# Pregnancy Toolkit

JDRF IMPROVING LIVES. CURING TYPE 1 DIABETES.

www.jdrf.org.uk

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# Introduction and goal of this guide

If you are consulting this guide you have probably made the decision or are starting to think about the possibility that you and your partner would like to try for a baby.

Most women with type 1 diabetes are aware that they should plan for pregnancy but many women don't know why it's so important.

If you're pregnant or planning a pregnancy, and have type 1 diabetes, you need to plan months in advance to have the best chance of having a healthy pregnancy and a healthy baby. It's important to have your blood glucose controlled as well as possible before conceiving to minimise the risk to mother and baby. By planning ahead you can make sure you are ready for pregnancy, giving yourself enough time to make important changes.

Throughout this toolkit, we'll talk about many of the factors that you have to consider when getting ready for a baby. In the next few chapters, we will discuss pregnancy with type 1 diabetes, with special emphasis on preconception planning, the actual pregnancy and delivery. We'll also explain the type 1 diabetes management goals for pregnancy and how to obtain the best possible support from healthcare providers at every stage.

This is all about what to expect when you're expecting...with a type 1 diabetes twist.

# Planning for a pregnancy with type 1 diabetes

## Why plan?

Don't believe the stories you've heard about "can't" and "won't." With careful planning and plenty of support, you and your partner CAN have a healthy, happy pregnancy and baby.

The definition of 'right time' varies from family to family, but when type 1 diabetes is part of the family-planning scenario, you have a few extra things to consider. Aside from the financial and emotional readiness that all couples strive for, the health of the woman with type 1 diabetes carrying the child is even more important. An unplanned pregnancy with type 1 diabetes can directly impact the health of the child and the mother, and it's important to have your type 1 as controlled as possible before conception. **Until you feel you have reached this point it is really important that you should continue to use your normal method of contraception.**

To find out more about why planning your pregnancy is important, visit the following website produced by Dr Valerie Holmes at Queen's University Hospital, Belfast to view video clips of women with diabetes talking about planning for pregnancy:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyouneedtoknow/

## Pre-pregnancy goals for the mum-to-be

There are many things to consider as you plan for your pregnancy. Here is a pre-pregnancy checklist of things you need to do as you prepare for pregnancy.

1. See your diabetes healthcare team and GP – let them know your plans
2. Control your blood glucose/HbA1c
3. Check your medication
4. Check your insulin
5. Take folic acid
6. Have eyes and kidneys checked.
7. Have you been vaccinated against rubella?
8. Manage your dental health
9. Look at your lifestyle

You can also watch a short video clip outlining the steps you need to take for planning a pregnancy by visiting the following website:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyouneedtoknow/WhyPlanRisks/

### 1. See your diabetes care team and GP

When you're ready to plan a pregnancy, contact your diabetes care team and let them know your plans. Schedule an appointment with your GP as well as it is important that they are aware of your plans too.

It is important that your GP or the team looking after your diabetes refer you to their **specialist pre-pregnancy planning team**. Once you are pregnant, you will spend a lot of time consulting with your diabetes healthcare team and tweaking your management plan, and it's important to have a team you both trust and feel comfortable bearing all to – emotionally and physically!

As part of the team looking after you there will be a **diabetologist** who specialises in assisting women who have diabetes in pregnancy and an **obstetrician** who specialises in looking after women with type 1 diabetes.

A **diabetes specialist nurse (DSN) and/or a diabetes specialist midwife (DSM)** will also help you through every step from planning to delivery.

The team should also have a **dietitian**, as a healthy pregnancy with type 1 diabetes is a delicate balance of food, insulin and the needs of your growing child.

You will feel much more confident and prepared during your pregnancy if you have a

multidisciplinary team that you trust to help you manage your pregnancy.

## 2. Control your blood glucose/HbA1c

It's never too early to be working towards your goal of good blood glucose control/HbA1c. It's best for the health of both you and your baby that you are in tight and streamlined control of your type 1 diabetes before conceiving. It is recommended that women aim to achieve and maintain their HbA1c goal for a few months before becoming pregnant.

The HbA1c is a benchmark of your overall type 1 diabetes control that doctors and hospitals use. The National Institute for Health and Care Excellence (NICE) recommends that women who are planning a pregnancy with type 1 diabetes should be offered a monthly measurement of HbA1c and aim for the following goals:

### HbA1c

If it is safely achievable, women with type 1 diabetes who are planning to become pregnant should aim to maintain their HbA1c below 43 mmol/mol (6.1%). Women should be reassured that any reduction in HbA1c towards the target of 43 mmol/mol is likely to reduce the risk of congenital malformations. Women whose HbA1c is above 86 mmol/mol (10%) should be strongly advised to avoid pregnancy.

### Blood glucose

You should agree your own pre-pregnancy targets with your healthcare team. During your pregnancy, preprandial (before meals) blood glucose levels of 3.5 to 5.9mmol/L; and one hour postprandial (after meals) plasma blood glucose levels below 7.8mmol/L should be the target levels you are working with.*

***It is important to agree individual targets that are right for you with your diabetes care team.**

Source: NICE Diabetes in Pregnancy Guidelines www.nice.org.uk/cg063

While these are the current targets recommended by NICE, it is important to remember that everyone is different. Therefore, it is important that you agree your individual targets with your pre-pregnancy healthcare team. You won't be alone in your journey to control your blood glucose, and your pre-pregnancy healthcare team will work with you to help you achieve your targets.

The insulin needs of women with type 1 diabetes will constantly change throughout pregnancy. Prior to pregnancy, some women with type 1 diabetes may move to an insulin pump to improve the precision of dosing and the ability to adjust basal rates. Some women may have the use of a continuous glucose monitor (CGM) to better monitor glucose trends. Other women find that using a pump and CGM during their planning and pregnancy can help them to maintain steady HbA1c results. However, any changes you make to your type 1 diabetes management routine are part of your unique circumstances, and these decisions must be weighed carefully with your diabetes team to ensure you understand the benefits, drawbacks, and commitments required.

## 3. Check your medication

Know your medications. Some medications and supplements are not considered safe during pregnancy, particularly during the first three months, so you will want to have an extensive talk with your healthcare team about each medication and supplement prior to conception.

Statins, angiotensin-converting enzyme inhibitors and angiotensin receptor blockers are common medications for women with type 1 diabetes that are not recommended for use in pregnancy, meaning that they have a risk of causing damage to the foetus.

## 4.Check your insulin

Some types of insulin are not suitable for use during pregnancy so discuss this with your diabetes care team. In addition the insulin regime you are using may not be the best for the frequent adjustments and changes which occur with pregnancy.

## 5. Take folic acid

Taking folic acid is important for all women planning a pregnancy, to reduce the risk of a condition called spina bifida, a fault in the development of the spine and spinal cord which leaves a gap in the spine. However, as this

condition is more common in women with type 1 diabetes than in the general public, you're advised to take 5mg of folic acid when planning a pregnancy, and up to at least 12 weeks during pregnancy. This dose is higher than that recommended for women without type 1 diabetes and you'll need to ask your GP for a prescription.

## 6. Have your eyes and kidneys checked

It is vital that your diabetes team check your eyes and kidney function as part of your pre-pregnancy checks. Pregnancy puts extra pressure on the small blood vessels of the eyes and the kidneys, so it's important to minimise the impact on these organs as much as possible.

## 7. Have you been vaccinated against rubella?

It is important that you've been vaccinated against rubella (German measles) to ensure that your unborn baby is protected should you be exposed to it. Rubella can cause miscarriage, still births and birth defects in unborn babies.

## 8. Manage your dental health

Gingivitis (inflammation of the gums) during pregnancy is very common affecting 70-100% of women. Hormonal changes during pregnancy can exaggerate how gum tissue reacts to plaque, causing dark and red, swollen and tender gums that are more likely to bleed. Patients with diabetes are more likely to develop periodontitis, a more serious form of gum disease. The best way to prevent oral complications is to:

- Have a routine dental check-up and professional clean to control any existing problems before your pregnancy
- Maintain good oral hygiene by brushing your teeth after each meal and using floss or interdental brushes. Using a toothpaste containing triclosan can also help reduce gingivitis during pregnancy.

