Frimley Health
NHS Foundation Trust

Diabetes in Pregnancy

Key Points

- Pre-conceptual counselling for women with pre-existing diabetes is key in reducing pregnancy complications.
- All maternity staff should be aware of indications for GDM screening and how to action results in a timely manner for pregnant women.
- Multi-disciplinary antenatal, intrapartum and postnatal care for women with pre-existing and gestational diabetes results in better outcomes for women and babies.
- Timing and mode of birth should be a joint decision made between obstetrician and the pregnant woman.
- Any woman with Type 1 DM who is unwell must have ketosis excluded.
- Women with GDM should be made aware of the life-long risk of developing Type 2 DM and the need for postnatal and annual GP follow up.

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Abbreviations

AC	Abdominal circumference
ACE-i	Angiotensin converting enzyme inhibitors
ACR	Albumin-creatinine ratio
ARB	Angiotensin Receptor Blocker
BP	Blood pressure
cBGM	Capillary blood glucose monitoring
Cr	Creatinine
CTG	Cardiotocograph
DANC	Diabetic antenatal clinic
DKA	Diabetic ketoacidosis
DM	Diabetes Mellitus
DSM	Diabetes specialist midwife
DSN	Diabetes specialist nurse
EFW	Estimated fetal weight
eGFR	estimated glomerular filtration rate
GDDM	Gestational diet-controlled diabetes mellitus
GDM	Gestational diabetes mellitus
GIDDM	Gestational insulin-dependent diabetes mellitus
GTT	Glucose tolerance test
IOL	Induction of Labour
LSCS	Lower segment caesarean section
LV	Liquor Volume
OVD	Operative vaginal delivery
PCR	Protein creatinine ratio
s/c	subcutaneous
VBG	Venous blood gas
VRIII	Variable rate intravenous insulin infusion

Contents

1. Introduction

Diabetes is a state of abnormal carbohydrate metabolism resulting in raised blood glucose due to a defect in insulin secretion or activity. It is estimated that approximately 5% of women giving birth in the UK have diabetes in pregnancy, which can be divided into 3 categories.

- Type 1 Diabetes Mellitus (T1DM): Due to autoimmune destruction of the Beta cells in the pancreas. Patients are dependent on insulin for life.

- Type 2 Diabetes Mellitus (T2DM): A consequence of either or both inadequate insulin secretion from failing Beta cells and insulin resistance. It may be treated by diet, oral hypoglycaemic agents, or insulin, although in pregnancy, metformin +/- insulin are the accepted treatments of choice.

- Gestational Diabetes (GDM): Carbohydrate intolerance of variable severity occurring in pregnancy, which usually reverts to normal in the postpartum period. Usually develops in the latter stages of pregnancy and is diagnosed by oral glucose tolerance test. Insulin therapy may be required. It is a risk factor for the future development of Type 2 diabetes.

Miscarriage, pre-eclampsia, pre-term labour and operative deliveries are all more common in women with pre-existing diabetes. Their babies are at increased risk of congenital malformations, macrosomia, birth injury, neonatal hypoglycaemia and perinatal mortality compared to babies of non-diabetic mothers.

There is a large body of evidence (Safer Maternity Care, Saving babies' Lives Care Bundle v2, NICE, 2020, Ockenden Report 2022) which shows that good pre-conception care, antenatal and intrapartum care delivered by a dedicated medical/obstetric and midwifery team can reduce the incidence of all the complications listed above.

2. Diabetic Antenatal Clinic (DANC)

There are multidisciplinary diabetes antenatal clinics as follows:

Monday afternoon (FPH site – consultant-led)
Wednesday morning (FPH site – consultant-led)
Friday morning (WPH site – consultant-led) and
Mon – Fri (WPH and FPH site - midwife-led).

Care is provided by:

- Consultant obstetrician
- Consultant endocrinologist
- Diabetes specialist midwife (DSM)
- Diabetes specialist nurses (DSN)
- Midwives
- Dietician
- Ultrasound sonographer

3. Pre-Pregnancy Care

Avoiding an unplanned pregnancy is important to improve outcomes and reduce the risk of complications in pregnancy. All women with pre-existing Type 1 or Type 2 diabetes should be offered pre-pregnancy care with a dedicated team member or asked about contraception if they are not planning to conceive.

Females wishing to receive pre-pregnancy care should be referred to;

Frimley Park Hospital:

- Dr Rasha Mukhtar, Consultant Endocrinologist
- Dr Aye Naing, Consultant Endocrinologist

Wexham Park Hospital:

- Dr S. Akavarapu, Consultant Endocrinologist, Diabetes Centre at King Edward VII Hospital, Windsor

Appointments for pre-pregnancy counselling will be prioritised. The aim of the visit is to:

- Discuss the potential risks of Type 1 and 2 diabetes in pregnancy: miscarriage, stillbirth, congenital malformation, foetal macrosomia, birth trauma (to mother and baby), increased early intervention, perinatal mortality, worsening retinopathy or nephropathy, obstetric complications, and the risk of inheritance of diabetes.
- Explain the importance of tight glycaemic control before and during pregnancy and that it will reduce but not eliminate the risk of miscarriage, stillbirth, neonatal death, and congenital malformations.
- Aim to achieve HbA1c <48mmol/mol or what is realistically safe prior to stopping contraception.
- To review current medications and make the appropriate drug changes to reduce the risk of harm in pregnancy.
- Advise women with HbA1c above 86mmol/mol (10%) to avoid pregnancy due to associated risks.
- Set individualized glucose targets (5-7mmol/L fasting, 4-7mmol/L pre-meals) and intensifying insulin regimen.
- Provide diabetes related education, including carbohydrate counting (if appropriate), and awareness of hypo- and hyperglycaemia.

Females with diabetes wishing to become pregnant should have the following reviewed and altered by their GP as soon as an interest in becoming pregnant is confirmed.

- Be provided with a glucose meter for self-monitoring and advised to monitor at least 4-6 times per day to include fasting levels and a mixture of pre-meal and post-meal levels.
- Test HbA1c to if not checked within 3 months and monitor regularly (N.B. If HbA1c >86mmol/mol (10%), then pregnant women should be strongly advised to avoid pregnancy and continue contraception until improved.
- Review all medication:
    - to stop any potentially teratogenic agents, etc. Statins, Angiotensin Converting Enzyme (ACE)-inhibitors, Angiotensin Receptor Blocker (ARBs).

Substitute with labetalol, nifedipine MR (modified release) or methyldopa to achieve BP <140/80mmHg.
    - to substitute all oral diabetes medications with Metformin and/or insulin
- Prescribe 5mg Folic acid once daily from stopping contraception until at least 12 weeks of gestation to reduce the risk of neural tube defects.
- Provide women with Type 1 Diabetes with ketone strips and advise to use when hyperglycaemic or unwell.
- Refer for microvascular screening if not up to date
    - Retinal screening if not done within 6 months.
    - Neuropathy assessment
    - Refer to nephrologist if Cr >120mcmol/L, eGFR less than 45ml/min or ACR >30mg/mmol.
- Encourage smoking and alcohol cessation.
- Encourage weight optimisation for women with BMI >27kg/$m^{2.}$
- Refer women to the DANC as soon as pregnancy is confirmed.

4. Screening for Gestational Diabetes

Women with previous gestational diabetes are likely to have GDM in subsequent pregnancies. GDM will present earlier in the pregnancy, with the likelihood of medication being higher. They should be offered a GTT at booking, repeated at 24-28 weeks, if negative. Women taking anti-psychotic medication have an increased risk of developing gestational diabetes in pregnancy and should be offered screening by HbA1c blood serum at booking or a GTT at booking, repeated at 24-28 weeks if negative.

Women who present at booking with an HbA1c of ≥48 mmol/mol are considered to meet the diagnostic criteria for Type 2 Diabetes Mellitus (T2DM) and should be referred to the Diabetes Specialist Midwives (DSMs) for further assessment and management.

Women with a known HbA1c between 42–47 mmol/mol at booking are classified as having prediabetes. A GTT should be arranged as soon as possible. If the initial GTT is normal, a repeat GTT should be performed between 24–28 weeks' gestation to reassess glucose tolerance.

Women with the following risk factors should be offered screening for gestational diabetes at 24 -28 weeks or earlier, if clinically advised.

- BMI >30 kg/m2 • Previous baby >4.5kg
- First and second-degree relatives with diabetes
- An ethnicity with a high prevalence of diabetes, e.g., ethnic minorities including black, Asian, and Middle Eastern ethnic groups.
- Previous unexplained perinatal death
- Polycystic ovarian syndrome (PCOS)

If the following risk factors are picked up in a pregnant female, then screening with GTT should be offered:

- Glycosuria 2+ or more on dipstick testing on one occasion or 1+ on two occasions (a week apart).

If Large for Gestational Age (LGA) or Polyhydramnios is identified, please refer to the relevant guideline for appropriate GDM screening.

If an initial GTT is normal, the test should be repeated if the woman develops a further risk factor for GDM. The interval between GTTs should preferably be at least 4 weeks; however, it can be repeated after 2 weeks following a discussion with a member of the Diabetes Antenatal Team.

For Women 24-28 weeks, the recommended test to diagnose GDM is a 2-hour (120 min) 75g oral GTT. Where a GTT cannot be performed, 7-day monitoring can be used. Examples of this would be:

- Woman's intolerance to the 75g oral solution,
- If GTT is declined, but the woman wishes to be screened

- women who have had Bariatric (restrictive/malabsorptive) surgery, as they are likely to have dumping syndrome with false low readings.

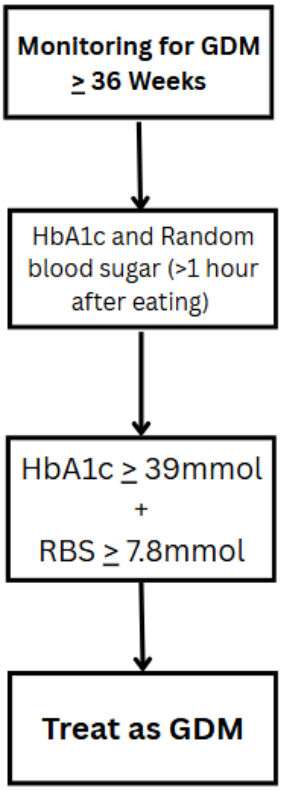
Women should be counselled that a diagnosis of GDM may lead to increased intervention in pregnancy and labour. If they decline screening, then they need to be aware of the risk for increased adverse pregnancy outcomes if undiagnosed.

