

WOMEN'S HEALTH AND PAEDIATRICS  
 MATERNITY UNIT

**Diabetes in Pregnancy**

Amendments			
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## 1.0 Gestational diabetes (GDM)

### 1.1 Care pathway for women with GDM or previous GDM where indicated

<b>Booking 10/40</b>	<p>Discuss information, education and advice especially:</p> <ul style="list-style-type: none"> <li>• Diet</li> <li>• Previous pregnancy</li> <li>• Screening</li> <li>• Plan for this pregnancy</li> <li>• FBC, U&amp;Es, HBA1C</li> <li>• OGTT (for women with previous GDM)</li> </ul> <p>Book appointments as scheduled below including 12-16/40 OGTT for women with previous GDM.</p> <p>Refer for an early GTT at the time of the booking appointment.</p> <p>Early GTT to be scheduled as soon after the booking appointment as possible in the first or second trimester. In order to allow women to make arrangements to attend this should ideally be booked with 1- 2 weeks notice, this may not be possible in all cases.</p>	<b>CMW</b>
<b>11-13/40</b>	<p>Screening USS</p> <p>Start Aspirin if indicated (as per Tommys)</p>	<b>USS</b>
<p>If OGTT is normal revert to standard care pathway for that pregnancy but rebook OGTT for 24-28/40</p> <p><b>If OGTT confirms GDM refer to maternal medicine diabetes service within 7 days, commence CBG monitoring and follow schedule below:</b></p>		
<b>20/40</b>	Anomaly USS and Obs review	<b>USS and Obs</b>
<b>24-28/40</b>	OGTT (for women with risk factors or those with previous GDM who had a normal OGTT at referral at time of booking)	<b>ANC</b>

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<p>If OGTT is normal revert to standard care pathway for that pregnancy</p> <p><b>If OGTT confirms GDM refer to maternal medicine diabetes service within 7 days, commence CBG monitoring and follow schedule below:</b></p>		
<b>28/40</b>	<p>USS growth, liquor and dopplers</p> <p>BP, urine</p> <p>Take routine bloods and HbA1C assessment</p>	<b>USS and Obs</b>
<b>30/40 (para 0 only)</b>	BP, Urine, and FH	<b>Obs</b>
<b>32/40</b>	<p>USS growth, liquor and dopplers</p> <p>BP, urine</p>	<b>USS and Obs</b>
<b>36/40</b>	<p>USS growth, liquor and dopplers</p> <p>BP, urine</p> <p>Plan and book delivery (IOL or LSCS depending on the maternal and fetal situation)</p>	<b>USS and Obs</b>
<b>38/40 (if undelivered)</b>	BP, Urine and FH	<b>Obs</b>
<b>39/40 (If undelivered)</b>	BP, Urine and FH	<b>Obs</b>

**A further growth scan should be scheduled for 40/40 to check for late onset FGR in anyone being offered or requesting IOL after 40/40**

**Women with HbA1C >48mmol/mol at diagnosis should be managed on the pre-existing diabetes antenatal care pathway**

## 1.2 Risk Assessment

### 1.2.1 Risk factors at booking

All women should have a risk assessment for gestational diabetes undertaken at booking by the booking midwife. This should be recorded on BadgerNet as part of the booking summary.

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Women with previous Gestational diabetes - Offer a formal OGTT at 10 - 16/40

**\*\*\* for women with previous bariatric surgery, do not book an OGTT, they require capillary blood glucose monitoring\*\*\***

Offer a formal OGTT at 24-28/40 with women who have one of the following risk factors at booking:

- BMI above 30 kg/m<sup>2</sup>
- Previous macrosomic baby weighing (>4.5 kg)
- Previous gestational diabetes whose 16/40 OGTT was normal
- Family history of diabetes (first degree relative with diabetes)
- Minority ethnic family origin with a high prevalence of diabetes.
- Polycystic ovarian syndrome
- Women taking antipsychotic medication
- Previous IUD / stillbirth

### 1.2.2 Risk factors arising during the pregnancy

***EFW or fetal AC>95<sup>th</sup> centile or Polyhydramnios (single deepest pool >8cm) diagnosed by Ultrasound scan***

- *If <36 weeks*, Offer an OGTT and manage according to results
- If 36 weeks or more, offer capillary blood glucose profiling for 7 days. A diagnosis of GDM will be made on reviewing the fasting and post prandial readings if there are 3 or more abnormal readings
- Women should be referred to diabetes team if missed GTT or abnormal GTT that was not reviewed or actioned appropriately

***Glycosuria 2+ on one occasion or 1+ on 2 occasions***

If < 36 weeks - Offer an OGTT and manage according to results

If 36 weeks or more:

- Give dietary advice as per GDM
- Offer USS for growth, liquor and dopplers (if not already done in the last two weeks)
- Book for delivery as per “Timing of delivery” section.
- Offer capillary blood glucose profiling via diabetes midwives

If >38/40 Gestation

- Counsel fully re delivery options and document the discussion
- Book for delivery as per “Timing of delivery” section.
- **Do not** offer capillary blood glucose monitoring profile monitoring for diagnostic purposes unless they decline delivery or there is another indication.

**NB:** So that women can make an informed decision about risk assessment and testing for gestational diabetes, explain that:

- Gestational diabetes may respond to changes in diet and exercise, however, many women will need oral blood glucose lowering agents or insulin therapy if lifestyle changes in diet and exercise do not control blood sugar effectively

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- If gestational diabetes is not detected and controlled, there is a small increased risk of serious adverse outcomes (including stillbirth, pre-eclampsia and macrosomia)
- A diagnosis of gestational diabetes will lead to increased monitoring, and may lead to increased interventions, during both pregnancy and labour

### 1.3 Testing

This is done by a 2 hour 75 g oral glucose tolerance test (OGTT)

**Please note that women who have had bariatric surgery must not be booked for an OGTT but should have capillary blood glucose (CBG) profiling arranged instead.**

Refer for an OGTT via BadgerNet, the OGTT will be arranged and conducted as per the SOP section 6

A diagnosis of GDM is made with one or both of the following results

- Fasting blood glucose = 5.6 mmol/litre or more
- 2 hour post 75g load glucose of 7.8 mmol/litre or more

The results of the test will be reviewed and actioned by the diabetes specialist midwives

- Normal results - they will be available on BadgerNet within 7 days.
- Abnormal results - the woman will be contacted and given an appointment to attend for counselling, dietetic advice, and commencement of capillary blood glucose monitoring within 7 days. An appointment will be made for the next available diabetes antenatal clinic. Multidisciplinary care will be provided if required by the joint antenatal diabetes team.