## 9. Look at your lifestyle

### Get your weight in the healthy target range:

Carrying too much weight can make conception difficult and increase the risk of pregnancy complications, such as preeclampsia.

To find out if you are carrying extra weight you will need to check if your body mass index (BMI) is within the normal weight range. Calculate your BMI using this online calculator: www.nhs.uk/Tools/Pages/Healthyweightcalculator.aspx

Ideally, your BMI should be within the normal range before you conceive to increase your chances of a healthy pregnancy.

> "Before we started trying for a baby I remember asking my consultant if my HbA1c was low enough for us to proceed. We had been working hard to lower my HbA1c. It felt strange asking permission to try and get pregnant, but it was great when he smiled and said: "Absolutely, these levels should be fine."
>
> **Holly**

### Eat a healthy diet:

Include whole grains, fruits, vegetables and low-fat dairy products in your diet, while reducing your intake of junk food and high-fat foods. It is important to get your weight in the proper range to increase the chances of conception. Eating a balanced diet can also stabilise blood glucose levels, which in turn improves your chances of conception. Ask your DSN, DSM, dietitian or type 1 diabetes specialist for individual recommendations about calorie and carbohydrate intake during the conception phase.

### Exercise regularly

Exercise is important for all women who want to or already are pregnant. A good exercise programme gets your body in the best shape possible for the demands of carrying a baby. Regular exercise can also regulate your blood glucose levels, further enhancing your chances for conception, a healthy pregnancy and a healthy baby (it can also help lower stress, which is a plus!). You must take extra care to monitor your blood glucose to avoid the negative consequences of low blood glucose levels.

### Reduce your caffeine intake:

It has been suggested that a high intake of caffeine during pregnancy may increase the risk of miscarriage. Be prepared to reduce your intake of caffeine during conception and pregnancy if you drink more than one or two cups of caffeinated coffee (or the equivalent in other beverages) per day.

**Eliminate alcohol consumption and smoking:**

Both alcohol and smoking can have detrimental effects on an unborn child, so it is highly recommended that both be discontinued prior to attempting to conceive. Help with stopping smoking should be available either through your GP or hospital team. Visit the following websites for more information:
www.nhs.uk/conditions/pregnancy-and-baby/pages/alcohol-medicines-drugs-pregnant.aspx#close

www.nhs.uk/conditions/pregnancy-and-baby/pages/smoking-pregnant.aspx#close

Now that you're attending the pre-pregnancy planning service and are fully aware of all the pre-pregnancy goals, you and your partner are ready to try for a baby. There is a lot to think about, especially when you're also managing your type 1 diabetes. But this doesn't mean that your pregnancy isn't going to be healthy and amazing – you just need a little extra TLC to get you across the finish line.

At the pre-pregnancy planning appointments, you should receive a health check including blood tests, treatment for any conditions that may interfere with your pregnancy and you should also get your immunisations updated. You should also receive additional assessments for diabetic retinopathy (eyes), nephropathy (kidneys), neuropathy (nervous system), and cardiovascular disease (heart) prior to conception. It's important to have a baseline for these concerns before getting pregnant.

Make note of your thyroid function level prior to conception and compare your results during and after your pregnancy. This is because you have an increased risk of developing thyroid disease.

It is also important that you, your partner and other family members know how to treat hypoglycaemia. Hypoglycaemia is common in pregnancy and may happen more often, and be more severe, than before you were pregnant.

**IMPORTANT NOTE:** If you do not already have a glucagon kit, now is the time to get a prescription from your doctor and familiarise yourself and your family members with how and when to use it.

Finally you should ensure you have someone from your healthcare team you can contact as soon as you think you may be pregnant.

## An unplanned pregnancy: Important considerations

While an unexpected or unplanned pregnancy isn't the 'best case scenario' for a woman with type 1 diabetes, it does not mean that there will be a negative outcome for you or the baby. Many people have heard that high blood glucose levels at conception and/or during the baby's early formation is associated with an increased risk of congenital anomalies or birth defects. However, with the current technology available, many more women today have blood glucose within a healthy range at the baby's conception and during the first few weeks of their unexpected pregnancy.

It is best not to get bogged down trying to determine exactly what your blood glucose levels were or whether they were high enough to increase your risk of complications. Even if you feel certain that your blood glucose was not within the recommended range, the most important step to take at this point is to get on track with your pregnancy by getting your levels under control as soon as possible. Begin by checking your blood glucose more frequently. Enlist the help of professionals by scheduling an appointment with your diabetes healthcare team as soon as possible. Next, ensure that you know what to expect during a pregnancy and follow your healthcare team's recommendations.

A child can be a very motivating factor for many women to get their blood glucose levels under very tight control. Much can also be said about the value of a mother's outlook and its impact on the unborn child. To set your unborn child up for a positive introduction to the world, use the next few months to prepare mentally, physically, emotionally, and financially for his or her arrival.

## Conception misconceptions

**MYTH:**

**Every woman with type 1 diabetes who becomes pregnant is put on bed rest.**

**FACT:**

Women are put on bed rest for a number of reasons during pregnancy, but type 1 diabetes is not one of them. Common reasons for bed rest during pregnancy include threatened miscarriage, high blood pressure or preterm labour. There are also varying degrees of bed rest: from resting at home to resting in hospital either partially or completely. However, there is no evidence to suggest that complete bed rest is beneficial. It is best to keep exercising during pregnancy, unless one of the problems mentioned above develop.

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**MYTH:**

**Having a blood glucose level in the 10–18mmol/L range during the first few weeks of pregnancy (before the pregnancy is confirmed) will cause the baby to have birth defects.**

**FACT:**

It is true that the first six weeks of pregnancy are critical because your baby's organs are forming during this time. Fortunately, birth defects are quite rare for women with type 1 diabetes. However, they occur more frequently than in the general population and high blood glucose is associated with increased risk. One high reading should not cause concern, however consistent high readings over time should be minimised. Good control before a pregnancy and during the first trimester will reduce this risk significantly. If you are concerned about the high blood glucose levels experienced during the first few weeks of your pregnancy, you should discuss these concerns with your diabetes team who will tell you about the ultrasound screening of your baby for such problems which is routinely available.

# As you move towards pregnancy

After pre-conception appointments, your head will probably be swimming with all of the information you receive. You may feel overwhelmed and even a little distressed. Take your time to digest the information. Talk about your concerns with your partner, and lean on one another as you move toward these goals. Take the time you need to prepare both emotionally and physically.

Once you have decided to start trying to get pregnant, you may feel heightened levels of excitement and anxiety. It is important to acknowledge that type 1 diabetes does require some additional monitoring during pregnancy compared to your peers who do not have type 1 and this might not feel fair all the time. Be sure to remind yourself that the end goal remains the same for everyone: a healthy baby and a healthy mother.

Now that you understand the importance of pre-pregnancy planning, you may feel you're ready to go ahead and try for a baby. Let's go over the people who will be involved in your care throughout your pregnancy.

## Your multidisciplinary team

### General Practitioner (GP):

Your GP is best for "big picture" health moments. Although your pregnancy and your type 1 will be best handled by your specialists, your GP is there for the before, during, and after, so keep them in the loop on your decisions to start a family.

"The DSN who looked after me for both pregnancies was amazing. She was practical, reassuring and realistic about the demands of the day to day management of full time work, pregnancy and type 1 diabetes."

**Emily**

### Diabetologist:

This doctor is your type 1 expert and during the preparation and duration of your pregnancy, they will be invaluable in keeping your type 1 as well-managed as possible. Inform your diabetologist that you're preparing for a pregnancy and once you're pregnant, stay in close contact. Your diabetologist will be the one to help you tweak your regime as your insulin needs change.

### Obstetrician:

Your obstetrician is crucial because they will be making the decisions with you about when and how your child will be delivered. Pregnancy brings about a lot of changes, both emotional and physical, so make sure you have an obstetrician that you can be honest with and you trust.