A GTT after 36/40 has a high false-positive rate; therefore, women with risk factors identified after 35+6 weeks should be offered the following blood test, and the DSM should be informed of the blood test results for them to follow up on.

- HbA1c and a Random blood test (> 1 hour after eating)

If readings are within target, then no further monitoring is required, and the woman can return to her standard antenatal care.

If blood tests are above target (HbA1c ≥ 39mmol/L, Random blood test ≥ 7.8mmol/L), a review will be arranged by the DSM.



The results of the GTT should be acted on as follows:

Fasting glucose <5.6 mmol/L and 120 min <7.8 mmol/L	No diabetes	Continue normal antenatal care
Fasting glucose ≥5.6 mmol/L and/or 120 min ≥7.8mmol/L	GDM diagnosed	Start cBGM. Give information leaflet on GDM. Refer to Diabetes midwives at FPH at fhft.diabetesmidwivesfph@nhs.net or Diabetes Midwives at WPH at fhft.diabetesantenatalclinicwph@nhs.net
Fasting glucose >7mmol/L or/and 120 min >11.0 mmol/L:	High probability of type 2 diabetes	Initiate management as above and refer urgently as above.

Low Glucose Levels after the OGTT

It is not uncommon to get low glucose levels 1-2 hours after an OGTT, a reaction known as reactive hypoglycaemia. Reactive hypoglycaemia is caused by the over-production of insulin by the pancreas following a meal that is high in refined carbohydrates. The cause of reactive hypoglycaemia is unclear, but similar responses are seen in women who have undergone weight loss surgery (gastric Bypass or partial gastrectomy), a sign of early type 2 Diabetes, or in those suffering from hyperemesis.

In such circumstances when 120 mins glucose is ≤2.5mmol/L the following blood tests should be taken Hba1c, liver function, thyroid function and 9 am cortisol, to rule out Addison's, hypothyroidism, liver problems, and one-week capillary blood sugar monitoring offered to rule out the possibility of GDM, review with results in DANC.

5. Antenatal Care

Women with GDM should expect the following:

- an invitation to attend the joint Diabetic ANC
- contact with the Diabetes care team to assess glycaemic control, this may be via telephone or the GDm-Health app in order to reduce the frequency/inconvenience of hospital visits.
- be educated and provided with information on diabetes in pregnancy, its impact on mother and baby, risk factors and a management plan for pregnancy and post-natal review.
- to give birth in an Obstetric-led unit as GDM is considered a high-risk pregnancy requiring continuous electronic fetal heart rate monitoring and consultant-led care.
- Pregnant women with pre-existing or gestational diabetes have a structured schedule of antenatal care (see Appendices 1 and 2).
- Contraception should be discussed antenatally.

5.1 Blood glucose control

Women will be taught how to use a blood glucose monitor, provided with glucose targets, and advised to record them in their booklet or the GDM Health app via a smartphone. The DSM will facilitate training and follow up on any concerns by telephone. If using the health app, then all uploaded glucose readings will be reviewed by the DSM on a weekly basis, who will be in touch if readings are out of range.

Women with gestational diabetes are advised to test blood glucose pre-breakfast and 1-2 hrs post each meal. The frequency of testing may be adjusted at later appointments depending on glucose levels.

Blood glucose targets are:

- <5.3mmol/L pre meal
- <7.8mmol/L 1hr post meal
- <6.5mmol/L 2 hrs post meal

Women should be asked to contact the DSM or diabetes team if they have 3 or more consecutive readings above target within one week. If blood glucose readings are high despite diet and lifestyle advice, then hypoglycaemic medication will be introduced in the form of metformin or insulin, depending on the pattern of readings. This may need up-titrating as the pregnancy proceeds and should be discontinued as soon as the baby is delivered.

Women with pre-existing diabetes are advised to test at fasting, pre-meals, 1- 2 hours post-meals and pre-bedtime. Blood glucose targets are the same as for GDM. More frequent testing is required to ensure levels are within target and to avoid hypoglycaemia.

To assist with testing, tracking glucose readings and maintaining levels within target, women with Type 1 DM can be offered the use of continuous glucose monitoring (flash glucose monitoring or real-time continuous glucose monitoring). Women with Type 2 DM who are on multiple insulin injections, at risk of hypoglycaemia or have learning disabilities can also be provided with flash glucose monitoring.

The CONCEPTT trial (Feig et al., 2017), which investigated the use of continuous glucose monitoring (CGMS) in pregnant women, demonstrated a reduction in adverse maternal and fetal outcomes. This has resulted in NHS England (NHS Long-term Plan, 2019) recommending that all pregnant women with Type 1 DM should be offered the use of CGMS for the duration of the pregnancy (funding available for 1 year) if deemed appropriate. The assessment pathway can be found at Appendix 15.

These women must be under the care of the multidisciplinary diabetes team to receive education and support to optimise their use of the CGM devices, in addition to assessing ongoing suitability.

In addition to glucose monitoring all pregnant females with pre-existing diabetes should be provided with ketone test strips and advised to test for ketones if hyperglycaemic (CBG ≥12) or unwell.

- They should attend the maternity assessment unit for review if they have ++ ketonuria or more (on urine testing), ≥ 1.5mmol/L (on blood ketone testing) or are feeling unwell.
- They should give a corrective dose of insulin if glucose readings are >12mmol/L and recheck their ketone status 1 hour later. If ketones are rising, then they should attend for assessment (See Appendix 7 for interpretation of blood ketone results).

Women with pre-existing diabetes are at increased risk of hypoglycaemia and impaired hypoglycaemia awareness, particularly in the first trimester. They should be taught to recognise and manage hypoglycaemia and be prescribed glucogel and glucagon for treatment.

HbA1c should be checked at (Booking) first visit to DANC for women with pre-existing diabetes and a subsequent HbA1c in each trimester and on diagnosis for women with GDM. HbA1c above 48mmol/mol should be offered increased surveillance including additional diabetes nurse/ dietetic support, more frequent review and input from their named, specialist consultant to plan ongoing care and timing of birth decisions.

5.2 Hypertension

- Women with pre-existing diabetes are at risk of pregnancy-induced hypertension and pre-eclampsia and should be advised to take aspirin 150mg daily from 12 weeks until birth to reduce this risk.
- Aim for a blood pressure of <140/80 mmHg in women with pre-existing diabetes. If complications are present, an individualised target may be set.
- Women with pre-existing hypertension should be offered home blood pressure monitoring from 12 weeks' gestation.
- Normotensive women with pre-existing diabetes should be offered blood pressure monitoring from 28 weeks, or as clinically indicated.

5.3 Retinal Screening

Women with GDM do not routinely require eye screening.

Women with pre-existing diabetes should be referred for retinal screening within the first trimester (or as soon as they book with DANC) and third trimester. A further appointment may be booked at 16-20 weeks if retinopathy is present.

Frimley Park Hospital referrals are made to:

- Berkshire Diabetic Eye Screening Program at St Marks Hospital, Berkshire Healthcare Foundation Trust if from Berkshire.
- Online referral to Wokingham.dess@nhs.net if from West Berkshire
- Hampshire & Surrey women should book directly with their Ophthalmologist.

Wexham Park Hospital referrals are made to:

- Berkshire Diabetic Eye Screening Programme: form sent securely via email to failsafe.berkdes@nhs.net
- NWL Diabetic Eye Screening Program; form sent securely via email to HIL.failsafeNWLDESP@nhs.net
- Buckinghamshire Diabetic Eye Screening Programme: form sent securely via email to mkg-tr.bucks-desp@nhs.net

5.4 Renal Assessment

- Check Cr and ACR at booking. If positive, repeat ACR with an early morning urine sample and arrange for a PCR check if new or increasing levels of proteinuria are seen on urinalysis.
- Refer to nephrologist if ACR > 30mg/mmol, Cr >120µmol/L or 24-hour protein is > 0.5g/24hrs.

In those with PCR/ACR >300 or proteinuria >5g in 24 hours (ACR >220mg/mmol), consider thromboprophylaxis with Fragmin.

5.5 Antenatal Corticosteroids for Fetal Lung Maturity

Antenatal corticosteroids should be administered in line with local guidance. If required, they should ideally be given 48hrs prior to delivery and no longer than 7 days before planned birth.

Antenatal steroids are well recognised to raise blood sugar levels so all women with diabetes should be admitted from the first dose of steroids until at least 12 hours after the second dose of steroids unless alternative plans have been discussed and documented by the diabetes antenatal team.

To reduce the use of VRIIIs please follow the guidance below and only initiate if glucose levels are uncontrollable. Capillary blood sugars should be checked 2 hourly following the first dose of betamethasone. If blood glucose exceeds 8.5mmol/ then check hourly and introduce insulin as per pathways (Appendix 10)

- Women who are diet-controlled or on metformin only should have their capillary glucose levels monitored. No intervention is required unless their blood glucose levels rise to >8.5mmol/L and remain elevated on two consecutive readings.
- Women on insulin should increase their insulin doses by 20 – 40% or as advised by the diabetes team.
- If glucose readings remain persistently >8.5mmol/L despite correction doses of insulin start a variable rate intravenous insulin (VRIII). Any short-acting (mealtime) insulin (Humalog, Novorapid, Apidra) should be withheld while the VRIII is running but continue long-acting insulin (Humulin I, Glargine, Detemir). No additional fluids need to be prescribed with the VRIII unless nil by mouth.
- Capillary blood glucose must be checked on an hourly basis while on a VRIII.
- The VRIII should continue for at least 12hrs after the last dose of steroids and stopped when blood sugars <7.8 mmol/L on two consecutive occasions.
- If capillary blood glucose levels exceed 12mmol/L, check the urine or blood for ketones. If urinary ketones are ≥2+ or blood ketone levels are >1.5 mmol/L, organise a venous blood gas (VBG) and seek urgent medical attention to rule out Diabetic Ketoacidosis

Diagram 1 - Pathway for Antenatal Steroids

5.6 Timing of birth

- Women with type 1 or type 2 diabetes and no other complications should be delivered between 37-38^{+6} weeks. An earlier birth may be necessary if obstetric or diabetes complications are present. This will be decided depending on circumstances and after a joint discussion between the consultant and the woman. All women with pre-existing diabetes should be counselled regarding the risks of vaginal birth i.e. increased risk of perineal trauma and shoulder dystocia particularly if an induction of labour is being recommended. Alternative modes of birth should be discussed.
- Women with diet-controlled gestational diabetes should be advised to deliver no later than 40^{+6} (induction of labour to be booked at 40^{+4} to allow delivery by 40^{+6}).
- Women with well-controlled diabetes who are taking Metformin only and have a baby with EFW and AC <90th centile growth may be delivered up to 40+6 (induction of labour to be booked at 40+4 to allow delivery by 40+6) if they are considered stable by their medical team.
- If EFW and/or AC >90th centile and taking Metformin, then delivery should be considered </= 39 weeks' gestation.
- Women with insulin-controlled diabetes should be advised to deliver no later than 39+0 weeks. An earlier birth may be necessary if obstetric or diabetes complications are present.

