Gestational Diabetes Mellitus (GDM)

University Hospitals of Leicester NHS Trust

Trust ref:C14/2022

Contents

1. Introduction and Who Guideline applies to

This guideline applies to the management of gestational diabetes and its complications. This applies to obstetric, midwifery and neonatology staff.

Diabetes Care Team
The Diabetes Care Team consists of Consultant Obstetricians, Consultant Diabetologists, Diabetes Specialist Midwives (DSM), Diabetes Specialist Nurses (DSN) and Diabetes Specialist Dieticians (DSD).

Pregnant women and people with any risk factors for gestational diabetes mellitus (GDM) (Box 1) are offered an oral glucose tolerance test (OGTT).

Related documents:

Diabetes in Pregnancy UHL Obstetric Guideline UHL B33/2018
Hypoglycaemia - Neonatal UHL Neonatal Guideline UHL C22/2008

What's new?

- Gastric surgery management CBG testing updated – CBC testing 4x daily for 7 days If ≥3 or more readings are above target, treat as GDM. If 2 or fewer readings are above target, stop testing and discharge from diabetes ANC
- Added actions to be taken if recommended timing of birth declined
- Removed the need to monitor CBG at midnight & 04:00 in cases where corticosteroids have been administered
- Transfer and follow-up section updated
- Updated neonatal care in line with NEWTT2

2. Guideline standards & procedures

2.1 Information before Screening:
Advise that:

- There is a risk of birth complications if GDM is not detected or controlled
- GDM may respond to changes in diet and exercise in some people
- Insulin therapy or oral blood glucose lowering agents will be needed if diet and exercise do not control blood glucose levels
- Extra monitoring and care will be needed during pregnancy and labour

Box 1 - Risk factors requiring screening for GDM

A)

OGTT at 24-28 weeks gestation

- An ethnicity with a high prevalence of diabetes
- First-degree relative with diabetes
- BMI > 30 kg/m^2 at booking
- Polycystic ovary syndrome
- Previous macrosomic baby weighing 4.5 kg or more

B)

If the following risk factors are present; pregnant women and people need OGTT as soon as possible after booking and at 24 - 28 weeks gestation:

- Previous GDM
- Glycosuria, any quantity, at booking
- BMI > 45 kg/m^2

2.2 Oral Glucose Tolerance Test (OGTT):

For pregnant women and people with risk factors for GDM (Box 1 B) identified at the booking appointment;
Offer a 2-hour 75g OGTT as soon as possible after booking in order to detect undiagnosed pre-existing diabetes that may have pre-dated conception

Normal values for OGTT in pregnancy are:

- ✓ ***Fasting glucose: <5.6 mmol/l***
- ✓ ***2-hour glucose: <7.8 mmol/l***

- Community Midwives must electronically refer all abnormal OGTT via the GDM Mailbox
- If fasting glucose **> 7.0 mmol/l** or 2 hour glucose **> 11.0 mmol/l**; a same day telephone referral should be made to the diabetes team. If this is not successful an electronic referral should be made to the GDM Mailbox.
- The diabetes antenatal team will inform the primary health care team when a pregnant woman or person is diagnosed with GDM. This will include supplies for the glucose meter and any medications prescribed. This will also include guidance for postnatal screening as per NICE Diabetes in Pregnancy (*see postnatal section) nice.org.uk/guidance/ng3/diabetes-in-pregnancy-management-from-preconception-to-the-postnatal-period-pdf

2.3 Glycosuria;

If the pregnant woman or person presents with any glycosuria at booking; an immediate OGTT should be offered (due to the high prevalence of undiagnosed Type 2 diabetes in the local population).

Be aware that glycosuria of 2+ or above on 1 occasion or 1+ or above on 2 or more occasions detected by reagent strip testing during routine antenatal care may indicate undiagnosed GDM. If this is observed, consider further testing to exclude GDM.

- Before 32 weeks gestation; offer OGTT
- After 32 weeks gestation; offer a random blood glucose and HbA1c

If HbA1c ≥ 6.0%/ 42mmol/l and / or and random blood glucose >7.8 mmol/l; refer to antenatal diabetes team via the GDM Mailbox.