### Diabetes Specialist Nurse (DSN) or Diabetes Specialist Midwife (DSM):

You may have a DSN or a DSM on your team, or both! Your DSN or DSM will work with you and your diabetologist to help you manage your type 1 diabetes. Like any other midwife, your DSM will help you to manage all aspects of type 1 and pregnancy, including preparation for birth and breastfeeding, and will stay in close contact with you throughout your pregnancy.

### Dietician:

A specialist dietician will be available both before pregnancy and during pregnancy to advise on a healthy diet during pregnancy and for management of your type 1 diabetes.

Visit the following website to see a clip describing the multidisciplinary team who will look after you before and during your pregnancy:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyoumightnotknow/SupportTeam/

## Conception: things to think about

### Know your cycle:

Pinpointing when you ovulate each month is the single most helpful task in improving your chances for conception. There are many ways to do this, like watching the calendar, taking your body temperature or purchasing an ovulation predictor kit. Books and websites offer a wide variety of options to help you better track your menstrual cycle and sexual activity. But don't let conception become an intimidating science experiment. Relax and enjoy this special time and the process involved.

### Be patient:

Pregnancy can happen today, in six months or in 12 months. There is no magic number. Even if you follow all of the instructions you're given, pregnancy may not occur immediately. Relax, take a deep breath, and try not to focus on it too much. As the saying goes, "As soon as you stop focusing on it, it will happen." However, it can be an extremely frustrating time, especially when making extra effort with your diabetes control. Most teams will be happy to provide simple fertility checks in this situation at an earlier stage than normal so you should discuss it with them.

## Involving your partner

### Talk:

It is natural for your partner to be concerned about the challenges type 1 diabetes can bring to a pregnancy, in terms of your health and your baby's health. Be open and discuss their concerns, as well as your own. Review your current daily requirements for managing type 1 diabetes and the ways you expect your management routine to change after you become pregnant.

### Understand your roles:

Make sure your partner understands their role in your pregnancy. Teamwork and communication are important for any pregnancy, but especially important for a couple managing type 1 diabetes and pregnancy. Don't let the focus of type 1 diabetes take over the happiness and fun of conceiving. The increasing number of doctor visits and the abundance of discussions related to your blood glucose level can be isolating for your partner so they may want to come with you to these appointments.

### Ask for and/or offer help:

Consider ways to involve your partner and suggest specific ways they can help you. Rather than a generic request to "be more patient" with you during your pregnancy, request that they take over a task such as food shopping, vacuuming, or preparing dinner one night each week. During the time that you would normally spend completing these tasks, relax in a quiet place and spend time recording your blood glucose levels, reviewing your numbers for patterns and making necessary adjustments.

### Plan ahead:

It's important to make your type 1 diabetes management a priority before conception rather than trying to force the extra tasks into your already busy schedule. Because low blood glucose levels are more common during pregnancy due to the ever-changing insulin requirements, it is very important to prepare your partner for dealing with them. As well as making sure they know where the food, juice and glucose tablets are to treat unexpected lows, make sure they know how to use a glucagon kit and when to use it.

### It takes two:

Pregnancy is a team effort, so your partner should prepare for conception by getting a check-up, eating a healthy diet, exercising regularly, quitting smoking, and limiting alcohol intake.

### Mind your moods:

Mood swings and emotional changes are going to become pretty common during your pregnancy. That's probably no surprise. But did you know that your blood glucose level can affect your moods and emotions too? If both of you have wild mood swings and emotional outbursts, things could get unpleasant. Be patient and considerate with each other.

### Heavy-lifting:

As your pregnancy moves along, there may be restrictions on what or how much you can lift, as

well as limits on your activity. Get your partner to use their muscles and make sure your needs, and the needs of the home, are taken care of.

### Paternity leave:

Employers must now offer paternity leave, and there are others who offer maternity/paternity leave for same-sex couples. Find out from your respective employers what options are available to you and your family. Be sure to explore all leave options and consider how you will use the paternity leave most effectively after the birth of your child. Some families take their leave together, while others stagger their days. Discuss these options with your partner and do what works best for your family.

### Existing children:

If you already have young children you may need to consider the availability of additional support, as the very careful control of your blood glucose may be associated with increased risks of a hypo.

## Employment and pregnancy

With the careful control of your blood glucose levels that is required during pregnancy, and if you work very variable hours or do a lot of travelling, you may need to consider whether you will need to renegotiate your hours to have more of a 'standard' working day.

Research your employer's benefit plan regarding pregnancy. Employers' benefits vary widely about the amount of time you are allowed to take off work with and without pay after giving birth. Sometimes, type 1 diabetes can create complications during pregnancy that require time off work or bed rest. Talk to your HR department and ask about your entitlement (for example, your paid time off after the birth might be affected by your doctor prescribing bed rest/time off work prior to the birth). Familiarise yourself with the Equality Act 2010 (England, Scotland and Wales) and the Disabilities Discrimination Act if you are in Northern Ireland and be prepared to advocate for what you need to make sure you have a healthy pregnancy. This can mean anything from having a scheduled snack time at work to taking time off work.

To find out more about your rights at work, visit the following websites:

www.gov.uk/working-when-pregnant-your-rights

www.gov.uk/equality-act-2010-guidance

www.nidirect.gov.uk/the-disability-discrimination-act-dda
(Northern Ireland only)

www.nhs.uk/conditions/pregnancy-and-baby/pages/your-health-at-work-pregnant.aspx#close

# The first trimester
## (weeks 1-12)

Now that you have found out you're pregnant, it's one of the most exciting and demanding times in your life, and there's plenty to do!

While your tummy may not be bulging, your body is already changing in many other ways. You may notice that your skin is a little less prone to breakouts, that your hair seems thicker and shinier than before, and that your hair and fingernails are growing at a rapid rate. You will also see changes with your type 1 diabetes too.

## Blood glucose control

### Hypoglycaemia (low blood glucose)

In this first trimester, as the cells which are developing into your baby are growing and multiplying every day, your body may revert back to its pre-diabetes days and actually start making some of your own insulin again. What causes this is a bit of a biological mystery, but it's very common. JDRF researchers are studying this phenomenon, which may help find new ways to regenerate beta cells as part of a cure for type 1 diabetes.

Regardless of the cause, this can cause a frightening tendency towards low blood glucose levels, which are not uncommon in the first trimester. Make sure you are testing your blood glucose before every meal and one hour after every meal. Ideally your blood glucose should be between 3.5 and 5.9mmol/L before meals and below 7.8mmol/L one hour after meals. Always test before going to bed and before driving.

"Up until about week 23, my insulin requirements were less than before I was pregnant. I love that this is because my pancreas was able to produce its own insulin, for the first time in 17 years! I went low a lot, but to me that was fine, I knew that this wouldn't harm the baby."

**Holly**

Make sure you have plenty of hypoglycaemia treatments available. Your healthcare team can give you a gel containing glucose that you can swallow if your glucose levels are low. You should also make sure you have glucagon to inject in an emergency to raise your blood glucose, and that your partner or family members know how to use it.

You may also want to consider how to manage the increased risk of hypos at work. This is a delicate matter as you may not be ready to tell your employer that you are pregnant, but it's important that colleagues are aware of the symptoms and treatment for hypoglycemia.

It's extremely important during this time that your partner becomes familiar with signs of a low blood glucose level. Some of these symptoms may be new or unusual, so it's important that they stay alert and be ready to act. Learn together by testing frequently and paying attention to subtle signs.

Some women find a continuous glucose monitor (CGM) to be really useful during these first few weeks of pregnancy, especially with the rising incidence of low blood glucose levels. This is expensive technology and is often not available within the Health Service. However, if you feel that a CGM is right for you and your needs, talk with your doctor about getting access to this technology.

### Hyperglycaemia (high blood glucose)

It is extremely important to pay close attention to high blood glucose readings during pregnancy. Diabetic ketoacidosis, which develops from a period of sustained high blood glucose, can be fatal to your baby. If your blood glucose readings are above 10mmol/L remember to check for ketones. Your healthcare team will provide you with ketone testing strips to test your blood or urine.