Whilst birthing in the hospital labour ward is recommended, women should have the opportunity to discuss their place of birth with a consultant obstetrician, if desired. Birthing on the midwifery unit with gestational or pre-existing diabetes is not permitted at either WPH or FPH.

If IOL is declined

- The woman should have a detailed discussion with a consultant obstetrician regarding the risks of declining or postponing an IOL.
- Women who decline IOL should be offered increased antenatal monitoring consisting of at least twice-weekly CTGs and an ultrasound scan to estimate EFW and LV. The Gap and Grow chart should be utilised.
- The obstetrician should explain to the woman that there is an increased risk of adverse neonatal outcome (increased risk of emergency LSCS, OVD, neonatal admission to NNU, poorer neonatal long-term outcome and stillbirth) occurring in a pregnancy affected by diabetes and if an IOL is declined, this increases the risk of a stillbirth as the gestation of the pregnancy continues. This discussion should be documented. The woman should be made aware that there is no reliable test to predict a stillbirth, and normal CTG monitoring is only reassuring for the time that it occurs.

See Appendix 1 and 2 for the schedule of care for women with diabetes in pregnancy.

6 Intrapartum care

6.1 Induction of labour

- Most women with pre-existing and gestational diabetes will be induced on the antenatal ward where they can be monitored and managed for any possible complications.
- During IOL, women can eat and drink normally, even if on subcutaneous insulin, until labour is established.
- All are encouraged to continue self-monitoring their own blood sugars as per protocol.

6.2 Diabetes care in labour

- Once labour is established, cBGM should be performed hourly and maintained between 4-7.8mmol/L to reduce the risk of neonatal hypoglycaemia. Alternating between cBGM and CGM may be performed if glucose levels are stable.
- A VRIII should be initiated on all whose capillary plasma glucose is not maintained between 4 and 7.8mmol/L on two consecutive readings. Intravenous 5% dextrose 125ml/hr containing 40mmol/L potassium or 10% dextrose 62.5ml/hr containing 20mmol potassium should be prescribed alongside the insulin infusion if nil by mouth and continued for the duration of labour and birth.
- All women should have a diabetes treatment plan for labour documented by the diabetes team in the antenatal notes at 36/40.
    - Women with pre-existing diabetes and those with gestational diabetes on multiple injections may require a VRIII during labour if levels are not maintained in target.
    - Women on metformin or overnight long-acting insulin only (Humulin I, Insulatard) are unlikely to require a VRIII.
- Blood sugars are monitored hourly on the VRII, and if >7.8 mmol/L for 2 hours consecutively, the scale should be adjusted to achieve target blood sugars.
- Women can snack during labour on low glycaemic index (GI) snacks as advised by the diabetes team, whether or not they are on a VRIII. They should not be given isotonic drinks.
- Stop the VRIII after delivery of the placenta **if the woman has gestational diabetes**.
- **If the woman has pre-existing diabetes and normally takes insulin,** continue the VRIII but halve the rate of insulin infusion after delivery of the placenta. When ready to eat and drink, give the woman's rapid-acting s/c insulin for that meal according to the regimen prescribed by the diabetes team. This will usually be at pre-pregnancy doses or 80% of the pre-pregnancy dose if the woman is intending to breastfeed.
- **Please <u>DO NOT STOP</u> the basal (long-acting) insulin (Glargine, Levemir, Tresiba) and ensure that the woman has not missed any doses**. The dose will need to be adjusted to her pre-pregnancy dose once the placenta is delivered or as advised by the diabetes team in notes.
- **If the woman has pre-existing type 2 diabetes and is not treated with insulin**, then check the maternal notes for a postnatal diabetes management plan.
- If on an insulin pump, see Appendix 12

6.3 If delivering by caesarean section.

- The usual dose of insulin should be given the evening prior to elective caesarean section.
- Aim for morning delivery wherever possible.
- The diabetes team should clearly document if the female requires a VRIII or not. VRIII will be required for women with Type 1 and Type 2 DM and those with GDM on multiple insulin injections. If on an overnight insulin **only** then a VRIII is unlikely to be required unless blood glucose reading is >7.8mmol/L on 2 consecutive readings.
    a. For a morning LSCS, women should be admitted at 0600 hours if a VRIII is required and should be first on the LSCS list.
    b. The VRIII should be continued in theatre until after the delivery of the placenta if GDM. If pre – existing diabetes, the rate should be halved, and an infusion continued until tolerating diet and fluids and she has received a bolus of the subcutaneous insulin regime. **Please <u>GIVE</u> the basal (long acting) insulin (Glargine, Levemir) despite being on a VRIII.**
    c. If caesarean section is in the afternoon, give half the usual dose of insulin with a light breakfast in the morning. Intravenous 5% dextrose 125ml/hr containing 40mmol/L potassium or 10% dextrose 62.5ml/hr containing 20mmol potassium and intravenous insulin VRIII can be commenced 2 hours prior to surgery.

- Check blood sugar levels half hourly if general anaesthesia is given (from induction of general anaesthesia until after the baby is born and the woman is fully conscious)

7. Postnatal Care of the women

7.1 Gestational Diabetes

- All hypoglycaemic therapy should be stopped immediately after the birth.
- Test blood glucose to exclude persisting hyperglycaemia (i.e., pre-meal and 2 hrs post-meal for the first 24 hours after delivery).
- If a fasting blood glucose level is ≥ 7 mmol or a random blood glucose level is >11 mmol/L, confirm with a venous blood sample sent to the laboratory for blood glucose level.
- Liaise with the diabetes specialist team about the need for further monitoring and medication.
- Remind women with GDM of the importance of a healthy diet and lifestyle and of the symptoms of hyperglycaemia.
- Women with GDM should be followed up by their GP with fasting blood glucose 6-13 weeks post-delivery and/or HbA1c at 13 weeks (a reminder will be sent to the GP from the DANC on when to do this and how to interpret the results). See Appendix 6.
- Women with GDM should have yearly HbA1c testing with their GP.
- Women with suspected Type 2 DM will have a GTT organised and reviewed by the hospital at 6 weeks post-natal. They will be identified by the Diabetes team at 36 weeks so arrangements can be made.

7.2 Pre-existing Diabetes

- A plan for diabetes medication changes should be clearly documented by the diabetes team within the antenatal notes at 36-38 weeks.
    - If on insulin prior to pregnancy, this should be changed to pre-pregnancy doses with a further 20% reduction if planning on breast-feeding.
    - If on oral hypoglycaemic medication prior to pregnancy, these may be restarted by the diabetes team, depending on the woman's intentions to breastfeed or not.
- Metformin is safe in breastfeeding, so women may continue postnatally.
- Continue blood sugar monitoring, but targets altered to pre-pregnancy levels. Aim for
    - pre-meal 5-8 mmol/l
    - post-meal 6-10 mmol/l
    - Avoid BM <4 mmol/l to reduce the risk of hypoglycaemia.
- All women with pre-existing diabetes should be referred to the DSN/DMW via the Patient Centre. Discharge does not need to be delayed until they are seen, but they will then be followed up by telephone.
- Women with pre-existing Type 1 or Type 2 DM should have an appointment arranged at the Diabetes Centre at King Edward VII Hospital, Windsor, or the Diabetes team at FPH at 12 weeks post-partum. This appointment should be arranged by the Diabetes/Antenatal team at the 36-week appointment.
- Inform women on insulin of the increased risk of hypoglycaemia in the postnatal period, especially when breastfeeding, and advise them to have a meal or snack available before or during feeds.

- Discuss contraception and the importance of planning any future pregnancy, and make sure that they have been given the preconception advice leaflet on discharge.

8. Postnatal care of the baby

- Babies of women with DM should stay with their mothers unless there is a clinical complication. The most common complication is hypoglycaemia, but hypocalcaemia, polycythaemia, cardiomyopathy and RDS are also seen, particularly if diabetes control in pregnancy has been suboptimal. Hypothermia predisposes to hypoglycaemia and should be avoided.
- Women should be told about the positive benefits of breastfeeding, particularly in terms of reducing the chance of the child developing diabetes and/or obesity in later life and reducing the risk of a woman with GDM developing Type 2 diabetes in later life.
- Colostrum harvested from 36 weeks of pregnancy may be utilised at this time.

9. Auditable Standards

NICE have set out quality standards for Diabetes in Pregnancy that should be audited regularly:

- Women with diabetes planning a pregnancy are prescribed 5 mg/day of folic acid from at least 3 months before conception.
- Women with pre-existing diabetes are seen by members of the joint diabetes and antenatal care team within 1 week of their pregnancy being confirmed.
- Pregnant women with pre-existing diabetes have their HbA1c levels measured at their booking appointment.
- Pregnant women with pre-existing diabetes are referred at their booking appointment for retinal assessment.
- Women diagnosed with gestational diabetes are seen by members of the joint diabetes and antenatal care team within 1 week of diagnosis.
- Pregnant women with diabetes are supported to self-monitor their blood glucose levels.
- Women who have had gestational diabetes have an annual HbA1c test.