2.4 Estimates Fetal Weight (EFW) above 90th centile

If EFW above 90th centile book an appointment for GTT if possible before $32+^{0}$ weeks gestation or take an HbA1c if more than $32+^{0}$ weeks gestation. The antenatal diabetes team should be informed of abnormal results via the GDM Mailbox

2.5 Gastric Surgery

Pregnant women and people who have had a gastric bypass or a gastric sleeve may be unable to tolerate an OGTT.

- Instead refer to the diabetes antenatal team who will commence capillary blood glucose (CBG) between 26-28/40 to be planned on an individual basis
- Start CBG testing 4 times per day for 7 days. (Pre-breakfast and 1 hour after each meal)
- Review after 7 days. If 3 or more readings are above target, treat as GDM and continue testing. If 2 or fewer readings are above target, stop testing and discharge from diabetes ANC.

Some pregnant women and people who have had a gastric band may be suitable for an OGTT. Please refer to the antenatal diabetes team who will discuss this with them and make an individual plan.

2.6 Antenatal care for pregnant women and people diagnosed with GDM:

All pregnant women and people diagnosed with gestational diabetes will attend an educational session, this may be in a group format or one-to-one depending on the individual preferences, requirements and clinical capacity.

The aim is to deliver education within 7 days of an abnormal OGTT result.

Education may be delivered by members of the MDT including diabetes specialist midwife, diabetes specialist nurse, dietician and diabetes clinical aide.

Education will include:

- Implications (both short and long term) of the diagnosis for both mother and baby
- The importance of optimal, normal blood glucose control throughout pregnancy to reduce risks to mother and baby (Box 2)

- That treatment may involve both diet and exercise and could include medications
- To demonstrate self-monitoring of blood glucose and discuss the normal blood glucose targets that pregnant women and people should aim for.
- To recommend that pregnant women and people should adopt a healthy diet with low glycaemic index foods as opposed to high glycaemic index foods
- To recommend pregnant women and people take regular exercise (such as walking for 20-30 minutes post meals) to improve blood glucose control
- To recommend weight management post birth and to aim for a normal BMI.

Box 2 - Risks of Gestational Diabetes Mellitus in pregnancy

Risks to pregnant women, people and their babies include:
• Fetal macrosomia • Induction of labour or caesarean section • Birth trauma (to mother and/or baby) • Neonatal hypoglycaemia • Stillbirth • Neonatal death

2.7 Blood Glucose Targets and Monitoring

Time	Blood glucose mmols/L
Fasting and pre-meal	4.0-5.3
1 hour post meal	4.0-7.8
2 hours post meal (if 1 hour target is unachievable or hypoglycaemia occurs between meals)	4.0-6.4

- Advise pregnant women with GDM that they should test their fasting and 1-hour post meal blood glucose levels daily during pregnancy

2.8 GDM-Health App

All women diagnosed with gestational diabetes will be offered use of the GDM Health App.

This App provides the Diabetes Antenatal Team with a visual display of the users individual blood glucose (BG) readings. These readings are reviewed in a Virtual Clinic by the Diabetes Team each user will be reviewed as a minimum every two weeks

The Wavesense Jazz blood glucose meter which is provided to the women, links to the App on their smart phone via Bluetooth. The blood glucose readings are sent to the UHL Sensyne Health website in a secure format allowing the team to review each patient.
There is also a no reply text message service that is accessed via the website. This is used by the team to communicate with the pregnant women and people on an individualised basis.

The aim of this virtual clinic is to increase surveillance of blood glucose levels. This enables the team to identify those pregnant women and people who have blood glucose readings that are;

- out of target range
- those who are not testing blood glucose levels at the recommended times
- to offer additional support via messages through the App, telephone conversations or face to face clinic visits.

Exclusions to offering the use of the App are pregnant women and people with Type 1 Diabetes Mellitus or those who decline the virtual pathway. Pregnant women and people whose preferred language is not English, may also be unsuitable to use the App. This will be decided on an individualised basis. Some pregnant women or people may prefer to use the traditional face to face pathway. All will have clear documentation in their notes, as to the pathway that they are following.

