?

What Insulin Will be Used in My Pump?

Only short acting insulin is used in insulin pumps.
The analogue insulins commonly used are

- Lispro (Humalog)
- Aspart (Novorapid)
- Glulisine (Apidra)

You will be able to obtain your insulin in the usual way from your GP by prescription however you will require 10ml vials rather than the insulin cartridges used in pens.

Getting Started

What do you need?

- Your pump
- Short acting insulin in 10ml vial
- Reservoir
- Your chosen cannula and insertion set
- Blood glucose monitor
- Completed audit questionnaires



- Any final questions or concerns?

The Basics of Insulin Pumps

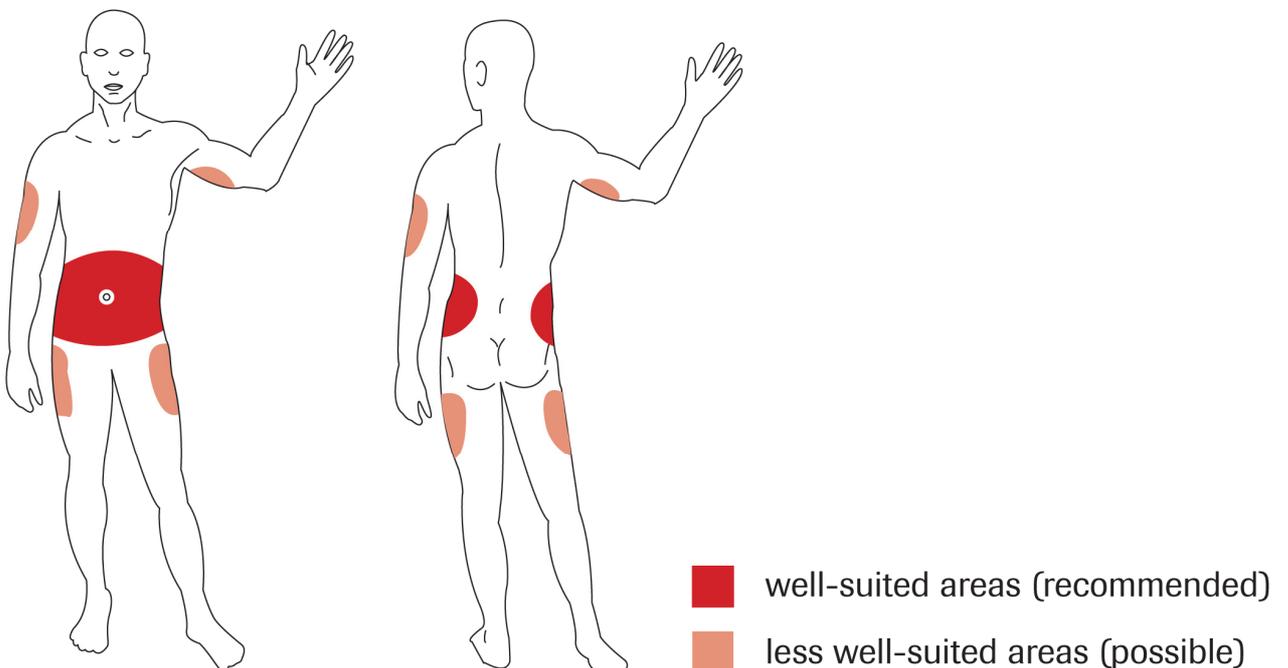
You will be taken through the basic functions of your pump by the diabetes team and the pump manufacturer's instruction book.

You will cover

- Inserting batteries
- Setting time and date
- Switching pump on/off
- How to give a bolus
- How to set basal rates
- How to fill up a cartridge
- How to insert a cartridge
- Different insertion devices

Insertion Sites

Below is a diagram that show the best sites to insert your cannula.