10. Monitoring compliance

Data will be collected regularly for the annual National Diabetes in Pregnancy Audit. The same data, in addition to further information to help measure local outcomes, will be collated on an annual basis and reviewed to measure the performance and outcomes of the joint antenatal clinic and identify any areas in need of improvement.

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List of Appendices

Appendix 1: Schedule of care for women with pre-existing diabetes in pregnancy

Schedule of care for women with pre-existing diabetes in pregnancy	
Gestation in weeks	Special tests required
7	Early pregnancy scan Folic acid 5mg/day Arrange a midwifery booking Family origins questionnaire Discuss sick day rules and hypo unawareness Bloods: HbA1c, booking bloods, U&Es, TFTs, ACR Refer to the diabetes eye screening team if the last screen > 3 months ago, retinopathy or HbA1c>86 Refer to the renal team if creat>120 or ACR>30mg/mmol Refer to an anaesthetist if BMI>50 or BMI>40 with significant respiratory or cardiovascular comorbidity. Or autonomic neuropathy Dietician Review Consultant Obstetric / Diabetes Clinic within 2 weeks of the maternity booking appointment
12	Dating ultrasound scan and Combined screening for T13/18/21 Check the booking blood results Start aspirin 150mg/day from 12 weeks (or earlier if confirmed by your consultant obstetrician) Consultant Obstetric / Diabetes Clinic FPH only: Evalina Referral for fetal cardiac ultrasound scan
16	Repeat diabetes eye screening retinal assessment at 16- 20 weeks if diabetic retinopathy is present at booking or HbA1c >86 at first antenatal visit Bloods: HbA1c and FDNA if you are Rhesus Negative Consultant Obstetric / Diabetes Clinic Appointment with Diabetes Midwife Whooping Cough vaccination
20	Anomaly ultrasound scan Bloods: HbA1c (if not previously performed at 16-week appointment) Consultant Obstetric / Diabetes Clinic
24	Consultant Obstetric / Diabetes Clinic Appointment with Diabetes Midwife
28	Growth Ultrasound Scan & consultant appointment Diabetes eye screening - Retinal review for all women Bloods: HbA1c, Hb, blood group Anti-D injection, if required, if your blood group is Rhesus negative and the baby is Rhesus positive Respiratory syncytial virus (RSV) vaccination
32	Growth Ultrasound Scan & consultant appointment
34	Appointment with Diabetes Midwife
36/37	Growth Ultrasound Scan & consultant appointment Plan delivery Discuss colostrum harvesting Discuss diabetes management in labour Prescribe VRIII Discuss postpartum diet & lifestyle Discuss contraception & next pregnancy Discuss postnatal targets Discuss snacking before breastfeeding to avoid hypos Refer for diabetes follow-up If declines, IOL or LSCS will require an individual plan by a Consultant Obstetrician. Refer to IOL guideline. Risks of stillbirth discussed

Appendix 2: Schedule of care for women with gestational diabetes

Schedule of care for women with gestational diabetes Please Note: when coming to consultant appointments, please allow 2.5 hours for a full appointment, as you may have an Ultrasound scan/Obstetric Consult & Diabetes Consult all in 1 appointment.	
Gestation in weeks	Special tests required
	Bloods: HbA1c (at diagnosis)
12	Consultant appointment
16	Diabetes Midwife appointment FDNA if you are Rhesus Negative Whooping Cough vaccination
20	Anomaly Scan & consultant appointment Check injection sites (if using insulin)
24	Diabetes Midwife appointment (via telephone if not your first baby)
28	Bloods: Hb, blood group Anti-D injection, if required, if your blood group is Rhesus negative and the baby is Rhesus positive Growth Ultrasound Scan & consultant appointment Respiratory syncytial virus (RSV) vaccination
32	Growth Ultrasound Scan & consultant appointment Check Injection sites (if using insulin)
34	Community midwife appointment Discuss colostrum harvesting Diabetes Midwife appointment via telephone Antenatal class online about labour & birth
36	Growth Ultrasound Scan & consultant appointment Date of Induction of Labour (no later than 40+4)/ LSCS depending on medication, blood sugar control and ultrasound scan findings Discuss diabetes management in labour Prescribe Sliding Scale if needed Discuss colostrum harvesting Offer postnatal advice
38/39	Diabetes Midwife appointment & Growth Ultrasound Scan if delivery planned for 40+4 weeks Delivery usually 38-39 weeks if using insulin medication Delivery usually 39 -40 weeks if using diet and exercise or metformin medication with poor sugar control and abnormal ultrasound scan findings (growth >90th Centile) Delivery usually 40+ weeks if using diet and exercise or metformin medication with good blood sugar control and normal ultrasound scan findings (growth<90th Centile) Note delivery timing above may differ depending on estimated fetal growth and if your pregnancy is complicated by additional risks.
40	If declines induction of labour or LSCS for an individual plan by the consultant obstetrician

Appendix 3: Informed consent for use of metformin

Use of metformin

Although metformin is commonly used in UK clinical practice in the management of diabetes in pregnancy and lactation, and there is strong evidence for its effectiveness and safety (NICE, 2020), metformin does not have a UK marketing authorisation for this indication.
The summary of product characteristics advises that when a patient plans to become pregnant and during pregnancy, diabetes should not be treated with metformin, but insulin should be used to maintain blood glucose levels.

The prescriber should follow relevant professional guidance.

Informed consent should be obtained and documented.

Advice is therefore to inform women

1. **No UK marketing licence for this indication**
2. **Studies to date suggest that it is safe and effective. No adverse outcomes reported.**
3. **The latest NICE guidelines (2020) support its use.**

Advantages of metformin over insulin

- Less maternal weight gain
- No maternal hypoglycaemia
- Good compliance and acceptability

When compared with insulin **(Ainuddin et al., 2015)**

- Less maternal hypertensive complications
- Less risk of neonatal hypoglycaemia
- Metformin treatment with insulin (T2 Diabetes) required lower dose of add-on insulin, at a later gestational age for maintaining glycaemic control when compared with insulin treatment

Appendix 4: Informed consent for use of long-acting insulin analogues

The summary of product characteristics (SPCs) for insulin detemir and insulin glargine state that their use may be considered during pregnancy; see the SPC of the individual products for details.

The prescriber should follow relevant professional guidance
Informed consent should be obtained and documented

Advice is therefore to inform women

1. **Use may be considered in pregnancy. Appear to be no major safety concerns, but studies are limited.**
2. **The latest NICE guidelines (2020) support the continuation of long-acting insulin analogues in those women already taking them**

Additional supporting information **(Lambert and Holt, 2013)**

a. **Insulin Glargine (Lantus)**
Most studies are small and retrospective. There appear to be no major safety concerns. Reasonable to continue if required to achieve excellent glycaemic control

b. **Insulin Detemir (Levemir)**
A head-to-head comparison between insulin detemir and NPH insulin in women with type 1 diabetes showed that while foetal outcomes did not differ, fasting plasma glucose improved with insulin detemir without an increased incidence of hypoglycaemia.

The greater evidence base supports the use of insulin detemir as the first-line long-acting analogue in pregnancy, but the lack of definitive focal benefits means that there is no strong need to switch a woman who is well controlled on NPH insulin.

Little justification for using long-acting insulin analogues in women with gestational diabetes or type 2 diabetes, where the risk of hypoglycaemia is low

Appendix 5: Letter to GP to request postnatal follow-up fasting glucose check.

Dear GP

This patient was diagnosed with Gestational Diabetes in her pregnancy [GDM controlled with smart list]

She gave birth on [Date of Delivery EPIC text]
GTT result in pregnancy [EPIC Smart Result displayed]
This lady's HbA1c at diagnosis was [EPIC Smart Result displayed]

Women with Gestational Diabetes are at high risk of developing Type 2 Diabetes (up to 50% in the first 5 years) after pregnancy.

The latest NICE Guidance (2015) recommends that the patient should have a follow-up fasting blood glucose test (not GTT) 6 - 13 weeks after the birth to exclude diabetes (for practical reasons, this could take place at the 6-week postnatal check.

Alternatively, an HbA1c blood test, 13 weeks after delivery, can be offered if fasting glucose is not possible.

Please would you be so kind as to arrange this.

Also kindly:

1. **CODE** this patient as 'Gestational diabetes mellitus (disorder)' (SNOMED CT 11687002)
2. **ANNUAL SCREEN** for Type 2 Diabetes & Add this patient to the High Risk of Diabetes Register
   They need an HbA1c at:
   - 3 months postpartum (Please add a diary date 3 months from their expected delivery date)
   - Annually (Please add a recall)
   - Prior to future pregnancy
3. **REFER** to prevent Type 2 Diabetes
   - Refer into the 'Healthier You: NHS Diabetes Prevention Programme' (SNOMED 1025251000000107) This is vital for providing support to reduce their high risk of developing Type 2 Diabetes
4. **SUPPORT** before another pregnancy (T2Day)
   - If this patient develops Type 2 Diabetes <40yrs
     - ◊ This is more severe than if diagnosed later in life.
     - ◊ NHS England has launched the 'Type 2 Diabetes in the Young' (T2Day) programme to provide more intensive targeted care to this age group.
     - ◊ Please ensure this patient accesses the T2Day programme.
     - ◊ T2Day provides dedicated support for pre-pregnancy care including:
       - ♦ Access to contraception

- Optimising glycaemic management (HbA1c<43mmol/mol)
- Medication 'safety for pregnancy' review
- Weight management
- 5mg Folic acid supplementation (to reduce congenital malformations)

Thank you for your ongoing support,

If you wish to discuss this further, please contact us

Regards,

Antenatal Diabetes Team.
Wexham Park Hospital 0300 615 4512
Frimley Park Hospital 0300 613 4880