2.9 Before their first appointment

- Pregnant women and people with GDM will be invited to download the App when they receive their appointment letter following a diagnosis of GDM.

- A member of the Diabetes Team will input details of the pregnant woman or person, onto the GDM health platform before their first appointment.

2.10 Education Session

- All pregnant women and people with GDM will be shown how to use their blood glucose meter in conjunction with the App and the functions within the App.

    - Functions available to access within the App

    Pregnant women and people will be informed that:

    - The diabetes team will review their blood glucose levels every two weeks
    - If they have any concerns they can request a call-back from the diabetes team via the App.

- This call-back must only be gestational diabetes specific and be in relation to their BG readings only. Any other queries or pregnancy concerns must be directed towards their community midwife, GP or MAU.
- Phone calls may take 2-3 days to be returned so if urgent, pregnant women and people must to be told to seek appropriate medical attention immediately
- That they will have a face to face appointment planned for around 36-38 weeks of pregnancy for a final review by the Diabetes Antenatal Team for a discussion of timing of birth.
- Pregnant women and people will be also advised of the importance of continuing their community midwife care as per NICE Antenatal Care pathway.

2.11 Review of GDM Health App by the Diabetes Antenatal Team

- On alternate weeks all pregnant women and people will have a review of their BG levels.
  Week 1 will be the LRI
  Week 2 will be the LGH.
- A text message contact via the UHL GDM Health website will be sent to all pregnant women and people who continue to use the GDM health App
- All contacts with pregnant women and people in the virtual clinic will be electronically recorded with up to date treatment details.
- Those whose blood glucose levels “red flag” will also be reviewed on a Monday, Wednesday and Friday staffing permitting.
  (red flags indicate higher or lower than expected blood glucose readings).
- Pregnant women and people who have already had a contact via a Red flag alert will not need a further review that week unless the Red Flag alerts again.
- If the pregnant woman or person is having difficulties or there is user non compliance, then an appropriate plan will be implemented and documented and a face to face clinic appointment arranged.

2.12 Initiation of Treatment

- If it is identified that a pregnant woman or person may need to start treatment, they are offered the next available appointment in clinic.

2.13 Bookmarking within the App

There is an option within the website to add bookmarks to the pregnant woman or person’s history, indicating a further review may be necessary by the clinician reviewing their BG.

Examples include:

- Review of treatment (and that this has been acknowledged by the user)
- Review of dietary advice
- Review of BG following text message contact via App.
- Review of findings of call back

Bookmarking can be used for any other reason as long as the clinician who bookmarks the patient enters a clinical note on the platform to ensure the next clinician is able to understand why they have been highlighted.

2.14 Communicating Prescription Changes

Clinicians during the virtual clinic will be able to telephone patients and document any changes to current treatment doses.

Once a medication change has been confirmed the GP needs to be updated via an appropriate letter.

2.15 Support

Technical support is provided by via Huma Health. All administrative users have this information and are able to cascade, either by telephone, or electronically any problems with APP functionality.

2.16 Green Diabetes Antenatal Paperwork

Pregnant women or people with GDM who are using the App will continue to have the green diabetes paperwork in their hospital records. This will continue to provide clinicians with their diagnosis and treatment at their last clinical contact.

Pregnant women and people will be able to show clinicians their BG readings from the App on their smartphone (instead of recording them in the yellow book that the traditional pathway users will still have).

The hand held records, electronic records and hospital notes will clearly identify which pathway they follow, and those using the GDm App. https://www.nhs.uk/nhs-app/

2.17 Treatment options for pregnant women and people with GDM.

- Offer a trial of change of diet and exercise to pregnant women and people with a fasting plasma glucose < 7.0 mmol/l at diagnosis