Diabetic ketoacidosis can occur without you feeling seriously ill, making it a dangerous

condition. If you are unwell (for example, if you are being sick or have diarrhoea) or if your blood glucose is over 10mmol/L and on rechecking after an hour still remains greater than 10mmol/L, you should test your blood or urine for ketones. Any more than a small amount of ketones in your urine or a blood ketone level above 0.6mmol/L means you need to get checked out urgently by your diabetes healthcare team.

### Blood glucose challenges

One of the biggest emotional hurdles in managing a pregnancy with type 1 diabetes is handling blood glucose issues. During pregnancy, a woman is responsible for creating a safe environment for the baby to thrive in, and type 1 diabetes can make guilt and worry rise to a whole new level. Pregnancy with type 1 diabetes is about maintaining stable and healthy blood glucose levels as consistently as you can. For many women with type 1 diabetes, new blood glucose thresholds are set, and these new goals can seem very intimidating. Your diabetes healthcare team may recommend that you set a fasting blood glucose goal between 3.5 and 5.9mmol/L. This may be a scary goal for some of you because of hypoglycemia unawareness, fear of middle-of-the-night blood glucose lows, and many other type 1 diabetes concerns. Even if you've been managing your diabetes for a long time, pregnancy presents a whole new set of challenges. You are not alone in dealing with these challenges. You will be working in partnership with your diabetes healthcare team to manage these challenges.

"Prior to getting pregnant I was already on a pump, but my husband and I decided that we wanted as much information as possible to help us control my blood glucose. I say 'us', I see it very much as a two person effort to keep my blood glucose within target. We decided to privately fund a CGM, our hospital weren't able to help us with one. It's certainly been expensive, but it's reassuring to be able to see what my blood glucose is doing all the time and it's helped me keep my lowest ever HbA1c."

**Holly**

## Antenatal visits

With every pregnancy comes plenty of appointments at the antenatal clinic, and when you're pregnant with type 1 diabetes, you're guaranteed a few extra visits. Women with type 1 diabetes are often given a long list of appointments during the course of their pregnancy, and each is important in its own way. However, to make it as easy as possible you should be seen by your team at a joint diabetes antenatal clinic, where all the healthcare professionals you need to see are in the same place.

### Antenatal checkups

Just like any other pregnant woman, you'll have regular appointments to see your midwife. A routine pregnancy usually includes two or three ultrasounds, but with type 1 diabetes and pregnancy, you may have up to one ultrasound per month and sometimes even more frequently towards the end. Women with type 1 diabetes are screened often to check the development and size of the baby and to ensure that things are going along smoothly. Macrosomia, which describes a baby who is larger than the 90th percentile for weight, can result from high blood glucose levels during pregnancy.

You may want to discuss with your employer the frequency of appointments you will be required to attend during your pregnancy and agree a plan to manage this.

### Your diabetes healthcare team

#### Diabetologist and diabetes specialist nurse or midwife

You will most likely see your diabetologist every two weeks during pregnancy to help you to maintain your blood glucose level. Together with the diabetes specialist nurse (DSN) or diabetes specialist midwife (DSM) they will give you blood glucose targets, help you with your blood glucose monitoring and alter your insulin dose as necessary. Your insulin requirements may change at every visit to ensure your blood glucose levels are the best they can be.

Your team are there to help you throughout your pregnancy so please let them know about any concerns you have.

#### Dietician

Type 1 diabetes and pregnancy can also create some tricky food situations. Not every pregnant woman craves cucumber slices and oranges (sometimes it's a very strong desire for the

greasiest hamburger you can get your hands on). What if you're dealing with morning sickness and don't want to eat breakfast, even though you've taken insulin for it? How about if you're craving a cheesecake every afternoon, but dealing with a stubborn high blood glucose trend? The dietician on your diabetes healthcare team will be able to help.

There are certain foods that are not safe for a growing baby, including soft cheeses, sushi, liver and liver products such as pate. Your dietician can help you understand what's safe for baby, safe for you, and easiest on your blood glucose levels. Even if you meet with your dietician only a few times throughout the pre-pregnancy and pregnancy stages, it's very useful to relearn things like carb counting, how certain foods may impact your blood glucose and understand the benefits of incorporating low glycaemic index foods in your diet. With this knowledge, you can help manage cravings without adversely impacting blood glucose control and minimising the postprandial (post-meal) glucose peaks over 7.8mmol/L which is often a particular problem after breakfast. A little information can help you have an occasional treat!

For more information on the healthcare team who will help support you through your pregnancy, visit:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyoumightnotknow/SupportTeam/

## Specific appointments/screening in the first trimester

### 1. Eye examination

Everyone with type 1 diabetes should have regular eye examinations at least once a year but when pregnant, you should have these examinations more regularly. Eye screening detects diabetic retinopathy.

Your healthcare team will arrange an eye examination for you if you have not had one in the past six months. At the eye screening clinic the healthcare professional may use eye drops to make your pupils bigger and then use a digital camera to take a photograph of the back of your eyes.

Pregnancy hormones can weaken the blood vessels of the eyes, so if you don't have pre-existing diabetic eye disease, you need to be closely monitored during pregnancy for changes in eye health. If this occurs you may well be offered treatment which is safe in pregnancy. Very occasionally, you may be recommended to avoid further stress on the eyes by having a caesarean delivery. So it's important that you discuss any developments with your medical team.

### 2. Kidney test

People with type 1 diabetes are at higher risk of having kidney problems known as diabetic nephropathy. If your kidney function has not been checked in the last 12 months then your healthcare team will test it. They will take a urine sample to check for protein, which would indicate that your kidneys are not working as well as they should be. They will also take a blood sample to check that the levels of substances filtered by the kidneys are normal.

As with all pregnant women your urine will be checked for protein at each clinic visit. There may be causes other than type 1 diabetes for this.

### 3. Ultrasound scan

You will be offered an ultrasound scan between 8 and 14 weeks of pregnancy to estimate when your baby is due and to check whether you are expecting more than one baby. This scan may also be part of a screening for Down's syndrome should you decide to have the test (see box for more information).

### Blood test plus nuchal translucency scan for Down's syndrome

This involves a blood test and an ultrasound scan. All women should be offered a dating scan between weeks 8 and 14 of pregnancy. In addition, most clinics* offer pregnant women a nuchal translucency scan and a blood test between 11 weeks, 0 days and 13 weeks, 6 days of pregnancy. If you choose to be screened for Down's syndrome, the dating scan and the nuchal translucency scan can be carried out at the same time, between 11 weeks and 13 weeks, 6 days of pregnancy.

The blood test measures two proteins associated with pregnancy. At the ultrasound scan appointment, the sonographer measures the thickness of the nuchal translucency (a pocket of fluid) at the back of your baby's neck. The information from the blood test is combined with your age and the nuchal translucency measurement and used to work out your individual chance of having a baby with Down's syndrome.

*This screening is not routinely offered in Northern Ireland.

## Should I call the diabetes team?

One question you may ask yourself is: "Should I call the diabetes team?". Here's a quick chart to help you make the decision.

| | |
|---|---|
| My blood glucose is only a little elevated, but I have moderate ketones. | This is a good time to call your diabetes team, to make them aware of the situation. You may be able to flush the ketones by drinking lots of water and closely monitoring both your hydration and your blood glucose levels. If your blood ketone level is above 0.6mmol/L call your diabetes team for advice. |
| I'm so nauseous and sick that I can't keep any food down or my blood glucose level regulated. | If you are vomiting due to morning sickness, and you are experiencing low blood glucose levels that you are unable to bring up adequately, call your diabetes team. They may want to adjust your insulin doses over the phone or want you admitted for observation until your nausea passes. Speak to them on the phone and see how they would advise handling this situation. |
| I had a bad low and now I'm scared that something is wrong with my baby. | Did you pass out due to your low blood glucose level? Did you fall and/or jostle your tummy in an abrupt manner? If so, you should call your GP or diabetes team as soon as possible so that you and your baby can be checked out. |
| I am low every morning and high almost all afternoon. What can I do? | If you and your diabetes team are comfortable with your self-adjustment of insulin doses and basal rates, make your dose changes in small increments so that you can keep track of what works and what needs more or less. You should be able to call them and have an over-the-phone consultation. The constantly changing insulin needs of pregnancy require this kind of teamwork, so don't be afraid to ask for help! |

To find out more about what happens in the first trimester, visit:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyoumaywanttoknow/

# The second trimester
## (weeks 13-27)

In the next three months, you are going to start looking pregnant as everything gets bigger. At this stage of your pregnancy, you are likely to feel some or all of the following common symptoms which are not related to your diabetes: fatigue, occasional dizziness, nasal congestion, heartburn, indigestion, flatulence, increased appetite, occasional headaches, constipation, nausea, and vomiting. You may also see continued breast enlargement, bleeding gums, mild swelling of the ankles, varicose veins in the legs, and hemorrhoids. (Sounds like fun, right? Just remember, you're building a beautiful baby!)