Infusion Site Management

- It is best to avoid any 'lumpy' or heavily used sites
- Ensure you rotate your infusion sites
- The infusion set should not be sited directly on the belt line or under the waistband
- Think of things like seat belts
- Insert the new infusion set at least 5cm away from the old site
- Some people prefer to stand while inserting
- Change infusion sets every 2 – 3 days
- Always check blood glucose level two hours after inserting cannula to ensure it is working
- Best time to change site is after a bath but not late at night as you need to ensure that the cannula is working before you go to sleep. Failure to absorb insulin overnight may result in ketones
- Another good time to change is before a meal so that the meal bolus ensures any clearing of tissue or blood left in cannula.
- Leave old infusion set in until the new one is in place. Some people leave it in for up to 2 hours
- Examine your cannula after removal to check for kinking or bending. Consult your diabetes team if this happens regularly
- Infusion sites are sometimes painful after insertion. If still painful after one hour it is best to change the cannula and site. You may experience a slight stinging sensation
- If you see blood in tubing, your infusion site will need to be changed
- Tea tree cream is useful to help heal scars

Preventing Infection

- Wash your hands before you open any package
- Wash your hands after touching the old site
- Use no touch technique for ends of tubes
- Change set at first sign of pain, redness or discomfort

What to Do When Your Blood Glucose Is Low

Hypoglycaemia means low blood glucose and is commonly called a “hypo”.



Think back to your last hypo and consider the events that may have led to it.

The three most common causes of hypos are:

- Too much insulin
- Overestimation of carbohydrate content of food
- More physical activity than planned



When you have a hypo how do you feel?

What warning symptoms do you have?



What blood glucose level would you count as a hypo?

At what level do you experience warning symptoms?

Generally a blood glucose level of less than 4 mmols/l is defined as the onset of hypoglycaemia. The motto often used is “**Make 4 the Floor**”. Maintaining your blood glucose no lower than 4mmols/l allows time for you to recognise any symptoms and take the necessary action.

Remember a hypo during the previous 24 hours may increase the risk of further hypos. Any hypos can lead to unpredictable blood glucose readings over the next 24 hours due to the body releasing various hormones in response to the low blood glucose level.

Treatment

Self-treated hypos



What do you use to treat your hypos?

In order to increase the low blood glucose levels as soon as possible, the ideal option is a glucose-rich food or drink. The table below shows some examples of treatment for hypos. **Aim to initially take 15 to 20g of carbohydrate.** You may be able to treat the hypo yourself, but if symptoms are severe, you may require help from others.

Food	10g CHO is found in:	15g CHO is found in:
Glucose/dextrose tablets	3	5
Lucozade	50 ml	80 ml
Cola-type fizzy drink (non-diet variety)	100 ml	150 ml
Jelly babies	3	5
Jelly beans	7	10
Fruit pastilles	4	6

It is recommended that you take 15 - 20g fast-acting carbohydrate and then wait 10 -15 minutes, re-test and if necessary, treat again with a further 10 -15g carbohydrate.

My preferred option for hypo treatment is.....

Help from Others

Any of the above treatments can be given if you are able to swallow.

In severe hypos you may be unconscious, in which case your family and friends may be taught how to give you a glucagen injection.



Are there any differences to treating a hypo now you are using an insulin pump?



It is not necessary to stop the pump if you are having a hypo but it is important to treat it quickly. You will not need longer acting carbohydrates such as a biscuit or a sandwich.

Remember: if you are having frequent episodes of hypoglycaemia, or are unable to treat the hypo yourself, you should contact your diabetes team for advice.

Always try and think of the reason for your hypo so that you can learn from your experience

Potential Reasons for Low Blood Glucose Values

- Overestimating carbohydrates and giving too much insulin as a bolus
- Giving large bolus with food (may be better to use a different type of bolus)
- Slow digestion of food
- Basal rate too high
- More activity than usual without setting a temporary basal rate
- Over correction for high blood glucose value
- Alcohol
- Stress causes hypos in some people
- Around time of menstrual cycle

Prevention

- Calculate carbohydrate correctly to ensure correct bolus
- Check your insulin to carbohydrate ratio is right for you
- Split bolus or use different type of bolus if larger amounts of carbohydrate are eaten
- Be careful when giving correction boluses. Work out exactly how much you need. Remember: insulin may last in the body for up to 6 hours so it is advisable only to give half of the calculated correction dose if correcting between meals
- Basal rates should be tested regularly
- Use temporary reduction of basal rate when exercising
- Never give bolus of insulin for alcohol consumed unless you are sure of the effect
- Always look for a pattern before changing basal, bolus or correction doses

Causes of High Blood Glucose Levels



What symptoms do you experience when your blood glucose levels are high?

