# Gestational diabetes mellitus (GDM)

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| **Target audience** | Maternity staff |
| **Patient group** | Pregnant women/birthing people with GDM. The term 'women/birthing people' is used within this document to include women, girls, trans men, and non-binary and intersex people, who are pregnant or have recently been pregnant. |

## Summary

This guideline supercedes that called "Guideline for screening for gestational diabetes in Lanarkshire" (Nov 2020).

Gestational diabetes mellitus (GDM) is a form of diabetes which develops during pregnancy. Due to elevation in maternal blood glucose (sugar levels), these pregnancies are high risk of complications to both mother and fetus. This includes fetal macrosomia, shoulder dystocia, neonatal hypoglycaemia, fetal respiratory distress, polyhydramnios, caesarean birth, pre-eclampsia and stillbirth. Patients who develop GDM have a ~50% chance of developing type 2 diabetes after pregnancy.

Dietary management, metformin and insulin therapy are the only options safe in pregnancy to help control blood glucose in GDM.

Most GDM patients (~60-80%) however can be safely managed with consultant led, community based maternity care using this pathway, for women requiring diet +/- metformin only. Patients requiring only diet or metformin for GDM have a lower risk of adverse outcomes. Patients needing insulin, however, have higher risk of adverse outcomes and should continue to attend a UHW (University Hospital Wishaw) medical obstetric clinic.

The aim of this pathway is to give guidance about management of GDM patients using diet +/- metformin in the community in NHS Lanarkshire and when to refer back to the UHW medical obstetric service.

Any GDM patient concerns/queries can always be discussed with the diabetes specialist nurses (DSN) and dietitians or obstetric/diabetes teams at the UHW medical obstetric clinics (contact numbers at end of this pathway).

# Contents





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| **Lead author** | J McLaren | **Date approved** | 19.11.25 |
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# Chapter 1 – screening

## Risk factors

A risk factor assessment should be made at booking and a 75g glucose tolerance test (GTT) undertaken at the appropriate gestation if the following risk factors are present:

| Risk factor | Gestational age (weeks) |
|---|---|
| BMI (body mass index) ≥ 30 kg/m$^2$ | 24-26 weeks |
| Previous gestational diabetes | At booking (ideally 10-14 weeks) and if normal, repeated at 24-26 weeks |
| Family history of type 1 or 2 diabetes in first degree relative (mother, father, child or brother/sister) | 24-26 weeks |
| Family origin with high prevalence of diabetes* | 24-26 weeks |
| Previous macrosomic baby ≥ 4.5kg | 24-26 weeks |
| Maternal age ≥ 40 years | 24-26 weeks |

*Minority ethnic origin/high diabetes prevalence areas include South Asia - India, Bangladesh, Sri Lanka, Pakistan, Black African/Caribbean, Middle Eastern - Saudi Arabia, United Arab Emirates, Lebanon, Egypt, Iraq, Jordan, Syria, Oman, Qatar and Kuwait.

Risk factor assessment is continuous throughout pregnancy and a 75g GTT should be undertaken, ideally within one week, if the following develop during pregnancy:

| Risk factor developing during pregnancy |
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| Urine glycosuria ++ on one occasion |
| Urine glycosuria + on more than one occasion |
| Macrosomia (estimated fetal weight ≥ 97$^{th}$ centile) |
| Polyhydramnios (deepest vertical pool ≥ 8cm) |

- If the patient has already had an GTT during current pregnancy but a new risk or factors develop, please discuss with senior obstetric staff / medical obstetric team regarding if and when a further GTT is indicated.

- If the patient has had previous bariatric surgery, a GTT is not indicated due to poor tolerability. Instead, perform HbA1c and 1 week of blood glucose monitoring.

## GTT process

When attending for a GTT, patients should be advised of the following:

- Not to have anything to eat or drink (except sips of plain water) after 10.30pm the night before the appointment.
- Prescribed medication should be taken as normal.
- Not to smoker or vape from midnight the night before the test until after the second blood sample has been taken.
- During the test, they will be asked to sit for two hours and avoid eating/drinking/smoking/activity during this time.