## Insulin requirements and blood glucose control

### Insulin

Until now, you may have made very few changes to your insulin dosage. The second trimester will bring a number of changes regarding your type 1 diabetes management. Not only will you and your baby be growing, but also your insulin requirements will start to increase.

This increase in your insulin requirement is due to your increasing body size and the hormones produced by the placenta, which cause insulin resistance. Frequent blood glucose testing will make it easier to adjust your dose and your insulin to carbohydrate ratio.

It is not uncommon to see your insulin requirements double during your second trimester and your insulin to carbohydrate ratio decrease dramatically (meaning less carbohydrate will be covered by one unit of insulin). The exact point when this change starts to happen differs from person to person. Proper nutrition and physical activity are as important as ever during this time because gaining excess weight during pregnancy will require even greater increases in insulin doses. You may also notice an increase in your hunger levels and some new – and perhaps bizarre – food cravings. This is very normal! Eating lots of small meals is the best way to keep from feeling hungry all of the time and to stabilise blood glucose levels. Since heartburn is not uncommon during this phase, eating more slowly may help you avoid this uncomfortable condition.

### Blood glucose control

Most importantly, you should be prepared for an increase in the frequency of low blood glucose levels, which may also come on more quickly or be more difficult to detect until they are very low. It is important to store snacks and/or glucose tablets in every possible place that you may be during the next three months – in your car, handbag, desk, work bag, gym bag, and by your bed.

Keep in contact with your antenatal diabetes care team and use their help if you are not confident making changes to your insulin doses during this rapidly changing phase and discuss any concerns you have.

Talk with your partner about what you're experiencing, especially in regard to low blood glucose levels. You won't regret having a second set of eyes helping to keep you safe from unexpected lows.

Continue to pay close attention to any high blood glucose readings (above 10mmol/L). Test for ketones anytime your blood glucose is above 10mmol/L or you are feeling unwell, and contact your healthcare team if you have ketones or are unsure what you should do.

## Antenatal visits

Your antenatal visits during the second trimester may be both fun and anxiety inducing. You will continue to have ultrasounds, but don't be alarmed if/when you begin having more than your pregnant friends without type 1 diabetes. Quite simply, ultrasounds are the best way for your healthcare team to keep a close eye on

## Second trimester misconceptions

**MYTH:**

**As I have type 1 diabetes, it is too dangerous for me to carry multiple births (i.e. twins, triplets).**

**FACT:**

Women with type 1 diabetes are no different than women who don't have type 1 diabetes when it comes to successfully carrying multiple births. There are numerous cases of successful multiple births on record.

**MYTH:**

**I am pregnant and I have type 1 diabetes, therefore I should not get the flu vaccination**

**FACT:**

Everyone with type 1 diabetes, including pregnant women, should get a flu vaccination every year to protect themselves and their unborn children. The best time to get a flu vaccination is between October and mid-November, before the flu season begins.

your baby's development. Ultrasounds can be fun because they provide in utero photos of your baby. Today's high-resolution photos provide lots of detail about your baby. You may be able to see your baby's face or see him/her sucking their thumb. However, don't be surprised if you notice yourself feeling anxious prior to your ultrasound appointments out of fear that a problem will be discovered.

## Specific appointments/screening in the second trimester

### 1. Eye examination

At 16 - 20 weeks you will be offered another eye examination if you were found to have diabetic retinopathy at the first antenatal appointment. It is really important that eye screening is carried out if it is required and you discuss any developments with your antenatal team.

### 2. Quadruple screening test

If it has not been possible for you to have the combined screening test for Down's syndrome in the first trimester (perhaps because of a late booking appointment or owing to foetal position) you may be offered the quadruple screening test in the second trimester.* The test is offered between 15 - 20 weeks.

This is a blood test that measures four proteins associated with pregnancy. This information is combined with your age and used to work out your individual chance of having a baby with Down's syndrome. This test only measures risk and is not a diagnostic tool.

Diabetes does not increase your risk of having a baby with Down's syndrome, but if your quadruple screen does show an increased risk, you will probably be offered an amniocentesis. If you are offered this, it is common to feel uneasy, scared, or even panicky. Talk to your healthcare team about any concerns you have.

For more information visit nhs.uk:
www.nhs.uk/conditions/pregnancy-and-baby/pages/screening-amniocentesis-downs-syndrome.aspx

* This test is not routinely offered in Northern Ireland.

### 3. Anomaly scan

You will be offered this ultrasound scan at around 20 weeks. This is a detailed scan which checks for major physical abnormalities in your baby and is offered to all pregnant women. Your type 1 diabetes means you have a slightly higher risk of having a baby with heart problems and so particular attention will be given to scanning the

heart. Some units routinely offer a more detailed screening of your baby's heart by an expert. Others just reserve this for anyone whom they have any concerns about, either as a result of the routine anomaly scan or because the mother has had difficulty with obtaining good control during the first trimester.

### 4. Foetal growth scans

As previously mentioned, as a woman with type 1 diabetes you may also be offered additional ultrasound scans throughout your pregnancy as they are the best way of monitoring your baby's growth and these scans may start later on in the second trimester.

Type 1 diabetes and pregnancy can be overwhelming if you focus on the enormity of your responsibilities as a mother and a woman with type 1 diabetes. Keep in mind that this needless worry and stress can take away from the beauty and joy of your pregnancy. You will want to look back on this special time with your baby with fond memories. To foster a positive atmosphere, focus on the gift of your pregnancy and the triumph you will feel when your healthy baby is born.

"I've had more scans than my non-diabetic pregnant friends which has been fun. It's lovely to be reassured that everything is progressing fine, but also to see our little one again."

**Holly**

## Your partner and the second trimester

Your partner will not only see your body beginning to transform now, but they will also likely notice some significant emotional changes in you. Mood swings are very common during this trimester. It is important that your partner does not confuse the moodiness caused by a low blood glucose level with the moodiness of pregnancy. Similarly, weepiness, forgetfulness, and a scattered mindset are commonly seen during the second trimester and are easily confused with a low blood glucose level.

You may be accustomed to being the primary manager of your condition at all times, including the testing of your blood glucose level. Now is the time to have a talk with your partner and consider temporarily adjusting their role in your type 1 diabetes management. Foster a sense of partnership in the pregnancy by discussing your likelihood of experiencing more frequent low blood glucose levels with lower blood glucose readings during the second trimester. Discuss the signs and symptoms of low blood glucose and review the use of your Glucagon Emergency Kit. Consider giving your partner permission to ask you to test or to test your blood glucose if/when they are unsure about the cause of your behaviour. This extra observation is important not only for your health, but for the health of your unborn baby.