### 1.4 New diagnosis of gestational diabetes

**1.4.1 Initial appointment will be conducted by the diabetes midwifery team. At this appointment the following should be discussed and an appointment with a diabetes dietician should be made at the next available opportunity**

Explain and advise:

- The implications (both short and long term) for her and her baby
- Good blood glucose control throughout pregnancy will reduce the risk of fetal macrosomia, trauma during birth (for her and her baby), induction of labour and/or caesarean section, neonatal hypoglycaemia and perinatal death
- Treatment includes changes in diet and exercise (e.g. 30 minute walk after a meal), and could involve medications
- Healthy diet and exercise should be maintained throughout the pregnancy
  - The necessity of avoiding high glycaemic index foods
  - How to monitor blood glucose
  - How to use the GDM app
  - How to seek help, whom to contact and when it is appropriate to do so

Offer women with a diagnosis of gestational diabetes an appointment to attend for counselling, dietetic advice, and commencement of capillary blood glucose monitoring within 7 days. An appointment will be made for the next available diabetes antenatal clinic. Multidisciplinary care will be provided if required by the joint antenatal diabetes team.

### 1.5 Treatment of GDM

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These women should be managed by the maternal medicine diabetes service as part of the MDT with input from Endocrinologist, Dietitian, Specialist Midwife and Obstetrician when required.

All women should be referred to a dietician

-If controlled by diet alone with no other pre-existing medical or pregnancy complications, they will be seen in the GDM clinic by the Specialist Diabetes Obstetric Fellow or by the Band 7 Specialist Diabetes Midwife. If the women is on Metformin 500mg once daily alone, she can continue to be seen in the GDM clinic.

-If the dose of Metformin is administered more frequently than 500mg OD or insulin is added, they will need to be reviewed in the Combined Obstetric and Diabetic clinic. Referral to this clinic will be made if results are consistently outside target range and if escalation of treatment is required.

**Fasting plasma glucose level between 5.5 – 7.0 mmol/litre at diagnosis**

- Start with dietary and lifestyle changes.
- If diet and exercise measures are unsuccessful, then the first line treatment is metformin. If metformin is contraindicated or unacceptable then offer insulin.
- If metformin fails to control plasma glucose levels, then offer additional insulin as well as the metformin.
- If there is macrosomia +/- polyhydramnios, with fasting plasma glucose level between 6.0 – 6.9 mmol/litre, then consider starting insulin +/- metformin

**Fasting plasma glucose level above >7.0 mmol/litre at diagnosis**

Offer immediate treatment with insulin, with or without metformin, as well as changes in diet and exercise.

**Glibenclamide**

This is rarely used and should only be started by an endocrinologist under very specific circumstances such as women with gestational diabetes who either:

- Do not achieve adequate control of blood glucose on metformin
- Who decline insulin therapy
- Cannot tolerate metformin.

**1.6 Antenatal care in GDM**

**1.6.1 Ante-natal appointments**

- The appointments will be at minimum at the four-weekly scans.
- Appointment frequency can be increased in frequency if blood glucose levels are poorly controlled.
- If the woman has well controlled gestational diabetes on diet only or up to 500mg Metformin OD and no other pre-existing medical or pregnancy complications then she can be seen in the GDM clinic which will be run by the Specialist Diabetes Obstetric Fellow or the Band 7 Specialist Diabetes Midwife.

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- Women requiring more than 500mg Metformin OD or insulin or if they have co-existing medical/pregnancy complications, must be reviewed through the diabetes ANC by an Obstetrician +/- Endocrinologist
- Women with HbA1C >48mmol/mol at diagnosis should be managed on the pre-existing diabetes antenatal care pathway

**1.6.2 Blood glucose monitoring:**

- The capillary blood glucose (CBG) levels will be reviewed regularly by the Diabetes Specialist Midwives
- Women who are on diet control, a single oral hypo-glycaemic medication or a single dose of intermediate or long acting insulin need to check their fasting and post meal glucose levels.
- Women with gestational diabetes who are on a multiple daily insulin injection regimen to test their fasting, premeal, 1hour postmeal and bedtime blood glucose levels daily
- Target blood glucose levels should be above 4.0 mmol/litre but below:
  - Fasting – 5.3 mmol/litre
  - 1 hour post meal – 7.8 mmol/litre
- If a woman becomes hypoglycaemic (confirmed on CBG), she should be advised to eat some glucose containing foods (Jelly babies/glucose tablets), followed by some longer acting carbohydrate. If that doesn't increase the CBG or she feels unwell, the woman should contact the Surrey Heartlands pregnancy advice line and an urgent assessment arranged via the Maternity Assessment Centre (triage)

**1.6.3 Fetal growth monitoring:**

- All women with gestational diabetes should be offered serial scans at 28, 32 and 36 weeks gestation.
- If the scan is normal, the scan does not need to be reviewed by an Obstetrician.
- At the 36 weeks appointment, a plan will be made for the mode and timing of delivery
- A further growth scan should be scheduled for 40/40 to check for late onset FGR in anyone being offered or requesting IOL after 40/40

**1.7 Timing of delivery**

Diet control only

1 – Well controlled – delivery should occur between 40 - 40<sup>+6</sup>/40

2 – Poorly controlled – delivery can be planned sooner, depending on maternal and fetal indications including (but not limited to) macrosomia, polyhydramnios, fetal growth restriction, hypertension.

Well controlled on Metformin up to 500mg BD can be offered IOL at 39/40 if no other pregnancy complications

Oral hypo-glycaemics +/- insulin therapy

1 – Uncomplicated women – deliver electively by IOL or LSCS between 37<sup>+0</sup>/40 and 38<sup>+6</sup>/40

2 – Complicated women – consider delivery prior to 37<sup>+0</sup>/40 after MDT discussion

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## 1.8 Intrapartum care GDM

- Any IV fluids administered **must not** contain dextrose unless on VRIII
- Women with GDM **must not** be given glucose containing energy drinks in labour (unless treating a hypo-glycaemic episode)