- Offer immediate treatment with insulin and/or metformin, as well as changes to diet and exercise, to pregnant women and people with a fasting plasma glucose > 7.0 mmols/l at diagnosis
- Consider immediate treatment with insulin and/or metformin, as well as changes to diet and exercise, to pregnant women and people with fasting plasma glucose between 6.0 - 6.9 mmols/l at diagnosis if there are fetal complications such as macrosomia or polyhydramnios
- Offer metformin if blood glucose targets are not met using changes in diet and exercise after 1 to 2 weeks
- Offer insulin if metformin is contraindicated or unacceptable to the pregnant woman or person.
- Offer additional insulin if blood glucose targets are not met using metformin, changes in diet and exercise.
- Measure HbA1c levels in all pregnant women and people with GDM at the time of diagnosis to identify those who may have pre-existing Type 2 diabetes

2.18 Inpatient care

- All pregnant women and people with GDM will be self-testing their blood glucose using meters that are provided for them by the diabetes team. It is vital that the following steps are taken so that an appropriate audit trail can be provided whilst under inpatient care.
- All medications including insulin to be locked away as per medicine management policy (Leicestershire Medicines Code UHL Policy)
- All pregnant women and people with any form of diabetes must have their CBG recorded accurately on the appropriate chart.
- At a minimum, these should be documented 4 times a day:
    - Before breakfast
    - One hour after breakfast, lunch and evening meal.

2.19 Intrapartum Care

Every pregnant woman or person with diabetes in pregnancy will have an intrapartum care plan for delivery, which is filed in the hospital notes. This is developed jointly by the obstetricians and diabetologists in discussion with the pregnant woman or person, usually from 36 weeks gestation.

Discuss with pregnant women and people with GDM on diet control alone the recommendations are to give birth no later than $40+^{6}$ weeks, and offer elective birth (by induction of labour or caesarean section) to pregnant women and people who have not given birth by this time.

Discuss with and advise pregnant women and people with GDM taking metformin and/or insulin UHL recommendations are to give birth no later than 40 weeks.

Timing of delivery should include individualised risk assessments of each woman including:

- Pregnancy complications e.g. hypertension, proteinuria
- Recent ultrasound scan including growth velocity and liquor volume
- Suspicion of undiagnosed pre-existing diabetes prior to pregnancy
- Other maternal and fetal complications as per local guidance.

If the pregnant woman or person declines the recommended timing of birth, individualised Consultant led care plan should be developed in association with the pregnant woman or person and MDT. Please also refer to the Induction and Augmentation of Labour UHL Obstetric Guideline

2.20 Care during labour and birth:

- Monitor blood glucose levels hourly if on insulin, aiming to maintain blood glucose levels between 4 - 8 mmol/l
- For pregnant women and people with GDM on insulin whose blood glucose is not maintained between 4 and 8 mmol/l:
  - Commence Variable Rate Insulin Infusion (VRII) **0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr**-(Appendix 2: Intravenous Insulin and Fluid Prescription)

2.21 Care prior to elective Caesarean Section:

- Consider antenatal steroids if elective Caesarean Section is planned <36/40.
- Adjust insulin dosage to account for pre-operative fasting.
- Monitor blood glucose level prior to going to theatre.
- Consider VRII and **0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr**: If on insulin and blood glucose is not maintained within 4 - 8 mmol/l

3. Protocol for the administration of steroids for pregnant women and people with GDM

VRIII is recommended when blood glucose levels cannot be maintained by normal anti-hyperglycaemic medication.

REMEMBER- if pregnant women and people are eating and drinking normally DO NOT use IV Glucose.

When eating and drinking normally - Use 50 units of Human Actrapid made up to 50mls with NaCl 0.9% (1 unit per ml) with no additional Glucose.
U&E should be taken every 12 hours.

Diabetes is not a contraindication to steroid treatment. However, steroids increase blood glucose (BG) significantly in pregnant women and people with diabetes. It is important that the decision to give steroids is carefully considered, discussed with a consultant and that the expected hyperglycaemia is managed appropriately. Steroids should only be given if the delivery is thought to be imminent or planned within the

next 48 hours. Steroids should not be given to pregnant women or people with diabetes after 35+6 weeks even if they are undergoing caesarean section.