PLEASE SEE ADVICE BELOW ON HOW TO INTERPRET THE RESULT AND WHAT TO DO THEREAFTER

Advice to Patient if **Fasting level <6 mmol/L** **Or** **HbA1c <41mmol/L**	**Low probability of having diabetes at present. Will need an annual HbA1c test.** **Moderate risk of developing Type 2 Diabetes (future risk could be as high as 50%)** **Really important to follow lifestyle advice to reduce this risk (weight control, diet and exercise)**
Advice to Patient if **Fasting level between 6-6.9 mmol/L** **Or** **HbA1c between 42-47mmol/L**	**High risk of developing Type 2 diabetes** **Remind women of the symptoms of hyperglycaemia** **Will need an annual HbA1c test. Offer them advice on guidance and interventions in line with NICE guidance.** **on preventing Type 2 diabetes**
Advice to Patient if **Fasting level 7mmol/L or above** **Or** **HbA1c 48mmol/L or above**	**Likely to have Type 2 diabetes. Offer a diagnostic test to confirm diabetes.** **Remember to refer early to preconception clinic if further pregnancy planned**

Appendix 6: Interpretation of blood ketone tests (ketonemia)

Blood ketones should be measured in any patient where there is clinical suspicion of decompensated Type 1 diabetes or in people with Type 2 diabetes and Gestational diabetes mellitus (GDM) who are acidotic at presentation. This includes:

- All patients with Type 1 diabetes who are unwell and/or have vomited and/or have elevated blood glucose levels (SGLT2 inhibitor can mask ketones, but not advised in pregnancy)
- All patients who are pregnant with diabetes and a urine ketone of 2+ or greater
- Any patient with diabetes (Type 1, Type 2 or GDM) with acidosis, i.e., pH <7.3 and/or
- bicarbonate <15mmol/l
- In non-diabetic patients, if ketosis is suspected (Cons/Endo SpR request only)

β-OHB (Blood Ketone) (mmol/L)	Action
<0.5	Normal ketone level Treat the hyperglycaemia
0.5 – 1.5	Intermediate Ketone levels Follow sick day rules Ensure adequate fluid intake May need additional short-acting insulin for hyperglycaemia Retest glucose and blood ketone 2 hour later
>1.5 – 3.0	High Ketone levels with risk of DKA Check pH and HCO^3 on blood gas - if acidotic, please start treatment as per DKA guidelines If not acidotic treat hyperglycaemia with additional insulin If oral fluid intake is inadequate, then initiate IV fluids Recheck ketones in 2 hours
>3.0	High risk of DKA Contact doctor immediately Assess for signs of DKA, urgently check serum Na, K, bicarbonate and pH on venous blood gas If acidotic, follow the DKA guidelines If patient is not in DKA, they still require additional insulin and fluid replacement by intravenous infusion (or additional subcutaneous doses on advice of diabetes team) Recheck ketone levels with blood glucose levels and document on chart Monitoring blood ketones as per DKA guidelines.

- Blood ketones should be monitored 2 hourly if > 0.5
- With adequate treatment of DKA, the blood ketone levels should fall by at least 0.5mmol/L per hour.
- Ketosis is resolved when blood ketones are <0.5 mmol/L
- If unable to eat or drink, switch to a variable rate intravenous insulin infusion

Appendix 7: Management of pregnant women with diabetes admitted to the antenatal ward

Background
Women with type 1 diabetes have an absolute requirement for insulin and will quickly become ketotic without insulin. Ketones can cause foetal death at any stage of pregnancy.

Women with type 2 diabetes and gestational diabetes (GDM) may require insulin therapy during pregnancy.
Diabetic ketoacidosis (DKA) is normally associated with Type 1 Diabetes, but it can occur in Type 2 Diabetes or women with GDM and may be precipitated by illness, prolonged fast, alcohol or the use of steroids.

If a pregnant woman with diabetes attends and is unwell, please assess her general status. If 'unwell' or hyperglycaemic (capillary blood glucose ≥12mmol/L)

- Check urinalysis or blood ketone status
- If ketone 2+ or more in urine or blood ketones ≥1.6 mmol/L on blood ketone test, do a venous blood gas (VBG) to rule out DKA

How to diagnose DKA

2 of the 3 listed components should be present to diagnose DKA
- pH<7.3
- HCO^3 <15
- Ketone ≥3+ in urine or blood ketones ≥3 mmol/L on blood ketone testing

If DKA confirmed

- Start fluids (N/Saline) 1 litre stat and a fixed rate insulin infusion according to the DKA in Adults on the intranet.
- **Alert the diabetes team or medical registrar (if out of hours) and arrange for an immediate move to the acute dependency unit.**

Please also note

- **'Euglycaemic ketoacidosis' can occur** where blood glucose can be within a normal range
- **Bicarbonate (HCO3) between 16-22mmol/L may imply incipient DKA**. If in any doubt, treat as DKA but do seek urgent advice from the Diabetes team or the Medical Registrar (if out of hours)

If DKA is excluded, but the patient is unwell or vomiting with a capillary blood glucose >12mmol/L and ketonuria >+ or blood ketones >1.5mmol/L

- Start fluids (N/Saline) 6-8 hourly and a VRIII (sliding scale).
- Check capillary blood glucose hourly and adjust the VRIII if readings remain high for two hours consecutively (>7.8mmol/L) or are low (<4mmol/L)
- Check blood ketone status 1-2 hourly to ensure that this is clearing.
- If increasing ketonuria/ketonaemia on subsequent check or if you have any concern that the patient is not getting better, then please arrange for a repeat venous blood gas (VBG).
- Please seek the Diabetes specialist team's input at the earliest opportunity

Appendix 8: Diabetic ketoacidosis

Pregnant women with Type 1 DM can get accelerated ketosis, which can rapidly progress to diabetic ketoacidosis. This is a medical emergency which requires prompt diagnosis and treatment as it is associated with increased mortality, especially for the foetus (30-90%). Predisposing factors include infections, beta mimetics and steroids for foetal lung maturation.

- Women with Type 1 diabetes should be provided with a blood ketone meter and educated on when to use and how to interpret initial results. If unavailable, prescribe Ketostix. Advise to test for ketones whenever their blood sugars are high (≥12 mmol/L) or they feel unwell.

- Women should be advised to seek medical attention if they develop vomiting, severe infection or are unable to tolerate diet, as they are at risk of DKA if unable to have insulin.

- **Any woman with type 1 diabetes in pregnancy who is unwell must have ketoacidosis excluded.** Clinical features include: dehydration, polydipsia, polyuria, malaise, headache, nausea, and vomiting.

- If ketonuria (++) is present in an unwell patient, with or without hyperglycaemia, check capillary ketones (meters available in antenatal department, A&E, Acute Medical Unit or HDU/ITU), and take bloods for U&E's, lab glucose, venous bicarbonate, and arterial blood gas, FBC and CRP.

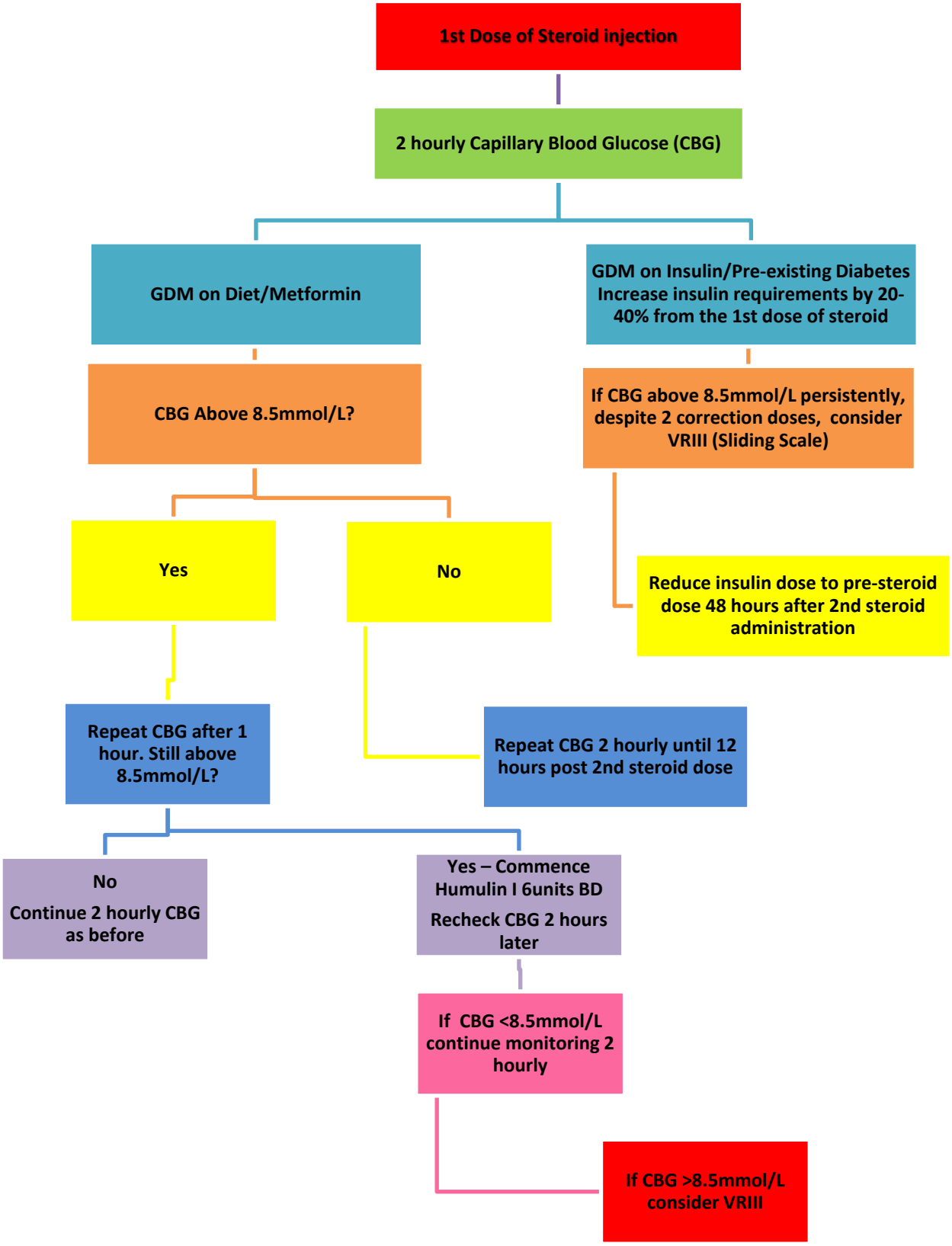
- If the patient is acidotic (Bicarbonate <15 or PH <7.3) and capillary ketones >3mmol/L, commence intravenous normal saline and intravenous fixed rate insulin regimen as per above guidelines for management of DKA.