	GDM diet	Metformin	Insulin +/- metformin
<b>Spontaneous labour</b>	<ul style="list-style-type: none"> <li>- No special precautions, manage as normal labour</li> <li>- Blood glucose monitoring is not required</li> <li>Suitable for ABC if wished</li> </ul>	<p><u>Early labour</u></p> <ul style="list-style-type: none"> <li>- Eat and drink normally</li> </ul> <p>Take medication as normal</p> <ul style="list-style-type: none"> <li>- Check and record pre and post meal CBG</li> </ul> <p><u>Established labour</u></p> <ul style="list-style-type: none"> <li>- hourly CBG and ensure it is maintained between 4.0 – 7.0 mmol/l and start VRIII if CBG &gt;7.0 mmol/litre</li> </ul>	<p><u>Early labour</u></p> <ul style="list-style-type: none"> <li>- Eat and drink normally</li> <li>- Check pre and post meal CBG only</li> </ul> <p><u>Established labour</u></p> <ul style="list-style-type: none"> <li>- Hourly CBG monitoring, ensure CBG remains between 4.0 – 7.0 mmol/l and start VRIII if CBG &gt;7.0 mmol/litre (NICE)</li> <li>- Use VRIII regardless if woman is using long acting insulin</li> </ul>
<b>Induction of labour</b>	<ul style="list-style-type: none"> <li>- IOL to take place on Joan Booker Ward</li> <li>- Can eat and drink during induction</li> <li>- Pre and 1 hour post meal blood glucose levels (CBG) to be recorded on the diabetes chart</li> <li>once in established labour</li> </ul>	<ul style="list-style-type: none"> <li>- IOL to take place on JBW</li> <li>- Can eat and drink during induction and labour</li> <li>- Take medication as normal</li> <li>- Pre and post meal CBG to be recorded on a diabetes chart</li> <li>- Once in established labour as above.</li> </ul>	<ul style="list-style-type: none"> <li>- IOL to take place on JBW</li> <li>- Can eat and drink during induction and labour</li> <li>- Take medication as normal</li> <li>- Pre and post meal CBG to be recorded on a diabetes chart</li> <li>- Once in established labour – as above</li> </ul>
<p><b>Elective caesarean section</b></p> <p><b>Always first on LSCS list</b></p>	<ul style="list-style-type: none"> <li>- As per normal elective LSCS pathway</li> </ul>	<ul style="list-style-type: none"> <li>- Fast for 6 hours pre delivery</li> <li>- Can drink plain water until 2 hours pre delivery</li> <li>- Omeprazole and metoclopramide as usual</li> <li>- Omit metformin on the morning of surgery</li> <li>- Hourly CBG until delivery to be documented on the diabetes chart</li> <li>- VRIII only if CBG &gt;7.0 mmol/l</li> </ul>	<ul style="list-style-type: none"> <li>- Fast for 6 hours pre delivery</li> <li>- Can drink plain water until 2 hours pre delivery</li> <li>- Omeprazole and metoclopramide as usual</li> <li>- Avoid metformin and insulin on the morning of surgery</li> <li>- Hourly CBG until delivery, ensure it is maintained between 4.0 – 7.0 mmol/litre, to be documented on the diabetes chart</li> <li>VRIII only if CBG &gt;7.0 mmol/l or if woman is using long acting insulin</li> </ul>

<b>Emergency caesarean section</b>	- As per labour pathway	- If VRIII has been started during labour or induction then continue throughout LSCS - If VRIII has not been started then continue without.
<b>Post delivery</b>	Routine care	Stop metformin +/- insulin Follow postnatal care section Stop VRIII once eating and drinking (follow VRIII chart) Monitor baby for signs hypoglycaemia as per neonatal guideline

### 1.9 Postnatal Care in GDM

- Normal diet
- Stop medication (metformin and/or insulin) and regular CBG testing immediately after delivery
- Monitor CBG for 24-48 hours prior to and one hour post meal
- Remind women of the symptoms of hyperglycaemia for long term health (thirst, excessive drinking and polyuria)
- Explain there is a recurrence risk in future pregnancies and an increased lifetime risk of diabetes. This risk can be reduced by a healthy lifestyle (weight control, diet and exercise)
- GP to arrange a fasting plasma glucose test and HBA1C 6–13 weeks after the birth to exclude diabetes (usually at the 6 week postnatal check) and annually.

<b>• GDM diet only</b>	<b>Metformin</b>	<b>Insulin +/- metformin</b>
<ul style="list-style-type: none"> <li>• No special diet required</li> <li>• CBG prior to meals and one hour after meals the day after delivery</li> <li>• If CBG is &gt; 11.0 mmol/l, repeat CBG again in one hour. If it is still &gt; 11.0 mmol/litre, contact duty Medical SpR</li> </ul>	<ul style="list-style-type: none"> <li>• No special diet</li> <li>• Stop metformin +/- insulin</li> <li>• Fasting CBG the day after delivery</li> <li>• If CBG &gt;11 mmol/litre, repeat CBG again in one hour. If it is still &gt; 11.0 mmol/litre, contact duty Medical SpR</li> <li>• If VRIII started during labour then continue VRIII until able to eat and drink (See chart in appendix )</li> </ul>	
Baby - Routine care	<ul style="list-style-type: none"> <li>• Monitor for signs of hypoglycaemia as per guideline</li> </ul>	

## 2.0 Women with pre-existing Diabetes

### 2.1 Antenatal care in pre-existing diabetes

All women with pre-existing diabetes in pregnancy will be case loaded by the diabetes specialist midwives. This includes all women with Type 1/Type 2 Diabetes and all women diagnosed with gestational diabetes who have a HbA1c level of >48 mmol/mol at diagnosis.

These women should be seen in a 'one stop' clinic and managed as part of the MDT with input from Endocrinologist, Dietitian, Diabetes Specialist Nurse, Diabetes Specialist Midwife and Obstetrician.

Where required, joint care with the perinatal mental health team, the safeguarding team, the community team and the primary care network should be provided. Ongoing antenatal care plans and birth plans should be shared on BadgerNet. These women will further be discussed at the monthly Specialist Teams Maternity Forum which occurs on the first Wednesday of every month.

Women with diabetes should have an HbA1c measured at the start of the third trimester and those with an HbA1c above 48mmol/mol should be having increased surveillance including additional diabetes nurse/dietetic support, and have more frequent face to face reviews in the MDT diabetes antenatal clinic to plan ongoing care and timing of birth decisions.

All women with pre-existing diabetes or gestational diabetes with HbA1C >48mmol/mol will be additionally discussed in the monthly MDT meetings which occur on the first Wednesday of every month and will be discussed in the monthly specialist teams forum.

Green	HbA1c 43 mmol/mol or less	Continue current care
Amber	HbA1c 44-48 mmol/mol	Consider additional input to improve glucose management
Red	HbA1c more than 48 mmol/mol	MDT discussion required. Offer additional input to improve glucose management including alternative methods of monitoring treatment. Offer increased fetal surveillance, and re-discuss increased risk of stillbirth, birth and neonatal complications.

During pregnancy data should be submitted to the NPID audit. This data will also be audited locally to ensure local guidelines are being adhered to and to address any ongoing challenges.