## Important facts:

- Women with type 1 diabetes are at an increased risk of delivering their baby early, but many women will not deliver early.
- Appropriate nutrition is especially important for women with type 1 diabetes during pregnancy. Gaining too little or too much weight can increase your chances of a preterm birth.
- Women with type 1 diabetes are at a higher risk of developing pre-eclampsia (high blood pressure and protein in urine during pregnancy). Therefore, your blood pressure and urine should be checked during every antenatal visit. Good blood glucose control can help reduce the risk of developing pre-eclampsia.
- Women with diabetes are at an increased risk of infections such as urinary, vaginal, and kidney infections. During pregnancy, this kind of infection can be harmful and increase the risk of preterm delivery.
- Pregnancy hormones can cause your gums to become swollen or inflamed or to bleed easily, leading to gum disease and increased chances of preterm labour. Gum infections, such as gingivitis, are also more common in women with diabetes. Therefore, practicing good oral hygiene and visiting your dentist is even more important for women with diabetes who are pregnant.

## Flying while pregnant

As with any pregnancy, you should discuss your plans to travel by plane with your healthcare team. After 28 weeks, airlines typically require medical clearance from your doctor or midwife. If complications in your delivery are expected a further assessment form may be needed. Flying may disrupt your routine insulin and eating schedule and in addition care will be needed with adjusting insulin boluses if you eat airline food. For more general information, visit www.nhs.uk/chq/Pages/927.aspx

To find out more about the second trimester, visit:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyoumaywanttoknow/

# The third trimester
## (weeks 28-40)

You're in the home stretch! The third trimester is when you will start feeling your baby moving around regularly, and when your trousers may need to be upgraded with a super-elastic waistband. This is an incredible time for you and your baby, and it's just a matter of weeks before your family grows by leaps and bounds.

## Insulin requirements and blood glucose control

### Insulin resistance

During the third trimester, both you and your baby will be gaining weight at a reasonably predictable, but rapid, rate. Your baby has gone from the size of a blueberry to the size of a baby

The third trimester is when your child will gain the majority of their size, both in length and in weight, and with their growth comes your resistance to insulin. For many women with type 1 diabetes, insulin needs are often tripled by the third trimester, so if you're taking much more than your normal dose, don't worry – that's normal.

It's very important to continue to monitor your blood glucose levels, as you may be adjusting your insulin needs on a weekly basis throughout this trimester. Make sure that you have plenty of insulin to hand to deal with these increasing insulin doses. Keep in contact with your healthcare team to discuss any concerns you have and ask for advice on changing your insulin doses if you feel you need help.

"At my NCT classes there was an emphasis placed on having a natural birth. I felt my type 1 made me less able to meet the expectations of the group as I knew I was likely to require more medical support at birth than the other women in the class. A group meeting or discussion of mums and mums to be with type 1 would have been really useful."

**Emily**

### Blood glucose control

You will continue to test your blood glucose before each meal and one hour after eating. Test before you go to bed, before driving and also whenever you have concerns that you may be high or low. Make sure you have plenty of treatments to hand to deal with low blood glucose. Monitor high blood glucose, testing for ketones if you feel unwell and/or your blood glucose levels are above 10mmol/L. Contact your healthcare team if necessary.

## Antenatal visits: Preparing for the birth

At this point in your pregnancy, you and your team will be establishing the birth plan for your baby's arrival. The timing and type of birth will be one of the things you will want to discuss with your team. You may have questions about pain relief and anaesthesia and changes to your medication during labour.

Many women with type 1 diabetes are told that a caesarean section is their only delivery option. Not true! Many women with type 1 diabetes deliver healthy, happy babies vaginally (and some even achieve a drug-free birth, aside from that ever-present insulin dose).

If you and your partner are anticipating a vaginal birth for your child, childbirth classes may help prepare you for that experience. Learning what to expect when your water breaks, understanding how a contraction may feel, and working together with your partner on how to deal with the birth experience may put you at ease, bring you closer, and prepare you for the arrival of your child.

You will also want to discuss looking after your baby following the birth. Learning how to change the baby's nappy and give a baby a bath can help prepare you for those first few weeks. Learning about breastfeeding and the effects this will have on your blood glucose levels will help prepare you as well.

## Specific appointments/screening in the third trimester

### 1. Eye examination

At 28 - 32 weeks you will be offered a further eye examination to check for diabetic retinopathy if you were found not to have diabetic retinopathy at the first antenatal clinic visit.

It is really important that an eye screening is carried out as pregnancy hormones can weaken the blood vessels of the eyes. Any developments should be discussed with your antenatal team.

### 2. Ultrasound scans

At 28 weeks you will be offered an ultrasound scan to check your baby's growth.

Ultrasound scans will also be offered at 32 and 36 weeks to check your baby's growth and more frequently if there is concern over growth.

### 3. Delivery

At around 36 weeks or earlier, your team will discuss delivery options with you for the weeks ahead. The options of inducing labour, or a caesarean section, if this is the best delivery option for you, will be explored.

If you are waiting for your labour to start naturally then your team will want to see you more frequently and may want to perform further checks on your baby's health.

## Your birth plan

A birth plan is literally a plan for how you'd like your child to arrive into the world. Sometimes this is an official document, and other times it is a discussion, but regardless of the formality, it can help a couple feel better prepared for the big day.

### What questions does your birth plan answer?

- Do I want to receive pain medication, or is my preference to give birth naturally?
- Who will manage my type 1 diabetes during the labour and delivery?
- How will insulin administration and glucose intake be managed during labour and delivery?
- Do I want to breastfeed immediately after delivery?
- What is going to happen to my insulin regime after delivery?

> "I'm nervous about the birth. I have to keep telling myself that most pregnant women, whether or not they have diabetes, are nervous about giving birth and that at the end of it all we should hopefully have a lovely healthy baby."
>
> **Holly**

- If my baby experiences a low blood glucose level after delivery, what is the hospital's policy regarding treatment of neonatal hypoglycaemia?
- Who are the people I want present during my child's birth?

With all deliveries, not just those of women with type 1 diabetes, the best-laid plans can change at a moment's notice, depending on the situation. It is good to have a plan for how you'd like your baby's birth day to unfold, but it's just as important to remain flexible and open to changing the plan to accommodate any emergencies.

The most important end result is a healthy mum and a healthy baby, and the goal of your medical team is to help you achieve that result.

### What should you bring to the hospital on the big day?

- Comfortable clothes and shoes to wear in the hospital and on your journey home.
- Several maxi pads to accommodate the post-birth bleeding (no tampons).
- A few overnight toiletries: toothbrush, toothpaste, shampoo, hairbrush.
- A camera to capture your baby's first moments, and your first proud moments with baby!
- The baby's car seat. Make sure you have it properly installed and ready before your child is strapped in.
- A few outfits for your baby, newborn nappies and wipes.
- Depending on the season, make sure you have a blanket and a hat to cover the baby on the walk to the car.
- Your personal type 1 diabetes supplies: insulin and blood glucose testing kit, syringes/pens, snacks, a record of your pre-pregnancy or post birth insulin requirements.

## Worries

Now is when you might be looking at yourself in the mirror and thinking: “This baby is almost here”. With that excitement and anticipation can come some worry. Will my baby be ok? Will I be ok? Will we be good parents?

For you, there are some added worries. Is my child growing according to schedule? Will my delivery be affected by my type 1 diabetes? Who will monitor my blood glucose while I’m in labour?

While it’s important to know and understand the worries of a pregnancy with type 1 diabetes, it shouldn’t be your focus in this exciting time. Know that you are doing the very best you can. You are almost there, so keep a handle on your level of worry as much as you can.

“I was terrified during both pregnancies that my babies would have problems or disabilities, that I thought would be my fault. The warnings from healthcare professionals about maintaining good control had convinced me that problems were likely. At each scan I was frightened that they were about to reveal a serious problem. At the moment when each baby was born my first question was ‘is it ok?’ And I immediately burst into tears of relief that the baby was healthy. I think the warnings I received and read about congenital abnormalities were too negative and frightening.”

**Susan**

# Labour and birth

Soon, you will be able to see and hold your baby. There is no reason why your birth experience should not be similar to that of women who do not have type 1 diabetes.

You will have already discussed your delivery options with your team during the last few clinic appointments. The options of a natural vaginal birth, induction of labour, or an elective caesarean section will have been explored. Which option you follow will very much depend on how your pregnancy is progressing and the health of you and your baby. Your own preference is important and your choice of delivery will be supported wherever possible. Remember, whatever delivery path you end up following the goal is a healthy mum and baby!