What are some of the reasons for high blood glucose levels?



What are other possible reasons for high blood glucose levels now you on a pump?

Reasons for high blood glucose levels

1. *Increased insulin requirements*

- Infection
- Illness
- Stress
- Inflammation at insertion site
- Reduced exercise
- Hormonal (pregnancy / menstruation)
- Steroids

2. *Infusion set*

- Insertion into hardened area
- Infusion set left in too long
- Infusion set dislodged
- Infusion set blocked
- Blood in infusion set
- Empty cartridge
- Large air bubble in tubing
- Infusion set leaking
- Pump failure

3. *Insufficient insulin delivery*

- Basal rate too low
- Forgot to give bolus
- Bolus too small for amount of carbohydrates / under calculated carbohydrate content of food
- Excessive carbohydrates after hypoglycaemia
- Rebound following hypoglycaemia
- Pump stopped

Managing Illness and Diabetic Ketoacidosis (DKA)

When you are ill, your body becomes more resistant to the insulin you are taking so you will always require more. In addition, you will produce stress hormones that will cause your glucose levels to rise.

Think back to times when you have been ill.



What were the causes?

How did you manage it?



What will be different now you on the pump?



Implications of ketones

In the absence of sufficient insulin, the body's cells cannot use glucose for energy. The cells will switch to an alternative energy source and body fat will be broken down to supply the necessary energy.

This rapid breakdown of fat can cause the build-up of substances known as ketones. Eventually, the blood glucose and ketones rise to levels that cause the blood to become acidic and this is known as diabetic ketoacidosis (DKA). The only treatment for DKA is insulin and fluids.

Ketones can be measured in urine by Ketostix or in blood by using a MediSense Optium meter. It is advisable to check the expiry date on urine and blood strips before use.

Remember: Now you are on a pump, you have no long acting insulin and ketones will be produced within 4 – 5 hours if there is insufficient insulin delivered. You will become unwell more quickly on a pump and action needs to be taken immediately.

As DKA can develop and progress quickly and makes you feel very unwell, the next section gives guidelines for you to follow if you are ill.

What should I do if I'm ill and my blood glucose levels are high?

It is recommended that you test your blood or urine for ketones if your blood glucose levels are over 14 mmol/l

What should I do if I have a positive ketone test?

- You should take rapid acting insulin by injection
- Take normal or double your usual correction dose according to policy
- Drink plenty of water or sugar free fluid
- Change infusion set and check pump settings
- Try to identify the cause of the high blood glucose and seek help / treatment as necessary
- Test blood glucose and ketones every 1 – 2 hours and repeat double the correction dose until blood / urine is negative to ketones
- Remember you should not exercise if ketones are present
- Contact the diabetes team if high blood glucose levels and ketones persist

My doubled correction dose is:

2 units of rapid acting insulin will lower blood glucose bymmol/l

Contact GP / Accident and Emergency Dept if you are vomiting, as dehydration may occur