Antenatal appointments and care should follow the care pathway section shown in 2.2

#### 2.1.1 Pre-conception

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Ideally women with pre-existing diabetes should plan pregnancy and optimise their diabetes control prior to conception. This should be in conjunction with their endocrinologist, obstetric consultant and GP and occur prior to discontinuing any contraception. Women with pre-existing diabetes should be referred to the pre-conception counselling clinic prior to conception. The below mentioned 'Education' (2.1.2) should be discussed during the consultation, as well as advice on weight loss if indicated and women who are planning a pregnancy should be commenced on Folic Acid 5mg daily. Also see 'Renal and Retinal assessment' (2.1.5)

### 2.1.2 Education

- Use contraception (including OCP) until good blood glucose control assessed by HbA1c level (target < 48 mmol/mol or 6.5% NICE,2015) has been established because establishing good blood glucose control before conception and continuing this throughout pregnancy will reduce the risk of miscarriage, congenital malformation, stillbirth and neonatal death (although it does not eliminate it)
- The role of diet, body weight and exercise
- The possibility of temporary health problems in the baby during the neonatal period, which may require admission to the neonatal unit
- The risk of the baby developing obesity and/or diabetes in later life.
- The risks associated with pregnancy in women with diabetes increase with how long the woman has had diabetes.
- Extra time and effort is needed to manage diabetes during pregnancy and that she will have frequent contact with healthcare professionals
- The increased risk of having a baby who is large for gestational age, which increases the likelihood of birth trauma, induction of labour and caesarean section
- The need for assessment of diabetic retinopathy and nephropathy before and during pregnancy

### 2.1.3 Blood glucose control:

Offer real time continuous glucose monitoring (rt CGM) to all pregnant women with Type 1.

Ensure these women are fully informed and educated as to how to use rt CGM and the benefits of it. If a women declines or is deemed unsuitable for rt CGM then she should be offered capillary blood glucose monitoring.

All members of the Maternal Medicine Diabetes Service should receive adequate training in using rt CGM. This training can be accessed via the Glooko Academy Platform.

All women with Type 2 Diabetes Mellitus and all women diagnosed with Gestational Diabetes who have a HbA1c level of >48 mmol/mol at diagnosis should have capillary blood glucose monitoring. Women who have needle phobia or where capillary blood glucose monitoring cannot be relied upon as effective monitoring, such as, poor compliance, should be offered rt CGM.

Glucose monitoring should be reviewed by the maternal medicine diabetes service every 1-2 weeks and results uploaded to the patient's electronic records or maternity notes.

Please see appendix for SOP on when women should be advised to self escalate blood glucose readings and training provided to women using digital monitoring.

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- Targets, glucose monitoring, medicines for treating diabetes (including insulin regimens for insulin treated diabetes) and medicines for complications of diabetes will need to be reviewed before, during and after pregnancy. Agree individualised targets
- Aim for fasting and pre meal reading between 4.0 – 7.0 mmol/.
- Target HbA1C level to below 48 mmol/mol (6.5%) to reduce the risk of congenital malformations in the baby
- Strongly advise women with diabetes whose HbA1c level is above 86 mmol/mol (10%) not to get pregnant
- Advise re the risks of hypoglycaemia and impaired awareness of hypoglycaemia during pregnancy
- How nausea and vomiting in pregnancy can affect blood glucose control
- The importance of maternal blood glucose control during labour and birth and early feeding of the baby, in order to reduce the risk of neonatal hypoglycaemia

#### 2.1.4 Diet, dietary supplements and body weight

- Offer individualised dietary advice
- Advise and support those with a BMI >27 to lose weight
- Prescribe folic acid 5mgs daily from pre-conception to 12/40

#### 2.1.5 Renal and retinal assessment

- Renal – if creatinine is >120 micromol/litre or urine PCR is greater than 30 mg/mmol or the eGFR <45 ml/minute/1.73 m<sup>2</sup> then referral to a nephrologist is advised prior to stopping contraception.
- Retinal – offer assessment unless they have had an annual retinal assessment in the last 6 months, this should continue annually if no diabetic retinopathy is found. This should be done prior to optimisation of blood glucose control.
- Women with diabetes and retinopathy requiring treatment during pregnancy and/or kidney impairment (CKD 2 with significant proteinuria i.e. PCR>30; or CKD 3 or more) should be managed in a regional maternal medicine centre where care can be delivered in a single MDT clinic. In circumstances where regular travel to a tertiary clinic is not possible, ongoing care should be planned via regular (4-6 weekly) MDT discussion with the MMC centre throughout the pregnancy. Our regional maternal medicine centre is St. George's Hospital.
- Consider thromboprophylaxis if nephrotic range proteinuria is present.

#### 2.1.6 Medication

- Women with diabetes may be advised to use metformin as an adjunct or alternative to insulin in the preconception period and during pregnancy, but all other oral blood glucose-lowering agents should be discontinued before pregnancy and insulin substituted.
- Use isophane insulin (also known as NPH insulin) as the first choice for long-acting insulin during pregnancy but insulin detemir, insulin degludec or insulin glargine can be continued in women with diabetes who have established good blood glucose control before pregnancy
- Angiotensin converting enzyme inhibitors and angiotensin II receptor antagonists should be discontinued before conception or as soon as pregnancy is confirmed. Alternative antihypertensive agents suitable for use during pregnancy should be substituted.
- Statins should be discontinued before pregnancy or as soon as pregnancy is confirmed.

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Service user feedback will be provided and audited by the MVP (Maternity Voices Partnerships).

Any case of antenatal stillbirth where diabetes was a risk factor, will be reviewed and investigated as per our local governance process and the findings as well as any learning will be shared.

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## 2.2 Care pathway – Type 1 or 2 diabetes

Midwifery care for women with type 1 diabetes should be undertaken by the specialist midwives, rather than community midwives.

<b>Pre-conception</b>	Pre-pregnancy counselling is offered by the lead obstetrician in their outpatient clinic.  Advised to start folic acid 5mg daily and to start aspirin 150mg from 12 weeks gestation onwards	<b>GP</b>
<b>Pre-booking (7-9/40)</b>	Viability USS	<b>USS (to be arranged by DSM)</b>
<b>Booking</b>	Diabetes specialist MW – Type 1  CMW - Type 2	<b>DSM</b>
<b>10/40</b>	<p>Discuss information, education and advice:</p> <ul style="list-style-type: none"> <li>• about how diabetes will affect the pregnancy, birth and early parenting (e.g. breastfeeding and risk of hypoglycaemia)</li> <li>• in relation to achieving optimal blood glucose control (including dietary advice)</li> </ul> <p>If the woman has not had preconception care and advice:</p> <ul style="list-style-type: none"> <li>• give information, education and advice for the first time,</li> <li>• take a clinical history to establish the extent of diabetes related complications (including neuropathy and vascular disease)</li> <li>• review medicines for diabetes and its complications.</li> </ul> <p>Offer retinal and renal assessment for women with pre-existing diabetes unless the woman has been assessed in the last 3 months.</p> <p>Arrange contact with the joint diabetes and antenatal clinic every 1–2 weeks throughout pregnancy.</p> <p>Measure HbA1C levels, renal function and TFTs in T1DM</p>	<b>Endo + Obs</b>