3.1 For pregnant women and people on diet alone (no metformin or insulin):
Monitor capillary blood glucose pre-breakfast and 1 hour after meals.
If capillary blood glucose is ≥12 mmol/l, measure blood ketones, transfer to delivery suite and commence VRIII
Patients should eat and drink as normal.
If a patient is not eating and drinking e.g. being prepared for delivery by caesarean section or vomiting, IV fluids will be required:
Give **0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr** to manage the VRIII.
If additional IV fluids are required, Hartman's can be given.

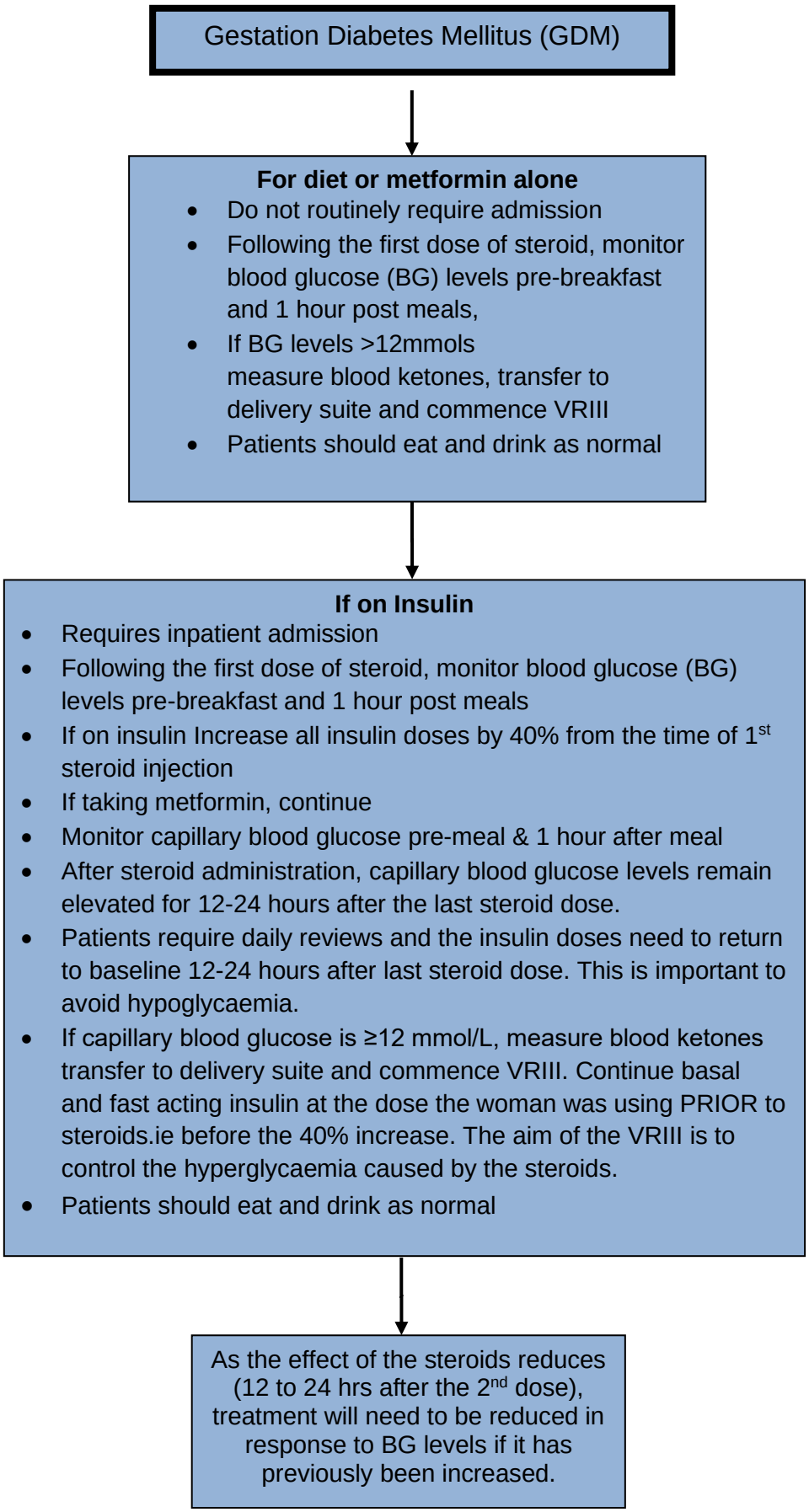
3.2 For pregnant women and people on metformin:
Continue metformin
Monitor capillary blood glucose pre-breakfast and 1 hour after meals.
If capillary blood glucose is ≥12 mmol/l, measure blood ketones, transfer to delivery suite and commence VRIII
Patients should eat and drink as normal.
If a patient is not eating and drinking e.g. being prepared for delivery by caesarean section or vomiting, IV fluids will be required:

Give **0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr** to manage the VRIII.
If additional IV fluids are required, Hartman's can be given.

3.3 For pregnant women and people on insulin:
Increase all insulin doses by 40% from the time of 1st steroid injection
If taking metformin, continue. Admit for monitoring of blood glucose levels following steroid administration.
Monitor capillary blood glucose pre-meals and1 hour after meals.
After steroid administration, capillary blood glucose levels remain elevated for 12-24 hours after the last steroid dose. Patients require daily reviews and the insulin doses need to return to baseline 12-24 hours after last steroid dose. This is important to avoid hypoglycaemia.
If capillary blood glucose is ≥12 mmol/L, measure blood ketones transfer to delivery suite and commence VRIII.

Continue basal and fast acting insulin at the dose the pregnant woman or person was using PRIOR to steroids.ie before the 40% increase. The aim of the VRIII is to control the hyperglycaemia caused by the steroids.
Patients should eat and drink as normal.
If a patient is not eating and drinking e.g. being prepared for delivery by caesarean section or vomiting, IV fluids will be required:
Give **0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr** to manage the VRIII.
If additional IV fluids are required, Hartman's can be given.

3.4 Administration of antenatal steroids in gestational diabetes flow chart



4. Postnatal Care

4.1 Information and advice

For postnatal women and people who were diagnosed with GDM:

- Offer lifestyle advice (including weight control, diet and exercise)
- To stop taking anti hyperglycaemic medication immediately after birth
- To stop blood glucose monitoring unless otherwise advised by the diabetes team
- Of the symptoms of hyperglycaemia
- Of the risks of GDM in subsequent pregnancies and the risks of developing Type 2 diabetes.

4.2 Transfer and follow-up

- The diabetes team will advise Primary care of the timing of the postnatal HbA1c according to EDD by ultrasound and appropriate referral into diabetes prevention programmes. This will include the importance of future pre conception counselling to be facilitated by primary care.
- Postnatal women and people should also receive a message to their phone via through the GDM health App to remind them of the recommended 13 week HbA1c and provide information on how to self-refer to diabetes prevention programmes.
- Postnatal women and people should have an annual HbA1c within the Primary care setting to assess the increased risk of Type 2 diabetes

4.3 Neonatal Care for babies born to mothers with Gestational Diabetes

- ✓ Babies of women with diabetes in pregnancy should be kept with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care
- ✓ Babies at risk of hypoglycaemia should have their vital signs observations monitored 4 hourly for the first 12 hours as per NEWTT2 recommendations
- ✓ Babies must have 2 consecutive normal pre-feed CBG levels (≥ 2.6 mmols) before being allowed home
- ✓ The baby should stay with the mother unless extra neonatal care is required
- ✓ Do not transfer babies into community care until they are at least 24 hours old, maintaining their blood glucose levels and feeding well

Preventing, detecting and managing neonatal hypoglycaemia

- ✓ UHL has a written policy for the prevention and management of symptomatic or significant hypoglycaemia in neonates

Feeding

- ✓ Antenatal colostrum collection should be discussed in line with routine discussion held between the pregnant woman or person at their 36 week antenatal appointment. Please refer to: Colostrum Collection – Antenatal UHL Obstetric Guideline

- ✓ Parent's should feed their babies within the first hour after birth'. If the baby does not feed at the breast the parent's should be helped to hand express and give any colostrum obtained, or antenatally collected colostrum. Up to 5 mls can be given. Subsequent feeds should be given at frequent intervals following responsive feeding principles, as a minimum every 2–3 hours) until pre-feed blood glucose levels are maintained at 2.6 mmol/l or more.