## GDM diagnosis

The following diagnostic criteria are based on a 75g GTT:

- Fasting blood glucose ≥ 5.3 mmol/L (and/or)
- 2-hour blood glucose ≥ 9 mmol/L

Patients with an impaired GTT, consistent with GDM, should be directly referred to the Lanarkshire Diabetes in Pregnancy service on receipt of results by the maternity day care unit staff.

## Chapter 2 – follow-up

- See appendix 1.
- Once GDM is confirmed refer the patient for dietary education and to commence finger-prick blood glucose monitoring.
- Maternity daycare unit staff should assign the patient onto the Trakcare list for the diabetes specialist dietician for initial education. During this appointment, they will be given dietary and blood glucose monitoring advice.
- Patients should simultaneously be referred to either Monday or Thursday UHW medical obstetric clinic depending upon their address/locality. Both clinic appointments should be made at time of initial GDM diagnosis. The patient should have an appointment for dietary/blood glucose monitoring education and medical obstetric clinic appointment 1-2 weeks later.
- After patients have had dietary and blood glucose education, they should commence blood glucose monitoring and attend a UHW medical obstetric clinic 1-2 weeks later with their blood glucose monitoring diary.
- At the medical obstetric appointment, the following should be discussed:
    - the potential obstetric complications of GDM.
    - the importance of optimising glycaemic control to reduce chance of complications.
    - assessment of third trimester fetal growth on ultrasound is recommended every 4 weeks until delivery.
    - hourly blood glucose testing is recommended in labour.
    - birth no later than 40+6 weeks of gestation is recommended for patients with uncomplicated GDM.
    - post-natal testing is recommended – fasting plasma glucose 6-13 weeks after birth followed by annual $HbA1_c$ in primary care – this should be detailed by letter to the GP (general practitioner) from clinic medical staff.
    - Advise post-natal screening for hypoglycaemia will be offered to baby.
    - In subsequent pregnancies, early GTT will be offered due to the risk of GDM recurrence.
- An $HbA1_c$ measurement should be taken at the 1st medical obstetric appointment to screen for undiagnosed type 2 diabetes ($HbA1_c$ >48 mmol/mmol).
- All GDM patients will initially be reviewed at a UHW medical obstetric clinic for 1st visit:
    - If the patient is low-risk, her $HbA1_c$ is <48mmol/mmol, and blood glucose readings are stable on diet or metformin, she can be referred to the community obstetric consultant clinic (see flowchart below). A referral for third trimester growth scans should be made by the clinician reviewing the patient in the medical obstetric clinic. A dictated letter should be sent to the local community consultant. A referral via BadgerNet to the patient's community midwife by the specialty clinic midwife should be completed, in order to inform them of the referral back to the community with recommendations for timing of the next appointment. For patients who do not require metformin, review every four weeks in the consultant antenatal is likely to be sufficient, however this will need to be individualised for each patient. Patients should be offered an

appointment two weeks after commencing metformin in order to assess their glycaemic control.

- If the patient is high-risk or if the $HbA1_c$ is ≥ 48mmol/mmol, if the blood glucose measurements are unable to be measured or if she requires insulin therapy, care should continue to be provided by the medical obstetric clinic.

# Chapter 3 – management (see appendix 2)

## Dietary management and exercise

Dietary improvement is the first line treatment for GDM. It is critical that patients with GDM adhere to dietary advice during pregnancy.

Dietary advice should be given emphasising carbohydrate awareness and reduction of carbohydrate intake to around 120-180g per day split into approximately 15-20g at breakfast and 40-60g at lunch and dinner. Mid-meal snacks, if eaten, should be 10-15g. Replacing simple sugars/high glycaemic index carbohydrate/processed carbohydrate with more complex/low glycaemic index carbohydrates is recommended.