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	Book appointments as scheduled below	
<b>11-13/40</b>	Screening USS Start Aspirin 150mgs daily from 12-36/40 Discuss risks re fetal growth restriction, macrosomia, pre-eclampsia and congenital anomalies	<b>USS and Obs</b>
<b>14/40</b>	Endocrine review	<b>Endo</b>
<b>16/40</b>	Refer to retinal assessment, through diabetes retinal screening service (DRSS).	<b>Endo and Obs</b>
<b>18/40</b>	Endocrine review	<b>Endo</b>
<b>20/40</b>	Anomaly USS Fetal Echo (type 1's only; individualise plan if poorly controlled type 2) Obs review BP and urine	<b>USS and Obs (+/- endo)</b>
<b>22/40</b>	Endocrine review	<b>Endo</b>
<b>24/40</b>	Endocrine review	<b>Endo</b>
<b>26/40</b>	Endocrine review, BP, Urine and FH	<b>Endo and obs</b>
<b>28/40</b>	USS growth, liquor and dopplers BP, urine Retinal assessment Take routine bloods and HbA1C assessment	<b>Endo, Obs and USS</b>

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<b>30/40</b>	BP, Urine and FH  Assess 28/40 test results	<b>Endo, Obs and USS</b>
<b>32/40</b>	USS growth, liquor and dopplers  BP, urine	<b>Endo, Obs and USS</b>
<b>34/40</b>	BP, Urine and FH	<b>Obs and Endo</b>
<b>36/40</b>	USS growth, liquor and dopplers  BP, urine  Plan and book delivery (IOL or LSCS depending on the maternal and fetal situation). Discuss feeding.	<b>Endo, Obs and USS</b>  <b>Postnatal delivery plan to be made</b>
<b>37+0/40 – 38+6/40</b>	Date for delivery should be in this time frame	<b>Obs</b>
<b>38/40 (if undelivered)</b>	BP, Urine, SFH and FH	<b>Obs</b>
<b>39/40 (if undelivered)</b>	BP, Urine, SFH and FH	<b>Obs</b>

## 2.3 Timing and mode of birth

1 – Uncomplicated women – deliver electively by IOL or LSCS between 37<sup>+0</sup>/40 and 38<sup>+6</sup>/40

2 – Complicated women – consider delivery prior to 37<sup>+0</sup>/40 after MDT discussion

### Notes

- Diabetes is not a contra-indication to VBAC
- Consider mode of delivery in light of the Montgomery ruling with regards to shoulder dystocia and fetal size.

## 2.4 Intrapartum care pre-existing diabetes

Advise birth on delivery suite with continuous CTG

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All women with pre-existing diabetes who are currently on insulin should be managed with a VRIII during delivery and in the immediate postpartum period until they are eating and drinking.

**2.4.1 Spontaneous labour:**

- Early labour:- hourly CBG, to ensure CBG levels are maintained between 4.0 – 7.0 mmol/l. Start VRIII if >7.0 mmol/litre
- When in established labour, start VRIII as per protocol.
- Can eat and drink as per normal whilst on the VRIII unless other indication to fast is present.

**2.4.2 Induction of labour:**

- Propess induction can start on JBW as per normal IOL process.
- Can have breakfast and usual insulin at home, before admission
- The woman should record pre and post meal blood glucose levels until in established labour.
- Whilst eating the woman should take her usual short acting insulin doses with meals.
- If not able to ARM after the Propess is removed, then continue with normal insulin and follow IOL protocol with Prostin gel
- If able to ARM then move to labour ward
- Start VRIII when in established labour or if an Oxytocin infusion is started.

**2.4.3 Elective Caesarean section (pre-op)**

- For women delivered between 38+0 and 38+6, elective steroid cover is not routinely required unless specifically requested by the diabetes team.
- No food from 6 hours prior to admission but can drink plain water until 6am.
- Omeprazole and Metoclopramide “premedication” (as per normal)
- **No** s/c insulin on the day of Caesarean section.
- Admit to labour ward at 7.30 a.m.
- VRIII regime to be commenced within 30 minutes of admission to the Labour Ward.
- Hourly blood glucose levels to be recorded on the relevant chart in Cerner by the midwife until the woman is transferred to theatre.

**2.4.4 Emergency Caesarean section:**

- If the VRIII has already been started this must be continued in theatre.
- If Caesarean section is required before the onset of labour, both the woman’s obstetric problems and her diabetes must be appropriately managed.
- Give usual Omeprazole and Metoclopramide
- The time interval between the decision to perform a Caesarean section and transfer to theatre, will inevitably depend upon the indication for Caesarean section. Where possible the woman should be nil by mouth for at least 6 hours.
- The VRIII is to be started within 30 minutes of a decision to perform a Caesarean section.
- If a category 1 Caesarean section is required then the VRIII can be started in theatre by the anaesthetic team
- Whilst on the VRIII, hourly blood glucose levels are to be recorded on the relevant chart in Cerner by the midwife and/or anaesthetist.

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## 2.5 Postnatal Care pre-existing diabetes

### 2.5.1 Management of the VRIII post delivery (refer to protocol chart)

Women with type 1 diabetes or type 2 on medication +/- insulin should have an individual plan made for their postnatal medication by the Diabetes MDT. This will be recorded in the management box on BadgerNet.

\*\*\*Always Continue VRIII as per protocol until able to eat and drink and have taken their regular s/c insulin in line with the documented post-natal management plan\*\*\*

**Oral antidiabetic tablets** - Give oral antidiabetic agents with meals as usual. Stop VRIII 30 mins after first dose of tablets.

**Women on mixed insulins eg:Novomix 30/Humalog mix 25/Humalog mix 50** - Prescribe their regular insulin to be given with breakfast and evening meal and stop VRIII 30 mins after first dose or when meal time insulin given

**Basal Bolus Short acting insulin with meals plus a long acting insulin 4 or more injections a day** - Restart rapid acting insulin with next meal. Can stop VRIII at any time if long acting insulin has been continued.

**Insulin pump users (CSII) (people who have their own insulin pump)** - The patients' own insulin pump and the VRIII must run together for one hour before stopping VRIII. Stop VRIII once Patients own insulin pump has been running for 1 hour. See section 2.6 for further information.

Patients to resume pre-pregnancy insulin regime in pump.

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## 2.6 Women who are using an insulin pump

- Women who are using an insulin pump in pregnancy should have an individual plan for management of their pump and settings made by the Endocrinology team.
- This will be documented in the management box on BadgerNet.
- The following guidance does not replace the individual plan but provides a framework for managing these cases.