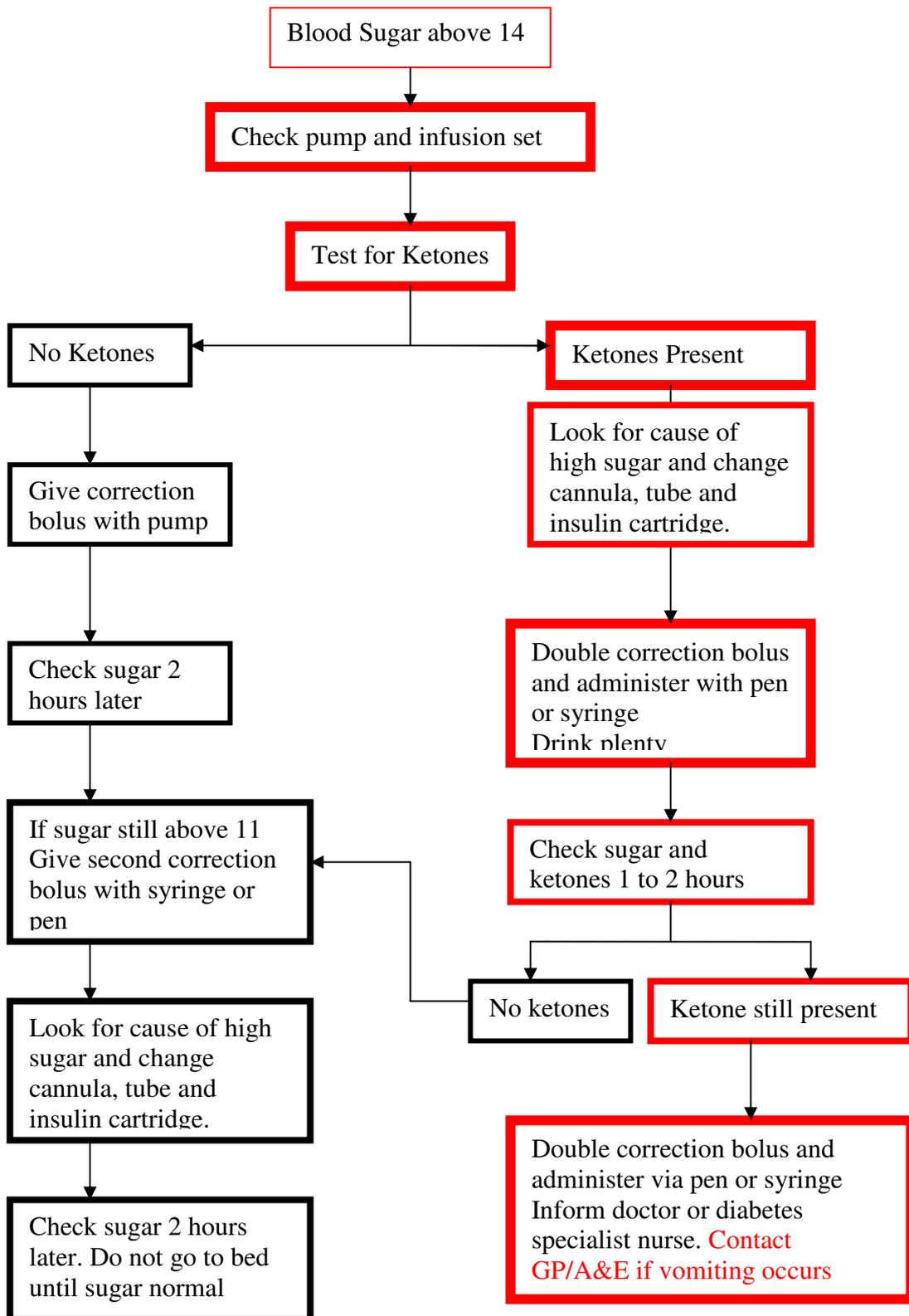
Managing High Blood Glucose Without Ketones

- If your blood glucose level is above 14mmol/l and your ketone test is negative take your **usual correction dose**
- Drink plenty of water or sugar free fluid
- Change infusion set and check pump
- Try to identify the cause of the high blood glucose and seek help / treatment as necessary
- Test blood glucose and ketones every 1 – 2 hours. If your blood glucose remains above 14 mmol/l repeat your normal correction dose
- **If you have a positive ketone test, treat as per “What should I do if I have a positive ketone test”**
- Do not go to bed until sugars are normal

My usual correction dose is:

1 units of rapid acting insulin will lower blood glucose bymmol/l

Contact GP / Accident and Emergency Dept if you are vomiting, as dehydration may occur



Case Scenarios



Mark has been using a pump for 2 months. He has woken up feeling very unwell with a sore throat. He has just tested his blood glucose and it is 25mmol/l. He has tested for ketones and has +++
What should he do?

Kirsty is surprised when she tested her blood glucose level and it was 18.8mmol/l. She has no ketones.
What are some of the possible reasons for her high blood glucose?

What should she do?

Checking Your Insulin to Carbohydrate Ratio

If your insulin to CHO ratio is right for you, your blood glucose level should be no more than 2mmol/l higher or lower than pre meal blood glucose level two to four hours after eating. For example if your blood glucose is 5.9 mmol/l before breakfast and is 7.8 mmol/l two hours later, you are using the right ratio.