- If DKA is confirmed, liaise directly with HDU (WPH) or MADU (FPH) to discuss immediate transfer to the Unit so that they can receive both medical and obstetric care as required.

- Continuous CTG monitoring of the fetus will be required.

Refer to the online guidance for DKA (FPH), which can be found on the intranet.

Appendix 9: Management of Diabetes when admitted for Antenatal Corticosteroids



Appendix 10: Basic advice on managing patients on a VRIII (insulin sliding scale)

Women with diabetes on insulin may need to be placed on a VRIII when admitted unwell or for delivery (labour or C/S). It is essential to remember that those with Type 1 diabetes are insulin deficient and must never go without insulin, as they can quickly progress into DKA.

Please download the protocol from the intranet.

Key points to remember

1. **What to do with the long-acting insulin?**
   Continue the long-acting insulin alongside the VRIII, especially for those with type 1 diabetes. It helps reduce the fluctuations in glucose readings when switching from the infusion back onto regular subcutaneous insulin

2. **What fluids are needed?**
   If the patient is nil by mouth, run the VRIII with 10% dextrose and 20 mmol KCL over 16 hours (62.5mls/hour). This reduces the risk of overhydration, although 5% dextrose and 40 mmol KCL running at 125mls/hr could be used if fluid is required.

   If the patient is able to eat and drink and the VRIII (sliding scale) is started to negate the steroid effect, then run continue the long-acting insulin but stop the mealtime doses until the VRIII has been discontinued. There is no need for additional fluids.

3. **How often should the CBGs be monitored?**
   Check the CBG hourly
   If the patient is anaesthetised and unconscious, then the CBGs should be checked every 30 minutes until they return from theatre and are awake. Please inform the theatre staff of this.

4. **What should happen if the CBGs are not in the target range?**
   Blood glucose targets for pregnant females are 4 – 7.8mmol/L. If readings are above this for 2 consecutive readings, then check:

- Is the line patent?
- Does the volume in the pump fit with how much should have been given – be alert to the patient returning from theatre and check that the infusion pump has been running while in theatre.

   If 1 or 2 are not the causes of the problem, then look to upgrade the VRIII. You will find advice on how to do this within the online VRIII protocol.

5. **My patient has become hypoglycaemic on the VRIII, what should I do?**
   If the patient becomes hypoglycaemic (CBG <4mmol/L) on the VRIII, stop the VRIII, treat the low glucose and then restart the VRIII within 20 minutes (the VRIII may need to be restarted at a reduced rate to offset the risk of another hypoglycaemic event).
   Please note that intravenous insulin has a very short half-life. If you fail to restart the insulin infusion, your patient may be at risk of diabetic ketoacidosis.

Appendix 11: Variable Rate Intravenous Insulin Infusion (VRIII) for Pregnancy

Absolute Indications

- Type 1 or 2 Diabetes with recurrent vomiting (exclude DKA) ie. hyperemesis
- Type 1 or 2 Diabetes or GDM on insulin with severe illness and unable to maintain good glucose control
- Type 1 or 2 Diabetes or GDM on insulin with persistently elevated CBGs despite correction insulin doses given.

Aim

CBG in range 4.0 – 8.5mmol/L

Avoid hypoglycaemia (CBG <4.0 mmol/l)

Try to avoid using in those patients able to eat and drink

VRIII use

- Stop any short acting insulin (Humalog, Novorapid) BUT **CONTINUE the basal insulin (Humulin I, Glargine, Levemir, and Insulatard).**
- Prescribe the VRIII and add fluids to go with this if the woman is nil by mouth (see tables 1&2 overleaf)
- **CBGs must be monitored hourly** whilst the VRIII is in use
- Review the readings regularly to make sure CBGs are in target range
- **Adjust the scale if readings are above target on 2 or more consecutive readings (1 hour apart) or woman hypoglycaemic.**
    - **For CBGs persistently above 10 mmol/L and NOT falling**
        - Check that infusion set is correctly connected and not blocked
        - Check that the infusion rate is appropriate
        - Check ketones if CBGs >12 on two consecutive readings
    - **For CBG < 4 mmol/L, i.e., hypoglycaemia**
        - Stop the VRIII and treat the hypoglycaemia as per local guidelines **(All Clinical Guidelines > Endocrinology > Management of hypoglycaemia in adults with diabetes mellitus (FPH), Clinical Guidelines >Diabetes > Hospital management of hypoglycaemia in adults with diabetes mellitus (WPH))**
        - NOTE the VRIII should generally not be stopped for > 20 minutes
        - STEP DOWN to the next scale when the VRIII is restarted – if you are already using the lowest pre prescribed scale, then use the customised section to downgrade further
        - Review again within 2 hours
- **Check electrolytes daily** (at risk of hyponatraemia and hypokalaemia)
- **Review the need for the VRIII at least once daily** – if not sure, ask the diabetes team for help
- **Review the fluid status daily** is your patient dehydrated or at risk of fluid overload (see table 2)

Stopping the VRIII

- Ensure
    - CBGs are ideally <8mmol/L
    - That discontinuation takes place at a mealtime (preferably breakfast or lunch but evening meal is acceptable) so that short acting insulin can be administered.
- For
    - **Insulin treated patients** – **Basal (long acting) insulin should have been continued**, if not, this MUST be given prior to discontinuation of the VRIII. Give rapid acting insulin with the meal and then stop the VRIII 30 minutes later.
    - **CSII (insulin pump) treated patients** – **involve the diabetes team**. Reconnect the CSII, start the normal basal s/c regimen, give a bolus dose of insulin with the meal and then stop the VRIII 30 minutes later.
    - that no contra-indications to the previous hypoglycaemic therapy have arisen (see table 4 overleaf)
- Check
    - CBG one hour after discontinuing the VRIII and as per the recommendations for the pregnant woman.

PLEASE CONTACT THE DIABETES TEAM

- **If you are unable to achieve CBGs within target range**
- **If your patient requires a VRIII for > 24 hours**

Table1. Suggested Insulin Infusion Rates

Glucose	Insulin Rates (ml/hour) Start on standard rate unless otherwise indicated				
	Reduced rate (for use in insulin sensitive patients e.g. ≤24 units per day)	Standard rate (first choice in most patients)	Increased rate (for insulin resistant patients e.g. ≥100 units per day)	Customised scale	Customised scale
NB if a patient is on basal subcutaneous insulin – continue this alongside the VRIII					
< 4.0	0	0	0		
4.1-.7.0	0.5	1	2		
7.1-11	1	2	4		
11.1-15.0	2	4	6		
15.1-20.0	3	5	7		
20.1-28.0	4	6	8		
>28.1	6	8	10		

Table 2. Choice of infusion fluid

If the pregnant woman is nil by mouth prescribe:

1 Litre of 5% dextrose with 40mmol KCl at 125ml/hr or 500ml of 10% dextrose with 20 mmol KCl to run at 62.5ml/hour (*exception to this would be if the woman's starting blood glucose was ≥15 mmol/L when you would prescribe 1 Litre of 0.9% sodium chloride with 40 mmol KCl to run at 125ml/hour*). Once the blood sugar has fallen to <11 you should then switch to glucose as above and continue with this as the fluid of choice. If the patient's blood sugar subsequently rises above 12 the VRIII scale should be upgraded to get better control but there would be no need to change back to 0.9% sodium chloride.

Note

If the patient's potassium is >5.5 mmol/L - no KCl is to be added to the infusion fluid

If the patient's potassium is <3.5 mmol/L – senior review needed as extra potassium needs to be given.

Caution in those with eGFR <20ml/min- may need less potassium.

Fluids may be adjusted according to the woman's general status. If dehydrated, then 5% Dextrose at 125ml/hr will be a better option. Monitor sodium levels as there is a risk of sodium falling.

Appendix 12: How to manage a hypoglycaemic episode.

Introduction

A blood capillary glucose of less than 4 mmol/L is the clinical definition of hypoglycaemia.

The reduction in blood glucose level causes cerebral dysfunction at a level below 3 mmol/L, as the brain cannot function without a constant supply of glucose and oxygen. Therefore, any blood glucose (BG) level below 4 mmol/L should be treated as a hypoglycaemic attack even if the patient is asymptomatic. Some patients with long-standing diabetes do not display the symptoms or are unable to recognise hypoglycaemia until glucose levels are very low, that is, they are hypoglycaemia-unaware (These levels may vary in pregnancy).

Treatment

If the patient is fully conscious and capable of swallowing:

Give 15g of fast-acting glucose If the blood glucose is below 4mmol/L this may need repeating.

Preferred treatment	5 Dextrose tablets OR 1 bottle (60ml) "Lift" fast acting glucose drink
Other treatment options	150- 200mls of pure fruit juice

1. Dextrose tablets may be obtained from the pharmacy as stock for wards. "Lift" fast-acting glucose drinks must be ordered from NHS supplies.

2. **DO NOT** mix sugar/dextrose with milk, as this slows the absorption rate of the glucose, therefore delaying recovery of the patient.

3. **DO NOT** add the glucose/sugar to a hot drink, as the patient will not be able to drink it quickly.

4. **Expect recovery within 10 -15 minutes**. Retest blood glucose level 10-15 minutes later, if the blood glucose remains below 4 mmol/L, repeat as above. If you have repeated the treatment 3 times and the patient still remains unstable, contact the Doctor.

5. **Once the blood glucose level is greater than 4mmol/L, the patient must be given a starchy carbohydrate (**e.g., a slice of bread, a digestive biscuit, a piece of fruit or a bowl of cereal) **if their meal is not due within an hour**. This will prevent the blood glucose from falling again due to the short action of glucose.

6. **DO NOT** omit the next dose of insulin. Ensure medical staff review the dosage of the medication prescribed to prevent further hypoglycaemia.

7. It is important to monitor blood glucose levels frequently after hypoglycaemia as there is an increased risk of further hypoglycaemia within the next 24 hours.