### Labour

- Women with insulin pumps may prefer to use them whilst in labour. Most typically they will self-manage their pump with assistance from their partner as required. They will use correction boluses and/or temporary basal rate changes to maintain optimal glycaemic control.
- Women using continuous glucose monitoring (CGM) should also be reminded that capillary glucose tests are more accurate during labour and delivery.
- Her own insulin pump should remain in place on the basal settings; this will allow safe transition to her postnatal regimen.
- If the woman is unable to manage her own insulin needs, or becomes unstable, i.e. blood glucose >7.0 mmol/L on two consecutive occasions, or has urinary ketones ++ or more on urinary dipstick or high capillary blood ketones (> 1.5 mmol/L) then a VRIII should be commenced immediately and patient's own insulin pump switched off.

### Caesarean section

- Women with stable glucose control may continue to use their own insulin pump. If the woman is unable to manage her own insulin needs, or becomes unstable, i.e. blood glucose >7.0 mmol/L on two consecutive occasions or has urinary ketones ++ or more on urinary dipstick or high capillary blood ketones (> 1.5 mmol/L) then a VRIII should be commenced.
- The insulin pump settings can be changed to post-partum doses by the woman or her partner just before the commencement of surgery.

### Post delivery

If she hasn't already done so, the woman **must** change the pump settings of her own insulin pump to her postnatal settings (pre-pregnancy dose) as described on her individual care plan provided by the diabetes team. If the woman's pump has been discontinued it should be re-connected for one hour prior to discontinuing the VRIII. Only discontinue VRIII when the woman feels able to manage her own insulin pump.

In the absence of a documented individual care plan, ensure the woman changes her pump following the advice below:

- Basal rates should be reduced to 0.5 units per hour
- Insulin to carbohydrate ratios should be changed to 1 unit of insulin per 15g of carbohydrate
- Insulin sensitivity should be increased to 4 mmol/L
- Blood glucose targets should be relaxed to 6-10 mmol/L

*Please note that an insulin bolus is usually not required for the first light meal taken post-delivery. The emphasis is now on avoidance of maternal hypoglycaemia so glycaemic targets are relaxed.*

- Refer to specialist diabetes pump team as soon as possible

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### 3.0 Hypoglycaemia

Hypoglycaemia occurs when the blood glucose drops below 4.0mmol/litre and is a common occurrence in pregnancy. Symptoms of hypoglycaemia include (but are not limited to):

- Weakness
- Sweating
- Shaking/tremor
- Reduced consciousness

Recognition, diagnosis and treatment of hypoglycaemia is essential to avoid the hypoglycaemic episode worsening and resulting in loss of consciousness and in some cases death. There is a “Hypobox” available in all clinical areas.

#### **Recognition**

If the woman has symptoms of the above then check CBG and if <4.0mmol/litre then follow the below escalation and treatment

#### **Treatment**

- Fully conscious - give oral carbohydrate (eg 3-5 jelly babies/glucogel/1-4 glucose tablets)
- Reduced conscious level - give buccal fast acting dextrose gel (40% dextrose), ‘Glucogel’. This is well absorbed across the buccal mucosa and therefore less likely to be aspirated.
- Unconscious
  - Give a 100ml bolus of 20% glucose intra-venously
  - If the initial bolus fails to raise CBG after 15 minutes then give a repeat 25-50ml bolus of 10% glucose intra-venously
  - If CBG is still <4.0 then start an infusion of 10% dextrose
  - Once CBG >4.0 and the woman is able to eat and drink, give slow release carbohydrates such as toast, digestive biscuits or a meal
  - Monitor CBG hourly when the woman has recovered to pick up any overshoot and high CBG levels.

#### **Escalation**

- if fully conscious call the SHO
- if reduced conscious level then call the registrar or CoW (0900 – 1700)
- If unconscious, then call 2222 ‘Obstetric emergency and Adult Priority Call’
  
- **Give glucagon 1mg intramuscularly if iv access is unavailable or if the above measures are unsuccessful.**

If the hypoglycaemic episode was mild then the woman can stay where she is, however, if the woman is on JBW and has suffered either reduced consciousness or has been unconscious, then when she is stable, she should be transferred to Labour ward and monitored until she can be reviewed by the medical team.

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## 4.0 Diabetic Ketoacidosis in pregnancy

Please refer to the trust guideline on diabetic ketoacidosis; it can be accessed by clicking [here](#)

### Antenatal monitoring

- Offer pregnant women with type 1 diabetes blood ketone testing strips and a meter, and advise them to test for ketonaemia and to seek urgent medical advice if blood ketones > 2 mmol/L as ketoacidosis can occur with normal blood glucose levels in pregnant women.
- Advise pregnant women with type 2 diabetes or gestational diabetes to seek urgent medical advice if they become hyperglycaemic (CBG>12) or unwell or any excessive vomiting.

### Management of suspected or confirmed diabetic ketoacidosis

- Please be aware that small percentage of diabetic women in pregnancy can have euglycaemic (normal) ketoacidosis
- Test urgently for ketonaemia if a pregnant woman with any form of diabetes presents with hyperglycaemia or is unwell, to exclude diabetic ketoacidosis.
- During pregnancy, patients suspected of having diabetic ketoacidosis should be seen and admitted if DKA is confirmed for both medical and enhanced maternal care.
- **This is a medical emergency and women may require critical care outreach review and ICU admission**
- DKA is a serious medical condition and patients should be seen in the emergency department or SDEC / AMU by the medical team. In this situation, the obstetric team should be informed of the admission. An urgent obstetric review should occur and a senior plan for monitoring maternal and fetal condition documented on BOTH CERNER and BadgerNet. The case details will be recorded on the outliers section of the labour ward board. The woman will be reviewed daily as a part of the Consultant led ward round whilst she remains in DKA, requiring HDU or ICU care. Obstetric and midwifery reviews may be required more frequently as part of the individual care plan.
- Indications for admission to labour ward would be for pregnancy related concerns or because imminent birth is felt likely. Full monitoring of fetal wellbeing with CTGs can be undertaken in any area of the hospital and does not require the woman to be on labour ward. If needed a midwife can be allocated to support the nursing team in HDU / ICU or on any medical ward.
- If admission to the labour ward is required this should be to the observation bay (unless in labour). Management needs to be with multidisciplinary care from the obstetric team, medical/diabetes team and the anaesthetic team. Depending on the severity of DKA the patient may require ITU admission and input.
- Follow trust pathway for management of diabetic ketoacidosis
  1. Monitoring – continuous observations for the first hour, then half hourly for 2 hours and after that hourly until out of danger.
  2. Urgent investigations – blood glucose, ABG, urine/blood ketones, U&Es/FBC, CXR/ECG, infection screen (blood/urine culture, swabs)

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3. Urgent management – IV access (lease with anaesthetist as may need a central line), continuous BP/ECG, Oxygen is arterial pO<sub>2</sub> <11kpa (80mmHg), catheter/hourly output, thromboprophylaxis, antibiotic therapy if required.