Have a look at these examples

Example 1

Andrea takes 1 unit for every 10g carbohydrate she eats. Here are her blood glucose readings over a couple of days

Time	Blood glucose	Amount of carbs	Insulin for food	Correction dose	Comments
Day 1					
0730	7.2	45g	4.5		Normal day
1030	3.2				Felt hypo
1330	5.2	45g	4.5		
1800	6.7	60g	6		
2200	4	15g			
Day 2					
0730	6.5	45g	4.5		Normal day
1030	3.0				Felt hypo
1330	6.2	40g	4		
1800	7.1	70g	7		
2200	4.1	20g			

- What pattern have you identified?
- Which options have you considered?
- What changes would you make?

Example 2

Sam takes 1 unit for every 15 g carbohydrate he eats. Here are his blood glucose readings over a couple of days.

Time	Blood glucose	Amount of carbs	Insulin for food	Correction dose	Comments
Day 1					
0730	5.7	60g	4		Normal day
1330	11.2	50g	3.3	2	
1800	7.2	72g	5		Went for 1 hour walk
2200	8.9			1	
Day 2					
0730	6.8	60g	4		
1330	12.3	50g	3.3	2	
1800	7.1	90g	6		
2200	11.3			2	

- What pattern have you identified?
- What changes would you make?

Checking Your Basal Rate

Basal rates should be checked periodically to ensure your programmed basal rate is meeting your body's requirement for your background supply of insulin.

Testing your basal rate involves fasting (no carbohydrates) for a period of time. If your basal rate is right for you, your blood glucose level should be kept within your targets.

General rules when checking your basal rate

- ✓ Have your last carbohydrates two hours before you start fasting and try to avoid low glycaemic index foods (see below) as they can continue to affect your blood glucose levels for several hours after eating.
- ✓ Give your normal insulin bolus with your last meal
- ✓ Do not eat any snacks during fast period
- ✓ Check your blood sugar level every 2 hours during the fast
- ✓ If hypo occurs (blood sugar less than 4) treat and abandon test
- ✓ If hyperglycaemia occurs (blood sugar over 14) treat and abandon test

Low Glycaemic Index Foods:

Milk chocolate	Milk, 3%+ fat	Ice cream
Banana	Fructose (fruit sugar)	Yogurt
Orange	Soya beans (dried)	Lentils, green
Apple	Peanuts	Kidney beans

What to do with results

- If blood glucose stays within 2 mmol/l - no change
- If blood glucose rises more than 2 mmol/l – increase basal rate by 0.1u one to two hours before rise
- If blood glucose falls more than 2 mmol/l – reduce basal rate by 0.1u one to two hours before fall
- Re- check by repeat fasting periods



Example 1

What changes would you make to the basal rate, for the fasting results below?

Time	1100	0100	0300	0500	0700
Glucose	5.3	4.2	5.9	9.1	10.4
Basal Rate	0.3	0.3	0.3	0.3	0.3
New Basal Rate					

Example 2

What changes would you make to the basal rate, for the fasting results below?

Time	1300	1500	1700	1900
Glucose	7.6	7.1	4.0	3.9
Basal Rate	0.5	0.5	0.5	0.5
New Basal Rate				

Fasting Record Sheet

Please record your blood sugar levels in the boxes marked with a red asterisk *

Day 1 date:

TIME (HRS)	MIDNIGHT	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	MIDDAY
	FAST												
BGL			*				*		*		*		*

BGL = Blood glucose (sugar level)

- Do not eat from midnight until midday the next day
- Miss breakfast. Please state time of last meal and last injection/bolus:

Day 2 date:

TIME (HRS)	08.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00
	FAST										
BGL			*		*		*		*		*

BGL = Blood glucose (sugar level)

- Do not eat from 8am – 6pm
- Miss lunch. Please state time of last meal and last injection/bolus:

Day 3 date:

TIME (HRS)	MIDDAY	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00
	FAST										
BGL			*		*		*		*		*

BGL = Blood glucose (sugar level)

- Do not eat from midday until 10pm
- Please state time of last meal and last injection/bolus:

If blood sugar drops below 4mmol/l or rises above 14mmo/l during fast - Abandon fast for that day and treat abnormal blood sugar. Consider need to change insulin doses. Repeat on another day.

Using Temporary Basal Rates



Do you know how to set a temporary basal rate on your pump? If you are unsure, please refer to your manual or ask your diabetes specialist nurse.

In what circumstances would you need a temporary basal rate decrease?