8. If hypoglycaemia occurs just before a meal, treat with fast-acting glucose, provide a meal, and then give the insulin after the meal. **DO NOT** omit the insulin dose.

If the patient has a reduced conscious level or is NBM

DO NOT put anything into their mouth due to the high risk of choking.

Glucagon

1. If the patient is uncooperative, IV access difficult or unconscious, and the patient is **not** on a sulfonylurea, you can give Glucagon 1mg IM or SC (Glucagen® Kit is kept in the hypo box and instructions on how to prepare the injection is found inside the lid of the Glucagen® Kit).

2. **Expect recovery within 10-15 minutes**. Check the blood glucose in 10-15 minutes. The glucagon effect will wear off after 30 minutes, so a starchy carbohydrate must be given once the patient is conscious and within this time frame. Patients given glucagon require double the amount of long-acting carbohydrate to replenish glycogen stores.

Caution

- Glucagon should not be used for sulfonylurea-induced hypoglycaemia as it may be prolonged, especially with renal impairment due to the long half -life of the drug.
- Glucagon can only be given once, and if not effective after 10-15 minutes, intravenous glucose must be given.
- Glucagon may also be ineffective if there is liver disease, or the patient is malnourished as there may be no liver glycogen to mobilise.
- Glucagon should not be used for alcohol-induced hypoglycaemia.

If the patient is unconscious, having seizures, or glucagon has had no effect.

- **Call 2222 and state obstetric emergency. Liaise with medical on call team.**
- **Give IV Dextrose**100 ml of 20% IV Dextrose **or** 200mls of 10% Dextrose stat.
- **Expect recovery within 5-7 minutes**.
- Check the blood glucose in 10 minutes and administer further Dextrose if readings remain below 4mmol/L
- Once patient is conscious and blood glucose is above 4mmol/l give starchy carbohydrate.
- There will be a delay between blood glucose rising and brain function returning to normal.

Hypo box checklist
https://ourplace.xfph-tr.nhs.uk/patient-care/clinical-guidelines/diabetes-and-endocrinology/

Appendix 13: The use of insulin pumps (continuous s/c infusion of insulin)

Insulin pumps are increasingly being used to achieve control in women with type 1 diabetes planning pregnancy as they deliver a continuous insulin supply that can be adjusted to a achieve almost physiological insulin dosing. Insulin pumps contain rapid acting insulin (Novorapid, Humalog, Apidra, Fiasp) which is being pumped in over 24hours in a set basal rate. The patient will calculate and programme the pump to administer boluses when they eat depending on their carbohydrate requirements.

It is important to remember that as it is only rapid acting insulin running through the pump this will run out within 2 hours if the pump is discontinued. **NEVER STOP A PUMP UNLESS AN ALTERNATIVE INSULIN SUPPLY IS IN PLACE.**

Management of insulin pumps during a hospital admission

- Patients using insulin pump therapy are usually well-trained to manage their diabetes and pump.
- The patient should have their own supply of infusion sets, infusion devices and reservoirs.
- Patients using pump therapy have a continuous supply of background insulin and therefore do not have to eat at set times. They will administer bolus insulin through the pump when they eat.
- Patients admitted to hospital should be allowed to continue to manage their diabetes using their pump except:
    - if they are unconscious
    - illness prevents self-management.
    - in event of diabetic ketoacidosis (DKA).
    - On these occasions, a VRIII should be commenced and the pump stopped.
- Fasting is not a problem for pump users as the basal rate can be adjusted if there are changes in glucose levels.
- Pump users usually treat hypoglycaemia themselves by taking 10g glucose if blood glucose is between 3 and 4mmol/l, and 20g glucose if blood glucose is under 3mmol/l. There is no need for long-acting carbohydrate.
- Unless the patient is unconscious pumps do not usually need switching off whilst treating a hypoglycaemic event. See hypo protocol.
- If a hypoglycaemic patient is unconscious, DO NOT CUT TUBING. Remove the catheter from abdomen (remove dressing and then remove like you would intravenous access) and place pump in safe place. Follow the hypoglycaemia protocol.
- If a surgical procedure is planned, please liaise with diabetes nurse specialist. If no specialist advice is available and there is no pre-existing plan in place, stop the pump and use a VRIII.

Management of insulin pumps during a hospital admission whilst pregnant

<u>Antenatal period</u>

- If a woman is using pump therapy, then she is expected to test 7 times per day (before and after meals and before bed) to achieve optimal glucose control.
- The woman should be allowed to continue to manage her diabetes using the pump when admitted to hospital unless unconscious, or unable to self-manage the pump.
- Insulin requirements are likely to change during infections and intercurrent stress. The woman should know to use a temporary basal rate and increase monitoring of glucose levels.

During labour

- Self-management of the pump is possible during labour if discussed and agreed between the woman and the diabetes team antenatally.
- The pump's cannula should be sited below the ribs and towards the back or on the arm to avoid a potential LSCS site.
- The woman should ensure that the pump has new batteries, a full reservoir and infusion set to reduce the risk of obstructed insulin delivery. She should also have spare supplies.
- It is important that the blood glucose is maintained between 4 and 7 mmol/l. If the glucose levels are above this target on 2 consecutive occasions or if ketosis develops then a VRIII should be commenced.
- If a C/S is planned then the surgeon, anaesthetist and theatre staff should be informed that the pump will be in use.

Postnatal

- A plan should have been agreed between the diabetes team and woman regarding insulin pump rates post-delivery. The basal rate should have already been programmed or documented in the notes and the woman should switch to this once she has delivered.
- If no plan is in the notes, then please reduce the basal rate by 50%.
- If breast-feeding a further 20% reduction may be required.

Please refer all pump patients to the Diabetes team for review when admitted.

Appendix 14: Continuous Glucose Monitoring (CGM) In Pregnant women with Diabetes

Continuous Glucose Monitoring (CGM) is a new way to monitor the blood sugars which involves use of a small device worn just under the skin. This measures interstitial glucose (sugar) levels continuously throughout the day and night, identifying trends in glucose levels. Some devices provide alerts for highs and lows to facilitate glucose control.

There are different types of CGM available:

- **Intermittently scanned CGM (isCGM**) uniformly tracks glucose concentrations in the body's interstitial fluid, providing glucose data retrospectively by scanning the sensor to display the readings. This is also known as Flash Glucose Monitoring (FlashGM). The current device is the FreeStyle Libre, shown below

- **Real-time CGM (rtCGM**) uses similar methodology to track glucose readings and automatically transmit the data to a receiver, or smartphone, so that the user has a visible, updated stream of glucose measurements. rtCGM can be used independently (standalone) but there are some which can be linked to an insulin pump (sensor augmented pump therapy), allowing features that can make the pump semi-automated. Commonly used devices are the Dexcom G6, as shown below, and the Medtronic Guardian Connect.

Advantages of CGM

1. Increased frequency of painless glucose monitoring
2. To view and follow the levels of blood sugars (Arrow on monitor will point based on BG going up/down/stable, etc)
3. Alarms (low/high warning), which are particularly useful for women who are prone to hypoglycaemia.

NICE recommendations for CGM/Flash monitoring

Evidence from the CONCEPTT Study (Feig et al., 2017), which studied the use of CGM in preconception and in pregnant women, has shown improved perinatal outcomes with reduced neonatal hypoglycemia, large for gestation baby, and neonatal ITU admissions. As a result, NICE have altered its advice regarding CGM, recommending it for all pregnant women with type 1 diabetes to help them meet their pregnancy blood glucose targets and improve neonatal outcomes.

The NICE (NICE, 2020) recommendations are:

- rtCGM for all pregnant women with type 1 diabetes to help them meet their pregnancy blood glucose targets and improve neonatal outcomes.
- Intermittently scanned CGM be for pregnant women with type 1 diabetes who are unable to use continuous glucose monitoring or express a clear preference for it.
- Consider continuous glucose monitoring for pregnant women who are on insulin therapy but do not have type 1 diabetes, if-
    - They have problematic severe hypoglycaemia (with or without impaired awareness of hypoglycaemia)
    - They have unstable blood glucose levels that are causing concern despite efforts to optimise glycaemic control.

All pregnant women on CGM are expected to show motivation and engagement with the CGM aiming to achieve a target of 70% time in range (Glucose levels of 4 - <7.8mmol/L), they should be in contact with the diabetes team during their pregnancy to provide support, and education in order to achieve the full potential of use as well as monitor the individual's suitability for continuing on CGM.
Any woman requiring support should contact the

- Wexham Park Hospital: Diabetes centre at King Edward VII Hospital 01753 636612
- Frimley Park Hospital Diabetes Specialist Team 03006 134701

Usage of Continuous Glucose Monitoring (CGM) During the hospital admission/inpatient stay, pregnant women using CGM can monitor their own blood glucose levels, but will need to document the readings on the Diabetes Monitoring Chart. Standard capillary glucose monitoring will be required in the following circumstances:

1. Women who are Unwell/dehydrated/fluid overload, etc.
2. Any episode of hypoglycaemia or hyperglycaemia (<4 or more than 8.5 mmol/l), please confirm reading on ward-based meter and take appropriate action
3. Women on a VRIII (sliding scale)
4. Suspected DKA
5. Discrepancy of more than 2 mmol/L between the Capillary blood glucose of ward meter and CGM.
6. Women who can't monitor (During the C-section or reduced GCS, etc.)

Appendix 15: SOP Statement- Diabetes Monitoring systems/technologies & patient-held applications.

Table of Contents

Summary

GDm-Health & Libreview is a health application designed for people with gestational diabetes and Type 2 Diabetes to allow for remote monitoring of blood glucose levels and communication with healthcare professionals.
The mobile app downloads data from the user's blood glucose meter/sensor and sends it to a secure website, which is monitored by healthcare professionals.
The GDm-Health website allows nominated healthcare professionals to send SMS text messages to patients and record notes on the website for other healthcare staff.
The app's use will improve patient safety, patient experience and clinical effectiveness.