Fluid Replacement: NORMAL SALINE 0.9%, 2 litres over first 4 hours; 2 litres over the next 8 hours then 1 litre 8 hourly (consider colloids after 2 hours if hypotensive or oliguric).

Start 5% Dextrose infusion over 4-6 hours once blood glucose falls to less than 13mmol/L. Aim for levels 6-8mmol/L. Restart normal subcutaneous insulin once eating and drinking as normal.

POTASSIUM: Start KCL infusion at 20mmol/hr if potassium <3.5mmol/L. Give simultaneous insulin infusions with potassium infusion at a rate of 20mmol/hr. STOP POTASSIUM INFUSION IF PLASMA LEVEL >6.0MMOL/L.

Blood levels of potassium should be checked hourly initially then 2 hourly.

Diabetic ketoacidosis will usually correct itself once normal circulation and metabolism are restored.

- Stabilise mother as first priority
- Monitor baby with a CTG at gestations >26/40 (a midwife should remain present for all periods of CTG monitoring if this is undertaken in another area)
- Remember that maternal acidosis will cause changes in the CTG (Usually a fetal tachycardia with reduced variability) which will resolve as the acidosis rectifies.
- Senior input is required for any women presenting with DKA and especially with regards to emergency delivery for CTG abnormalities in the acute phase.

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## 5.0 Antenatal steroids

If a woman is in preterm labour or if she requires preterm delivery for fetal or maternal reasons then antenatal corticosteroids will frequently be required. The administration of corticosteroids is highly likely to adversely affect blood glucose levels and therefore for women with either gestational diabetes or pre-existing diabetes will require close monitoring and control of their blood glucose. In view of the associated morbidity and excess monitoring, the decision for administration must be made by a senior clinician.

Inpatient administration - All women will require inpatient administration of steroids because they are indicated for preterm labour/PPROM/APH etc. which in themselves are indications for admission and monitoring.

## 6.0 Care on Joan Booker Ward

The diabetes team midwives will be available for advice Monday to Friday 0900 - 1700

The admitting midwife must ensure that all;

- **Type 1 and 2 Diabetes Women**
- **GDM Women on Insulin therapy**
- **GDM Women on Metformin**

are to receive the following on admission to the ward:

- Colour Specific wrist Band
- CBG Monitoring Chart on Cerner if not able to access GDM Health App, to record CBG readings
- Drug Chart on Cerner (Surrey Safe Care) with ALL insulin / hypoglycaemics as well as any other medicines including GlucoGel and Glucagon prescribed by the obstetric team
- Sharps Bin

GDM inpatients who have been monitored during pregnancy and controlled by diet alone will only require;

- CBG Monitoring chart if not able to access the GDM Health app, to record CBG readings
- Sharps Bin

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## 7.0 VRIII appendix

### VARIABLE RATE INTRAVENOUS INSULIN INFUSION (VRIII)

All information has been taken and adapted from “*Joint British Diabetes Societies: Management of pregnant women with diabetes on obstetric wards and delivery units*” May 2017.

Blood glucose targets are kept within a tight specific range throughout pregnancy (4.0 -7.8 mmol/L). Tight glycaemic target remains important during labour and delivery (4.0-7.0 mmol/L). It is commonly managed by an intravenous infusion of glucose and insulin that is adjusted according to hourly capillary blood glucose (CBG).

- CBG should be monitored hourly when mothers are administered steroids in pregnancy. The most effective way to control steroid-induced hyperglycaemia is by using VRIII
- All women with diabetes of any type should have hourly CBG monitoring in established labour. CBG should also be done on the morning of elective caesarean section. If general anaesthesia is used, monitoring should be every half an hour until the baby is born and the mother is fully conscious.
- Maintain CBG in labour in the target range according to the NICE guidelines (4.0 – 7.0 mmol/L).
- All patients with type 1 diabetes and some patients with type 2 diabetes or GDM may require VRIII in established labour to keep the CBGs in this range. An example pre-printed prescription chart and guidance is attached with this guideline
- Women who are on an insulin pump may choose to remain on CSII (in agreement with their treating physicians) unless they are not able or willing to continue pump therapy during labour.
- Reduce the rate of VRIII (if and when used) by 50% (or change to the lowest scale) once placenta is delivered. Contact the diabetes teams to review the on-going insulin requirement in insulin treated patients with type 1 and type 2 diabetes. The insulin dose may be 25% less than the doses needed at the end of first trimester

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### 7.1 Setting up VRIII

- Prescribe VRIII as '50 units (fifty units) ACTRAPID insulin in 50ml normal saline'
- If the patient usually takes a long acting insulin it must be continued. Prescribe on patient drug chart.
- Always use 0.45%NaCl with 5% glucose and 0.3%KCl (20mmol) 500mls bag to run at 125ml/hr unless told otherwise (ie severe PET)
- Target blood glucose:4.0 – 7.0 mmol/L

	Dosing Algorithm		
Algorithm	1	2	3
	For most women	For women not controlled on algorithm 1 or needing >80 units/day of insulin	For women not controlled on algorithm 2 (After specialist advice)
<b>CBG levels (mmol/l)</b>	Infusion rate (units/hr = mls/hr)		
<b>Target CBG level</b>	4.0 – 7.0 mmol/l		
<4	Stop insulin for 20 minutes and treat as hypoglycaemia protocol as per section 3.0 and re-check CBG in 10 minutes		
4.0 – 5.5	0.2	0.5	1.0
5.6 – 7.0	0.5	1.0	2.0
7.1 – 8.5	1.0	1.5	3.0
8.6 – 11.0	1.5	2.0	4.0
11.1 – 14.0	2.0	2.5	5.0
14.1 – 17.0	2.5	3.0	6.0
17.1 – 20.0	3.0	4.0	7.0
>20.0	4.0	6.0	8.0

If the CBG falls below 4.0 mmol/l or drops too fast, then move to a lower algorithm

If the CBG exceeds target and is not dropping, then move to a higher algorithm

### 7.1.1 Algorithm guide

All women with diabetes should have CBG testing hourly whilst on VRIII for the management of steroid hyperglycaemia during pregnancy

Start VRIII and fluids with the first dose of steroids and continue for up to 24 hours after the last dose of steroids

Algorithm 1 – this will apply to the vast majority of women

Algorithm 2 – Use this algorithm for women who are likely to require more insulin (*eg on steroids or requiring >80 units of insulin per day during pregnancy or those who don't achieve targets using Algorithm 1*)

Algorithm 3 – For women who are not achieving target on Algorithm 2 (*Do not start anyone on Algorithm 3 without specialist diabetes or medical input*)

If the woman is not achieving targets on any of the above, contact either the endocrinology team in hours or the medical SpR out of hours.