Test the baby's blood glucose levels:

- ✓ Before the 2nd and 3rd feed using a quality-assured method validated for neonatal use (ward-based glucose electrode or laboratory analysis).

- ➢ **If the baby has signs of hypoglycaemia; refer urgently to the Neonatal Team** Please refer to; Hypoglycaemia - Neonatal UHL Neonatal Guideline

5. Education and Training

UHL Mandatory annual update of insulin management in adults.

Diabetes management in pregnancy maternity essential to job training

6. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
2 yearly Essential to job role training complete	Mandatory training records	Training lead	Monthly dashboard	Womens' Quality & Safety Board
Women identified as at risk of GDM are referred for OGTT/HbA1c appropriately	Audit	Diabetic team	Annually	Departmental audit panel

7. Supporting References

Diabetes in pregnancy: management from preconception to the postnatal period NICE guideline [NG3] Published: 25 February 2015 updated 2020

https://www.nice.org.uk/guidance/ng3

Diabetes in Pregnancy UHL Obstetric Guideline UHL B33/2018
Hypoglycaemia - Neonatal UHL Neonatal Guideline UHL C22/2008

8. Key Words

Antenatal steroids, Blood glucose, Glucose Tolerance Test, Insulin, Metformin

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS			
Guideline Lead (Name and Title) H Maybury - Consultant			**Executive Lead** Chief Nurse
Details of Changes made during review:			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
Jan 2022	**1**	**Written by H Maybury**	**New guideline**
September 2021	**2**	**H Maybury** **L Taylor**	**Removed 500ml 0.9% NaCl + 5% glucose with 20 mmol/L KCl (0.15%) and replaced with 0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr, now to run at 125 mls/hr instead of 100ml/hr in line with Trust guidance. Newborn glucose monitoring amended in line with neonatal guidance.**

July 2024	**3**	**Tina Evans, Di Todd, H Maybury**	Risk factors - Removed family origin ethnicities specification list and replaced with NICE statement. GTT to be performed at 24-28 weeks (previously 26-28) Clarified glycosuria any quantity present at booking is a risk factor GDM mailbox added Gastric surgery management CBG testing updated – CBC testing 4x daily for 7 days If ≥3 or more readings are above target, treat as GDM. If 2 or fewer readings are above target, stop testing and discharge from diabetes ANC Pre-eclampsia & obesity and/or diabetes developing later in the baby's life removed from risks of GDM Added actions to be taken if difficulties with using the APP Added actions to be taken if recommended timing of birth declined Removed the need to monitor CBG at midnight & 04:00 in cases where corticosteroids have been administered Transfer and follow-up section updated Updated neonatal care in line with NEWTT2 Added link to A/N colostrum collection guidance Updated AN care pathway
September 2024	**3**	**L Taylor**	Updated neonatal glycaemic monitoring in line with NEWTT2 launched 02/09/24

ANTENATAL CARE PATHWAY FOR WOMEN WITH GESTATIONAL DIABETES*

Every woman is to keep in contact with her community midwife for routine care and Parentcraft information.

Women who have an abnormal OGTT at 8 – 16 weeks will follow the same care pathway as women with pre-existing diabetes

WEEKS OF PREGNANCY	ANTENATAL CLINIC	HbA1c	SCANS	BLOODS	INFORMATION
24 – 30 weeks	See DSM, DSN and Dietitian	✓	Growth Scan every 4w from 28/40 until delivery	FBC & antibody screen (Empath bloods) if not already taken. Anti-D if required	Diabetes and pregnancy Dietary Advice Home CBG monitoring Insulin start if indicated
31 – 34 weeks	2 weekly review of blood glucose control via GDM App Traditional pathway 2-4 weekly ANC		Growth Scan at 32/40		Documentation of blood results Review of blood glucose every 2 weeks via GDM App to continue until delivery
35 - 37 weeks	See DSM, Obstetrician, Diabetologist,		Growth Scan at 36/40	FBC	Discuss and document birth plan GDM on medication: • Arrange IOL or ELCS from 38 weeks onwards GDM on diet control: • IOL for 40-40+6 or ELCS for 39/40
40 weeks	Routine A/N appointment with Community M/W				

Telephone contact is maintained between appointments with the Diabetes Specialist Nurse and/or Diabetes Specialist Midwives if required.