1.0 Roles and Responsibilities

- The GDm-Health app is offered and initiated to women with GDM and Type 2 Diabetes, should the woman choose, by a Specialist Diabetic Midwife
- The Libreview app is offered and initiated to women who require additional support and monitoring for their diabetes control, or who choose to self-fund CGM.
- The Maternity Diabetes Team will be responsible for overseeing patients and ensuring appropriate follow-up plans are in place as per usual process and protocols.
- Patients will be assessed by the Maternity Diabetes Team regarding their suitability for the online monitoring platform and should fit the criteria listed in section 3.
- Members of the diabetes team making changes in the treatment regimen are responsible for updating the information on the app.

2.0 Implementation and dissemination of document

2.1 Dissemination

This document will be published on the Trust Intranet and will be an appendix in the Management of Diabetes in pregnancy guideline.

2.2 Training

GDm-Health (Huma Health) & Libreview training can be provided by experienced members of the diabetes team. In the event of this not being possible, the company representatives can provide training.

The Diabetes Lead Midwife will train women in the use of the app when their GDm-Health record or Libreview record is created during their clinical visit.

3.0 Processes and procedures – GDM Health App

3.1 Inclusion criteria

- Women with GDM 18+ years of age.
- Own a smartphone and can understand English and the instructions.
- Able to consent.

3.2 Exclusion criteria

- Unable to consent.
- Under 18+ years of age
- Does not own a compatible phone.

3.3 GDm Health app

3.3.1 Set up with patients.

The Diabetes Midwife will:

- Contact women with information about the GDM Health app in advance of their first appointment and gain consent for data sharing
- Discuss this further when seeing these patients for their first appointment.
- demonstrate the technique of testing blood glucose and uploading the results to the app.

3.3.2 Reviewing and updating the data

The Diabetes Midwife will

- Check the database twice a week (as a minimum), and where there are warning flags, the midwife will access the woman's record to determine the reason for abnormal readings, then contact the woman by text or telephone to discuss and advise accordingly.
- Review the database to identify if a woman has requested a call back through the app and will respond within 24 hours during working hours.
- Be able to assess via the app if the woman has not been transferring her readings via the app, and will contact her either via text message or phone call to explore any issues.

The Diabetes Antenatal Team can:

- Send messages such as new medical instructions/ advice to women to support the management of their condition (messages are sent both as SMS texts and within the app) – preferred contact method via EPIC patient message chart.
- See how much medication the patient has taken with a meal - the type of medication entered is dependent on what has been recorded by the clinician in the patient record on the desktop version of GDm–Health.

3.3.3 Warnings and Alerts.

These are shown on the dashboard after login.

BG readings are shown as high/low in graphical and individual numerical form, which are static and conform to the NICE Diabetes NG3 guideline.

Alerts are triggered and displayed to a clinician when the readings are outside the NICE guidelines.

The system also triggers alerts if a patient has submitted fewer than two-thirds of expected readings.

Clinicians are alerted when:

- A red alert is displayed when 3 or more consecutive meal type readings are high or low.
- A grey clock sign alert is displayed when a woman has not taken enough readings or when blood glucose readings are out of range (too high or too low)
- Clinicians can manually bookmark patients whom they want to monitor more closely.

3.3.4 From a patient perspective

The app provides pictorial and written instructions on how to use GDm-Health.

- Submit blood glucose readings to a clinician/ midwife.
- Request a call back from a midwife/clinician if required.
- Read messages sent by the midwife about how to better manage their GDM.
- Access information about GDM, including exercise and diet.
- View blood glucose over time. Blood glucose is displayed in a diary or graphical view.
    - They are highlighted as “high” or “low” based on static limits which conform to NICE GDM guidelines.
        - These readings are colour-coded to indicate high or low:
            - Red: High
            - Green: Within range
            - Blue: Low

3.3.5 Troubleshooting

It is expected that clinicians will talk to patients through the app when their GDm-Health record is created during the initial clinic visit following GDM diagnosis.

The company will set up an interface on the desktop with access for a number of staff.

Staff will log in securely to their Trust’s website
If staff find that they cannot access the website, a GDm-Health representative will respond to assess and resolve the issue either remotely or through a site visit.
If service users have any problems accessing or inputting information, then a GDm representative will be contacted to resolve the issue.
Should a member of staff not be able to access the URL cloud, or where there is a Trust connectivity issue, then they will call the IT department to resolve the issue.

4.0 Processes and procedures – LibreView App

4.1 Inclusion criteria

- Able to consent.
- Can use Libre reader if phone not available or compatible.

4.2 Exclusion criteria

- No exclusion criteria applicable

4.3 LibreView App

4.3.1 Set up with patients.

Appropriateness of LibreView sensor should be discussed with the Diabetes consultant prior to consenting and educating the patient if it is initiated for additional monitoring support and for their diabetes control.
Those who choose to self-fund can have consent and education with the Diabetes midwife without prior discussion with the Diabetes consultant

The Diabetes Midwife will:

- Contact women with information about the LibreView app in advance of their education appointment, gain consent for data sharing and advise them to download Librelink application before the appointment
- Discuss this further when seeing the patient at the appointment and provide Abbott literature “Get started”.

- Fit the Freestyle Libre sensor in the upper R or L arm, demonstrate the technique of testing the blood glucose via the sensor and uploading the results to the app.
- Demonstrate the use of the event logbook and alarm feature. And set up pregnancy targets.

4.3.2 Reviewing and updating the data.

The Diabetes Midwife will:

- Check the LibreView platform twice a week (as a minimum) and access the woman's record, then contact the woman by EPIC message or telephone to discuss and advise accordingly.
    - Assessment will include monitoring the last 7 days of uploaded results and assessing:
        - Time sensor if active (Aim 80%)
        - The time blood glucose is within the target range (Aim 90% for GDM, 80% for T2DM)
        - The time blood glucose is above target range / below target range (Aim for time below to be >5% if diet /metformin only medicated, >2% if medicated on insulin)
        - The number of low glucose events (Aim for less than 5)
- If further input is required from the wider Diabetes Antenatal Team, the diabetes midwife will refer appropriately.

4.3.3 From a patient perspective

The app provides pictorial and written instructions on how to use Librelink App.

- How to apply and scan a new sensor
- How to remove the old sensor
- How to view glucose readings & adjust glucose targets
- Setting Alarms
- Inputting data into the event log
- View blood glucose over time. Blood glucose levels are displayed in an event log or graphical view.
    - They are highlighted as "within range" based on static limits which conform to NICE GDM guidelines.
- The app also provides alerts to the patient.
- Directional trend arrow and message if the result is high or low / going high or going low.
    - The app will ask women to contact their healthcare provider in very high and very low alarms.
- Signal loss alarm if there is no connection for over 20 minutes.

4.3.5 Troubleshooting

It is expected that clinicians will talk to patients through the app when their LibreView record is created during the clinic visit for education.

The company will set up an interface on the desktop with access for a number of staff.

Staff will log in securely to their Trust's website
If staff find that they cannot access the website, a LibreView representative will respond to assess and resolve the issue either remotely or through a site visit.
If service users have any problems accessing or inputting information, then a LibreView representative will be contacted to resolve the issue.
Should a member of staff not be able to access the URL cloud, or where there is a Trust connectivity issue, then they will call the IT department to resolve the issue.

Full version control record

Version:	2.3
Guidelines Lead(s):	Drs R. Mukhtar, A. Naing, S. Akavarapu -Consultant Endocrinologists Drs O. Eniola, D. Aggarwal - Consultant Obstetricians E. Hwang, K. Stone, S. Barker, T. Hopkins - Diabetes Specialist Midwives
Contributor(s):	
Lead Director / Chief of Service:	Miss Anne Deans, Chief of Service for Obstetrics and Gynaecology
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Key words:	Diabetes, ketones, acidosis, insulin, hypoglycaemia, metformin, type 1, type 2, gestational diabetes, DKA.

This guideline has been registered with the Trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date.

This guideline is for use in Frimley Health NHS Foundation Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version Control Sheet

Version	Date	Guideline Lead(s)	Status	Comment
1.0	September 2017	A. Kirkpatrick (Consultant Obstetrician Cross Site), Z. Jones (Consultant Obstetrician FPH), R. Mukhtar (Consultant Endocrinologist FPH), Sally Barker (Diabetes Specialist Midwife FPH), Asha Matthews (Diabetes Specialist Midwife WPH), O. Eniola (Consultant Obstetrician WPH) S Akavarapu (Consultant Endocrinologist WPH)	Final	First cross site version, Ratified at Obstetrics and Gynaecology Clinical Governance Committee (cross site) on 14th September 2017

2.0	Nov 2022	Drs R Mukhtar, A Naing, S Akavarapu (Cons Endocrinologists), Drs O Eniola, B Sagoo, A Tillett (Cons Obstetricians) A Matthews, K Stone, Sally Barker (Diabetes Specialist Midwives)	Final	Full review
2.1	Oct 2023	N. Rose Stone	Interim	Amendment on page 10 (HbA1c above 48mmol/mol), approved by chairs action by CoS A. Deans on 26.10.2023
2.2	October 2024	Drs R Mukhtar, A Naing, S Akavarapu (Cons Endocrinologists), Drs O Eniola, D.Aggarwal (Cons Obstetricians) E Hwang, K Stone, Sally Barker, Tracey Hopkins (Diabetes Specialist Midwives)	Interim	Amendment on page 7 (Screening for GDM taking anti-psychotic medications Amendment on pages 14,15,31&33 (IV fluids for VRIII) Amendment on Page 20&21 (Appendix 1&2 – Schedules of care pathways) Amendment on pages 25&26 (Appendix 6 – Letter to GP to request postnatal follow-up fasting glucose check) Addition of Appendix 16: SOP Statement- Diabetes Monitoring systems/technologies & patient-held applications. Amendment of page 35 and Appendix 5 (removal of Glibenclamide as an alternative oral antidiabetic) Due for Full Review Jan 2026
2.3	July 2025	Stephanie Gregory (Diabetes specialist midwife)	Interim	Amendment on page 7-8 (Addition of pre-diabetic at booking) and (change to screening for GDM after 36/40). Signed as chair's action by CoS B. Sagoo on 15.07.2025

Related Documents

Document Type	Document Name
Guideline	Pre-term labour with Pre-term surveillance
Guideline	Large for gestational age
Guideline	Polyhydramnios
Guideline	Perinatal Mental Health