## 7.2 VRIII Regime for Antenatal Steroid administration

In T1DM and T2DM women who require antenatal steroid injection for fetal lung maturity inpatient admission is needed and VRIII regime started.

Women can eat and drink during VRIII.

Check U&Es prior to starting VRIII to monitor fluid balance and electrolyte abnormality. Repeat 24 hourly.

Women will omit mealtime (short acting insulin) but continue their long acting insulin during the VRIII regime.

VRIII regime to be started as follows:

- Aim for CBG between 4.0 – 7.0 mmol/l.
- Check U&Es 24 hourly

## 7.3 VRIII regime for labour and delivery

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- The day prior to induction, and during cervical ripening, CBG testing, insulin and oral glucose lowering drugs should continue as usual.
- Once in established labour, check CBG hourly. Stop meal time insulin (and metformin if taken) but continue long acting basal insulin once VRIII is started (See below).
- If CBG is less than 4.0 mmol/L, then treat hypoglycaemia with appropriate food/drink or commence iv 5% Dextrose infusion if nil by mouth.
- Start VRIII in all women with type 1 diabetes using multiple daily injections at the time of established labour.
- CBG should also be done on the morning of elective caesarean section. If general anaesthesia is used, monitoring should be every half an hour until the baby is born and the mother is fully conscious.
- In women with type 2 diabetes or GDM, VRIII should be started if two consecutive blood glucose levels are above 7.0 mmol/L. The second CBG should be within half an hour of the first high reading to prevent any delay in starting VRIII. For VRIII, a syringe pump is set up with 50 units human soluble insulin Humulin® S or Actrapid® insulin in 50 ml of normal saline
- If elective caesarean section is planned in the morning, a VRIII can be set up at about 6 a.m., or earlier if blood glucose levels are unstable overnight. • Women using insulin Glargine (Lantus®, Toujeo®), Detemir (Levemir®), NPH insulin (Insulatard®), Insuman® Basal or Humulin® I as background insulin should continue their basal insulin during labour but discontinue the short-acting insulin when VRIII is started.
- For all women on hourly monitoring CBG should be maintained within target (4.0 – 7.0 mmol/L).
- Check U+Es 4–6 hourly during labour to maintain potassium and bicarbonate. Use blood ketones (if available) or urinary ketones if ketoacidosis is suspected (see the section of ketoacidosis).
- Following delivery of the placenta the insulin infusion rate should be reduced by 50% in women with type 1 and type 2 diabetes and stopped in women with GDM. In women with pre-existing diabetes, pre-pregnancy insulin regimen should be resumed once eating and drinking. The doses should be as pre-advised by diabetes team or 25% less than early pregnancy doses. CBG may need to be monitored before and 1 hour after meal for up to 24 hours in gestational diabetes to ensure euglycaemia and pick up new or pre-existing diabetes. Women with pre-existing diabetes should resume their usual pre-pregnancy monitoring regimen

## 8.0 Appendix

### Standard Operating Procedure- Continuous Glucose Monitoring (CGM)

#### T1DM patients

[Offer real-time continuous glucose monitoring \(rtCGM\) to all pregnant women with type 1 diabetes to help them meet their pregnancy blood glucose targets and improve neonatal outcomes. \[NICE 2020\]](#)

At first point of contact with antenatal diabetes team – patient will be offered CGM sensor in the form of Freestyle Libre 2. Alternative CGM sensors may be offered if Freestyle Libre declined or blood capillary glucose monitoring kit provided.

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## Education

For pregnant women who are using continuous glucose monitoring (CGM), a member of the joint diabetes and antenatal care team with expertise in these systems should provide education and support (including advising women about sources of out-of-hours support) [NICE 2020]

Patient will be consented prior to application of sensor. Freestyle 2 libre sensor to be fitted in upper R or L arm. Patient to be educated in self-application of sensor.

Customer care number for Abbott provided to patient for faulty sensors – 0800 170 1177

NB patients will be advised to test capillary sample if sensor is faulty or to confirm a hypoglycaemic event.

Abbott literature “Get Started” to be given to patient with first sensor, in addition to the QR code with Freestyle Libre webinar for new service users.

Patient advised to download Librelink application and consent to share to Libreview St Peter’s Maternity platform for virtual clinical analysis.

**All multidisciplinary diabetes team members will complete annual CGM training via Glooko Academy, certificates stored on Academy platform.**

## Patient initiated escalation

Libreview platform will be reviewed by multidisciplinary staff, however patients will be advised to self-escalate concerns with their blood glucose monitoring when clinically indicated, in the presence of out of target blood glucose levels. Patients will have received Sick Day Rules literature.

Diabetes Specialist Midwives available Mon-Fri 9am-5pm via phone or email

**01932 723687/07790959949**

[asp-tr.diabetesmidwives@nhs.net](mailto:asp-tr.diabetesmidwives@nhs.net)

Upon patient escalation, diabetes midwife to review maternity libreview platform including daily log and time in range data. If required diabetes midwife will further escalate to Diabetes specialist Nurse, Endocrine Cons, Obstetric doctor or CoW depending on severity of escalation required.

NB patients will be advised to check blood ketones and will have been provided with a ketone monitor at first contact.

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Patient will also be provided with Call a Midwife line for out of hours advice **0300 123 5473** or in the absence of the diabetes midwives. In the event that Call a Midwife line is closed, patients will have been informed to contact maternity triage or 999 in an emergency.

Patient may need to present to Labour Ward, Maternity Triage or Accident and Emergency Department if clinically indicated.

**How to interpret blood ketone levels**

<b>&lt; 0.6</b>	<b>Under 0.6 mmol/L</b> – normal; consider rechecking blood ketone levels in 1-2 hours if blood glucose remains elevated, above 13.9 mmol/L.
<b>0.6-1.5</b>	<b>0.6-1.5 mmol/L</b> – indicates a need for extra insulin. It is important the patient calls or follows the rules provided by their diabetes health care team and checks their blood glucose and blood ketone levels again in 1-2 hours.
<b>&gt;1.5</b>	<b>Over 1.5 mmol/L</b> – indicates risk of diabetic ketoacidosis. Patients should call their health care team <b>IMMEDIATELY</b> .

## 9.0 References

1. NICE Guidance (NG 3): - Diabetes in pregnancy: management from preconception to the postnatal period 2015
2. Management of glycaemic control in pregnant women with diabetes on obstetric wards and delivery units May 2017 – JBDS 12
3. NHS England Saving babies' lives: version 3, Element 6: Management of pre-existing diabetes in pregnancy

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