Identify circumstances in your life where you will need a temporary basal rate increase.

Identify when you might use a temporary basal decrease.

In what circumstances would you take your pump off?

How long can you be detached from your pump for?

Activity and Exercise

Adjusting insulin rates for activity is often 'trial and error' as each individual reacts differently. The table below has some suggested dose adjustments.

	Light Activity	Medium Activity	Heavy Activity
Bolus	50-100%	Approx 50%	0-30%
Basal During	Approx 70%	Approx 50%	10 – 30% of basal + eat carbohydrate
Basal After	100%	100%	Approx 50%



What temporary basal rate are you going to start with?

How will you know if it is successful?

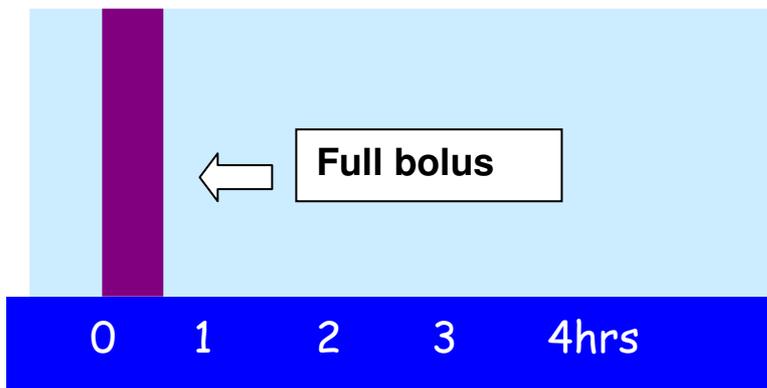
There is a lot of information and helpful advice about exercise, sport and activity at www.runsweet.com

Advanced Bolus Options

Another advantage of insulin pump therapy is the ability to have different choices when giving boluses. The names may differ according to the pump you are using