Appendix 2: Intravenous Insulin and Fluid Prescription

For use during pregnancy and labour for ALL patients receiving Variable Rate Intravenous Insulin Infusion (VRIII) **NEVER use an IV syringe to draw up insulin** **ALWAYS draw up insulin using an insulin syringe** **ALWAYS continue subcutaneous intermediate* or basal insulin**** ***Intermediate: Insulatard, Humulin I, Insuman basal** ****Basal: Lantus (Glargine),Levemir (Detemir), Tresiba (Degludec), Toujeo** **Doctor: All prescriptions for insulin and fluids must be signed** **Nurse/Midwife: All entries must be signed**	Ward	Consultant	Admission Date: Discharge Date:
	Surname		First Name
	Hospital Number		Date of Birth/Age
	NHS Number:		
	Address		

	DOSING ALGORITHM (please see guide below)		
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)**
CBG Levels (mmol/L)	Infusion rate (units/hr=ml/hr)		
<4	STOP INSULIN FOR 20 MINUTES Treat hypo as per guideline (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
>20.1	4.0	6.0	8.0
Signed			
Print name			
Date			

ALGORITHM GUIDE

- All women with diabetes should have Capillary Blood Glucose (CBG) testing hourly in established labour or at least once on admission for induction of labour or elective C-Section
- Start VRIII and fluids if two consecutive CBG's >target (see below) or at the start of established labour if the woman has type 1 diabetes.

Algorithm 1
Most women will start here

Algorithm 2
Use this algorithm for women who are likely to require more insulin (on steroids; on >80 units of insulin during pregnancy; or those not achieving target on algorithm 1)

Algorithm 3
Use this for women who are not achieving target on algorithm 2 (No patient starts here without diabetes or medical review)

If the woman is not achieving targets with these algorithms, contact the diabetes team (out of hours: Medical SpR on call)

Target CBG level=4-7mmol/L

Check CBG every hour whilst on VRIII and every half an hour if under anaesthesia

Move to the higher algorithm if the CBG is >target and is not dropping – D/W Obstetric team

Move to the lower algorithm if CBG falls below 4 mmol/L or is dropping too fast – D/W Obstetric team

Drug (approved name) Please tick	Dose	Volume	Route	Prescribers signature	Prescriber Print name	Date	SYRINGE PREPARATION			
Human Actrapid	☐ 50 UNITS	Made up to 50mls with NaCl 0.9% (1 UNIT per ml)	IV				Prepared and administered by:	Date	Time started	Time stopped

INTRAVENOUS SUBSTRATE FLUID PRESCRIPTION

Date	Intravenous Fluid and Rate	Alternative Rate	Prescriber's Signature	Nurse's Signature
	0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr			
	0.18% NaCl with 4% glucose with 0.3% KCl with 20 or 40 mmol/L at 125 ml/hr			

PRESCRIPTION OF INTRAVENOUS MANAGEMENT OF HYPOGLYCAEMIA

Date	Time	Preparation	Volume	Route	Duration	Prescriber's Signature	Print Name	Given by	Time given
		20% Dextrose	100 mls	IV	15 mins				

CAPILLARY BLOOD GLUCOSE MONITORING

Date	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00
CBG												
Insulin rate												
Blood Ketones												
Initials												
Date	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00
CBG												
Insulin rate												
Blood Ketones												
Initials												

GESTATIONAL DIABETES:
STOP VRIII and IV substrate Fluid regimen once placenta is delivered

TYPE 1 DM and INSULIN TREATED TYPE 2 DM
Reduce the rate of VRIII by HALF once placenta is delivered. Contact diabetes team to review on-going insulin requirements

Patients with type 1 DM on insulin pumps should be referred to the Diabetes Specialist Team

Maintain IV insulin infusion for 30 minutes after re-starting original insulin regimen – IV insulin has a 5 minute half-life