## Timing of your delivery

Most obstetricians prefer to deliver babies of women with type 1 diabetes prior to their due date. It is recommended that if you have a normally grown baby you should be offered elective birth through induction of labour, or caesarean section by 38 complete week's into the pregnancy. The risk of stillbirth is higher in women with type 1 diabetes which is a further reason to deliver prior to your expected date of delivery. Your healthcare team will consider your health and your baby's when deciding the best time for your baby to be born.

A common complication in babies of mothers who have type 1 is that they can grow considerably larger than normal and this is called macrosomia. Macrosomia occurs more often when the baby has been exposed to high blood glucose levels during pregnancy and sometimes the baby is too large to be delivered normally and a caesarean section becomes necessary. During pregnancy you will be offered ultrasound scans to monitor your baby's size. At approximately 36 weeks, your doctor will discuss the safest mode of delivery for you and baby.

On the positive side, planning the timing of the birth of your baby can actually be a source of excitement as you will no longer have to wonder about when your baby will arrive. Remember the arrival of your baby depends on you, your healthcare team, and choosing the best option for the safe delivery of a healthy baby.

## Premature labour - before 37 weeks

If your labour starts prematurely, that is before 37 weeks, you may be given medication to try to delay the birth.

If there is an increased chance your baby will be born prematurely you will be offered a course of steroids. Premature babies have an increased risk of health problems, particularly breathing. Steroids are a type of medication that can help your baby's lungs mature and prevent breathing problems.

Steroids are a course of injections for you given over a period of 24-48 hours. You may find that your blood glucose starts to rise following this treatment so we will need to monitor your blood glucose closely in hospital. Additional insulin may be required to keep your glucose normal and this is often given intravenously. Your diabetes healthcare team will support you to maintain normal blood glucose levels.

## Spontaneous labour

If your labour starts spontaneously after 37 weeks gestation and you have decided to have a vaginal birth fantastic. This is your best chance of a normal delivery.

## Induced labour

Induction of labour is a common procedure. Prior to formal induction you may be offered a membrane sweep at your 38-week antenatal appointment. Membrane sweeping makes labour more likely to occur spontaneously and reduces the need for formal induction. A membrane sweep involves an internal examination - a finger

sweeps the cervix (neck of the womb), hormones are released (prostaglandins) to help kick-start labour.

You will be asked to attend the hospital at a scheduled time. You will have the opportunity to make informed decisions about your care and treatment. Vaginal prostaglandins is a preferred method for induction administered vaginally by gel, tablet or controlled-release pessary. Some women may be offered breaking of the waters (Artificial Rupture of Membranes) or a hormone drip (Syntocinon) to stimulate contractions. You will be examined internally in the process of induction. The timing and number of examinations depends on which method of induction is chosen and how quickly you start to have contractions.

## Blood glucose control during labour

The ideal blood glucose level is between 4 and 7mmol/L during labour. It is really important that your blood glucose levels are well controlled as this will help prevent your baby's blood glucose from becoming too low (hypoglycaemic) after birth. Unless you have a very rapid labour, you will be offered an intravenous drip of glucose and insulin and the doses adjusted based on hourly tests to ensure your blood glucose levels remain normal. So if your blood glucose starts to drop, your healthcare team can reduce the amount of insulin through the drip. If you wear an insulin pump or CGM (Continuous Glucose Monitor), you may be able to continue to use it during the labour, however this is dependent on your diabetes team.

"It was standard procedure at my hospital to be put onto a drip of glucose and insulin during labour. With these, plus oxytocin (Syntocinon), I did feel a bit like a string puppet!"

**Rowena**

## Caesarean Section

For any pregnant woman, a caesarean section may be a surprise addition to the birth plan. It may be planned (elective) when there is medical need for the operation or in an emergency when a natural vaginal birth would put you or your baby at risk. Whatever the reason for a caesarean section, having your baby delivered by an operation may be the safest way. Your obstetrician will discuss the benefits and potential risks of the operation.

"Together with my diabetes healthcare team, I chose elective caesarean births for both my children. I felt the risk of major surgery for me was worth the reduction of risks for my babies. I think all mums to be with type 1 should be offered and consider all the options for giving birth and should be offered as much information as possible to make her choice."

**Emily**

You will be asked to attend the hospital at a scheduled time. An anaesthetist will see you before your operation and will review your medical history and discuss how your blood glucose will be managed. The anaesthetist will discuss your anaesthetic choices and will be happy to answer any questions. You may be given tablets to reduce acid in your stomach and prevent sickness, which may need to be taken the night before the operation and on the morning of the operation. You will be asked to fast prior to the operation and will be advised to monitor your blood glucose closely at this time. Your diabetes team will be able to support you.

Your blood glucose will be monitored closely during the operation. This is to ensure your blood glucose levels remain normal. You will be offered an intravenous drip of glucose/insulin during and after the caesarean section to keep your blood glucose levels normal. If you wear an insulin pump or CGM (Continuous Glucose Monitor), you may be able to continue to use it during the operation, however this is dependent on the anaesthetist and your diabetes team.

Following the operation you are likely to have the intravenous glucose/insulin drip to ensure stable blood glucose until you are eating and drinking normally – usually 24 hours. Women who are recovering well may be offered food and drink when they feel hungry and thirsty.

## After your baby is delivered

Your baby has finally arrived! As most new parents do, you both will likely feel a storm of emotions, from elation to relief.

Because you have type 1 diabetes, your baby will have his or her blood glucose tested after birth to make sure it is not too low (hypo). It is common for babies of women with type 1 diabetes to be born with low blood glucose. Maintaining normal

blood glucose control during pregnancy and birth can help prevent baby having low glucose levels after birth.

You are encouraged to feed your baby soon after birth to prevent them from having a low glucose level. Skin to skin contact immediately after birth is important to keep your baby warm, help bonding and encourage baby to breastfeed. Regular feeds in the first 24 hours help to prevent your baby's blood glucose dropping too low. Sometimes babies need to be transferred to the neonatal unit for treatment, but this does not mean that your child will have type 1 diabetes.

## Your blood glucose levels after birth

Your insulin requirements are expected to drop dramatically after birth. Many women return to their pre-pregnancy insulin doses. You should reduce your insulin immediately you have given birth and monitor your blood glucose levels closely. Testing frequently is important to prevent hypo and calculate how much insulin you need.

You are advised to test before and after meals, before bed and often during the night when you are awakened to feed baby.

Be aware that you have an increased risk of hypo at this time so always have fast acting glucose treatments and snacks available to deal with low blood glucose .

There are many benefits to breastfeeding and there are a few things you need to know. Breastfeeding uses up a lot of calories so you are at increased risk of hypo. This means that you are advised to further reduce your insulin doses – often by 25% - and monitor your blood glucose regularly. Your diabetes team can help you with this so please ask for their help.

With close blood glucose monitoring and support from your healthcare team you will find what works best for you.

For more information on what to expect during delivery visit:
www.womenwithdiabetes.net/WomenwithDiabetes/Thingsyoumaywanttoknow/

"I was told to expect to stay in hospital post birth to allow me and my baby's blood glucose levels to stabilise. I was put in the high risk post-birth ward, which was normal procedure for mum's with type 1 diabetes. This meant I was monitored more often and had more support which I thought was great. There are so many unknowns when having a new baby and when also looking after your own health and diabetes post birth, there is a lot to manage, so it's great to have the extra support."

**Rowena**

# Post birth and back at home

You've made it! You're going home for the first time with your new baby. You have navigated a successful pregnancy with type 1 diabetes and you should feel very proud.

What's next? Well, you now have a beautiful new baby to take care of, and that's one of the best things in the world, but it's also one of the most challenging and stressful things in the world. In addition to that, you still have your type 1 diabetes to manage.

This new baby is going to turn your life upside down for a while and your type 1 diabetes priorities are going to change. You may also be missing some of that intensive support and healthcare professional teamwork you had while you were pregnant. Your clinic visits are tapering off, and your diabetes appointments will go back to your pre-pregnancy schedule. For some, it might feel like flying solo, but remember your diabetes care team are still there to support you.