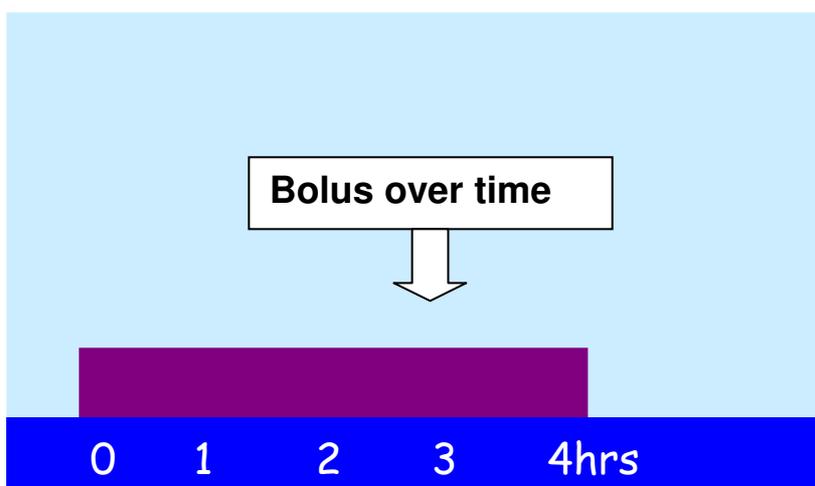
Normal or Standard

This is when the whole of the bolus is given



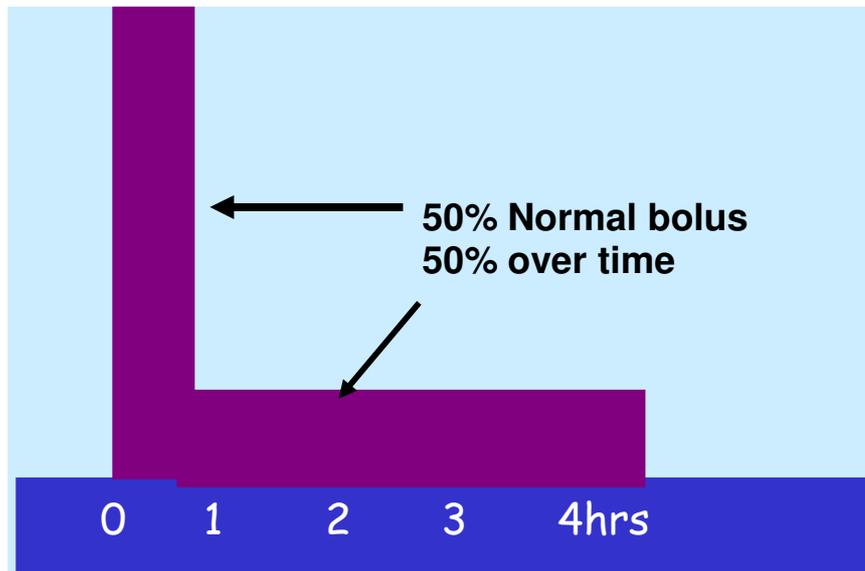
Extended or Square Wave

This is where the total bolus is spread out over time. The whole dose is evenly spread over the choice of time (15 minutes to 8 hours). It can be stopped at any time and is useful for long spread out meals, buffets and meals with either a very high fat or low glycaemic content



Multiwave or Dual Wave

This is a combination of the normal and extended when a chosen amount is given immediately and the rest over time. This is useful for high fat or high carbohydrate meals



Foods I eat that may need normal or standard bolus are

Foods I eat that may need extended or square bolus

Foods I eat that may require a multiwave or dual bolus are

Pump Failure



My pump is not working properly and I need to go back to injections – what do I do?

- Work out your **total daily basal rate** and inject this amount immediately with **Glargine or Detemir** (long acting insulin) e.g. if you on a total daily basal rate of 18 units – inject 18 units of long acting insulin. This will need to be repeated daily until you have a replacement pump.
- Use your **usual insulin to carbohydrate ratio** with your usual corrections, delivering the **short acting insulin** (novorapid, humalog lispro or apidra) with your pen or syringe. You will probably need more corrections than usual.
- Contact the pump manufacturer who will arrange to supply another pump for you if it is within warranty.

NB: some centres advise that you work out total daily pump dose (basal plus boluses) and increase that amount by 10%

Alcohol



What effect does alcohol have on your blood glucose level?

Which alcohol drinks have the most effect?



Have you experienced low blood glucose levels after drinking alcohol?

Low blood glucose levels are commonly experienced during the night and up to lunchtime on the following day. What action could you take to avoid these?

Travel

What will be different the next time you travel now you are using an insulin pump?

What will you need to take with you?



- Will I be able to go through security wearing my pump?
Yes, but **do not let your pump go through the baggage x-ray machines.**
- Should I take a letter with me about my pump?
Yes, your diabetes team should supply you with a letter.
- When traveling always take **plenty of supplies** including **short and long acting insulin** and a means of giving it (pen or syringe).
- Always take your insulin in your **hand luggage** on board airplanes. Do not pack it in your suitcase.



What about times zones?

What changes will you make if you are flying to Spain?

What changes will you make if you are flying to Australia?

- If the new time zone is less than 4 hours different adjust your pump on departure or arrival according to preference
- If the time zone is more than 4 hours different you can either
 - adjust by 4 hour on departure and then gradually adjust further over the next few days.
 - or
 - use lowest flat basal rate during flights, use correction doses if necessary and change time on departure or arrival according to preference
- Give boluses with meals as usual
- Monitor blood glucose levels regularly and correct high and low readings as needed.

Admission to Hospital



What do I do with my pump if I am admitted to hospital?

- If it is a planned admission, make sure you discuss it with hospital staff / diabetes team beforehand.
- If you are having a minor operation it may be possible to keep your pump on with the agreement of the anaesthetist.
- If you are having a major operation, you will need to take off your pump and be given insulin intravenously.
- If you are admitted with high blood glucose levels or ketones, you will be asked to take off your pump and given intravenous insulin until problem has resolved.
- If you are capable of looking after your diabetes yourself, you should continue using your pump while in hospital with the agreement of the medical team and nurses caring for you.
- If you are incapable of looking after your insulin pump yourself, you will need to use other methods to give your insulin. Hospital staff will advise.

Emergency Kit

The following equipment should be carried at all times for emergency use.

Essential

- ❖ Rapid acting insulin pen / syringe
- ❖ Hypo treatment
- ❖ Blood sugar testing kit

Advisable

- ❖ Spare infusion line
- ❖ Spare cannula
- ❖ Spare batteries
- ❖ Ketostix