## Things you need to think about post birth

- Managing type 1 diabetes for one again
- Contraception
- Looking after yourself
  - Diet and exercise
  - Sleep
  - Anxiety and Stress
  - Emotions
- Six week check-up

"When I left hospital, I think my diabetes pregnancy team assumed I went back to my normal healthcare team, but there was no exchange of information and I was confused about who to talk to. I'd recommend asking your healthcare team to arrange a handover of your care back to your regular diabetes team, if they are different"

**Rowena**

## Managing type 1 diabetes for one again

In addition to the physical changes your body has under gone, you have also experienced a huge change in the way you managed your type 1 diabetes as you went through each of the different stages of pregnancy.

How often did you see your type 1 diabetes healthcare team before your pregnancy? Once every three months? Six months? When you were pregnant this increased dramatically, and near the end of your pregnancy you were probably going in for checks and consultations every one or two weeks.

Your diabetes healthcare team is there to help you, so ask them for help with the transition to your post-pregnancy diabetes regime.

It is going to take time to adjust to your post pregnancy diabetes management regime. It's easy to feel that you're not doing enough to keep your type 1 diabetes management on track. You need to find a pace with which you are comfortable and that you can sustain. One thing that might help is to mark on your calendar a certain time/date every couple of weeks when you can check in with yourself. How are you doing? Are you happy and comfortable with your type 1 diabetes management? Do you need to re-evaluate things and build in some strategies to help you get closer to where you want to be?

For example, you might be worried about how infrequently you're testing your blood glucose. You worry that you will have a low blood glucose level that will put your new baby in a dangerous situation. Develop a strategy to deal with your worry. Start small, much smaller than you first think. It might be as simple as picking two additional times to check your blood glucose during the day and then setting things up to make that happen (reminders, easy access to your glucose meters etc.).

### Picture this:

you have been trying for an hour to get your little one to fall asleep for a long-overdue nap. You're walking back and forth, rocking and swaying, like parents do, working hard to soothe and calm the baby. After a while, the two of you settle into your favourite chair or spot on the sofa, and finally he/she drifts off to sleep. You know if you move a single muscle, he/she will wake again.

And then you feel it. Your blood glucose is dropping. You need quick and easy access to glucose tablets and a meter. If you have to do a bunch of shuffling to get them, you might wake your baby again, which is the last thing you want to do right now.

Have glucose tablets, or other sources of fast-acting glucose, stashed everywhere through your home. If you have extra meters and strips, put them nearby too. Your hands will be full most of the time until your baby grows a bit, and you'll need to be able to deal with a low blood glucose level without disrupting him/her.

By planning ahead a little bit, and envisioning these scenarios beforehand, you can put glucose tablets and meters where you can get to them quickly and easily. Remember to refill your supplies on a regular basis too.

Take time to look at your blood glucose patterns, and start by making some small and simple changes to help adjust your control for life post-birth.

Talk to your diabetes healthcare team about any concerns you are having. Remember you're not alone.

## Contraception

You need to decide what type of contraception you are going to use so that you don't have an unplanned pregnancy. Be aware that you can become pregnant while you are breastfeeding and before your period starts again. Discuss options for contraception with your healthcare team.

## Looking after yourself

Taking care of yourself is really important, so that you can give your baby the best care too. Things you need to think about:

### Diet and exercise

Make sure you are eating properly and following a healthy diet. You have to take time to look after yourself, so that you can look after your baby. Eating properly is extremely important, especially if you are breastfeeding.

Make sure you are checking your blood glucose regularly. Getting back to your normal weight will help with blood glucose control. Try to incorporate some physical activity into your day as this will aid weight loss. But don't rush it, your diabetes team can help you design an activity plan that will fit in with your routine.

### Sleep

Your sleep pattern at least for a while is going to be set by your baby. You will be tempted to get your long list of jobs done while your baby is sleeping. If you can, sleep when the baby sleeps. Even if you can't nap, at least put your feet up and take a few minutes to yourself.

Not getting enough sleep can affect the management of your condition. Blood glucose levels may run higher as a result of the stress of missed sleep, and you may tend to snack more and/or eat things that spike your blood glucose levels more dramatically.

Lack of sleep can make it even more difficult to find the time and energy to look after your type 1diabetes.

Be fiercely protective of your sleep. It never feels important until you're not getting enough of it.

### Anxiety and stress

New parents worry about everything. Try and keep things in proportion and keep your stress and anxiety levels low if you can.

As you probably already know, stress can affect your blood glucose levels. Stress levels can

increase in response to a baby's cry. So if you have unexplained high or low blood glucose readings remember to consider the affect stress may have had here.

In some cases, you can proactively deal with stress-related blood glucose levels, but many times there's nothing you can do. You just have to react to what your blood glucose meter is telling you.

### Emotions

Post delivery you are going to experience hormonal changes as your body recovers from pregnancy. These changes along with all the other stresses looking after a new baby can bring can have an impact on you psychologically.

Talk about how you are feeling with your partner, family and your healthcare team. Most worries will resolve themselves. But do be aware of the symptoms of post natal depression and seek help if you feel that things are getting out of hand. The symptoms include feelings of hopelessness, guilt, feeling overwhelmed, sleep and eating disturbances, exhaustion, low energy, and feeling easily frustrated.

Remember there are people who can help you sort out some of the feelings you are experiencing. Talking with a trained professional can sometimes be just what you need.

## Six week check up

You will have a check up with your GP or healthcare team approximately six weeks after giving birth. At this appointment you will be assessed to make sure that you feel well and are recovering properly. Your diabetes care team will arrange to have your eyes and kidneys checked.

# Research studies in pregnancy and type 1 diabetes

The biggest challenge for women with type 1 diabetes while they are planning to get pregnant and during their pregnancy is usually keeping their glucose levels under tight control. So research focused on pregnancy and type 1 diabetes is currently focusing on finding the best ways to support women to gain that tight control. Other studies are also looking at the best ways to protect women with type 1 diabetes from developing complications such as kidney or eye problems during their pregnancies.

In the UK, one clinical trial is currently looking for women who are pregnant or planning to become pregnant to volunteer to join the study. The Continuous Glucose Monitoring in Women With Type 1 Diabetes in Pregnancy Trial, or CONCEPTT, study is looking to understand whether using a continuous glucose monitor while pregnant or planning to get pregnant can make a significant difference in helping women with type 1 to achieve tight glucose control, without additional risk of hypoglycaemia during this exciting time.

## What does participating in CONCEPTT involve?

The study is a comparison study, looking at whether usual care (lots of finger-stick glucose tests) or usual care AND continuous glucose monitoring leads to better outcomes for mum and baby. So half of the women who participate in the study will be given a continuous glucose monitor to use, while the other half continue their finger stick tests. Participants will not be able to choose which study group they will join, as a computer will randomly allocate participants into each arm of the study.

## Where is CONCEPTT taking place?

CONCEPTT is an international clinical trial, with sites in Canada, Israel, Italy, Spain, the UK and the USA. The UK sites are in Cambridge, London (Kings College, Hospital), Ipswich, Norwich, Leeds, Middlesbrough, Manchester, Sheffield, Glasgow, Edinburgh, Aberdeen, Nottingham, Newcastle and Southampton.

## Artficial Pancreas in Pregnancy

Another study underway is the first home study of closed-loop (artificial pancreas) in type 1 diabetes pregnancy. This is a collaboration between Dr Helen Murphy (Diabetes Pregnancy Clinician) and Dr Roman Hovorka (Artificial Pancreas expert). It builds on the previously funded JDRF artificial pancreas studies outside pregnancy. It will test whether pregnant women may also benefit from cutting edge technologies linking continuous glucose monitoring with insulin pump delivery. The home closed-loop pregnancy trial is available to eligible women receiving antenatal care in Cambridge, Ipswich, Norwich and Kings College, Hospital London.

## How can I find out more?

Contact Dr Helen Murphy (hm386@medschl.cam.ac.uk) for more information about CONCEPTT or closed-loop pregnancy trials.

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