Patients with GDM should also be encouraged to complete at least 150 minutes of individualised moderate physical activity per week as this can significantly improve blood glucose measurements.

Patients should have had appropriate dietary education at the 1st dietician appointment prior to attending clinics. However, if there are uncertainties, the patients can contact the dietician for review.

## Monitoring

Patients are advised to keep a daily diary of a minimum of four finger-prick blood glucose measurements per day. Patients should test fasting blood glucose every day on waking, as well as a minimum of three other blood glucose tests. Recommend testing pre-meals and 2-hour post meals on alternate days. This testing pattern allows the patient and the diabetes team to assess the overall blood glucose control across the week. If HbA1c ≥48 mmol/mmol this indicates type 2 diabetes, rather than GDM, and patient should continue to attend UHW medical obstetrics for pregnancy care.

## Blood glucose targets

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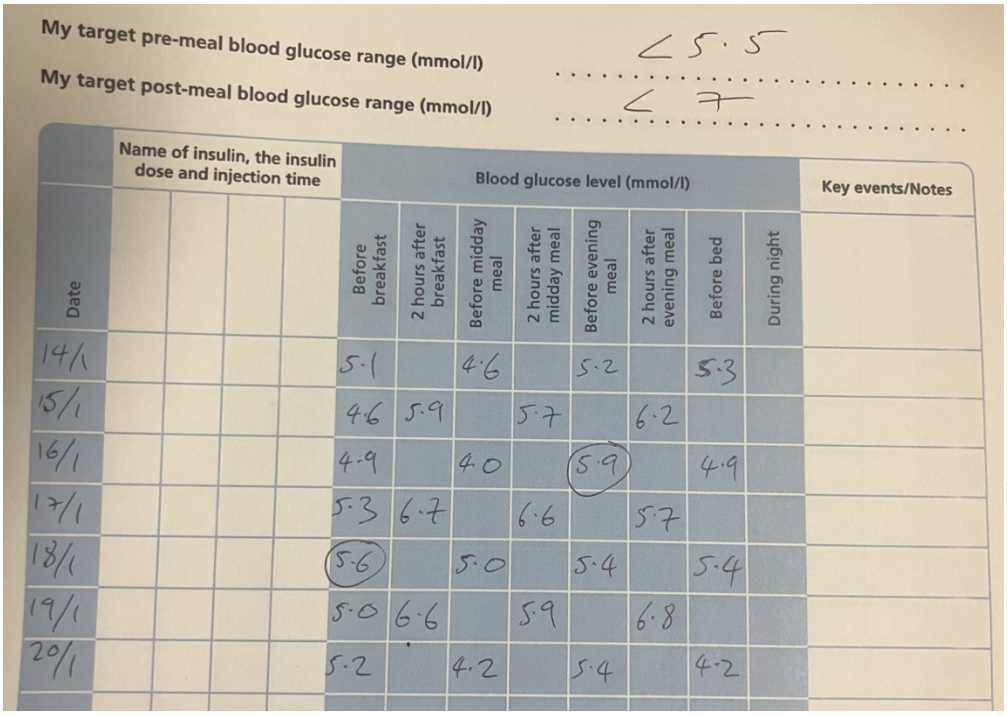
| **Fasting blood glucose** | < 5.5 mmol/L |
| **Pre-meal blood glucose** | < 5.5 mmol/L |
| **2-hour post-meal blood glucose** | < 7 mmol/L |

It is recommended that when taking any pre-bed blood glucose measurements, these are measured at least 2-hours post-food, and as for other 2-hour blood glucose measurements, the target should be <7mmol/L, when GDM is managed with diet and/or metformin.

If 10% or more blood glucose measurements are above target, despite adhering to a healthy diet, patients should be counselled/recommended to escalate treatment and commence on metformin 500mg twice daily (taken at breakfast and dinner).

For example if patients are testing 4 times per day, 3 abnormal readings or more of the 28 may suggest they need to commence or escalate treatment for sub-optimal glycaemic control. The below photograph is an example of well-controlled GDM:

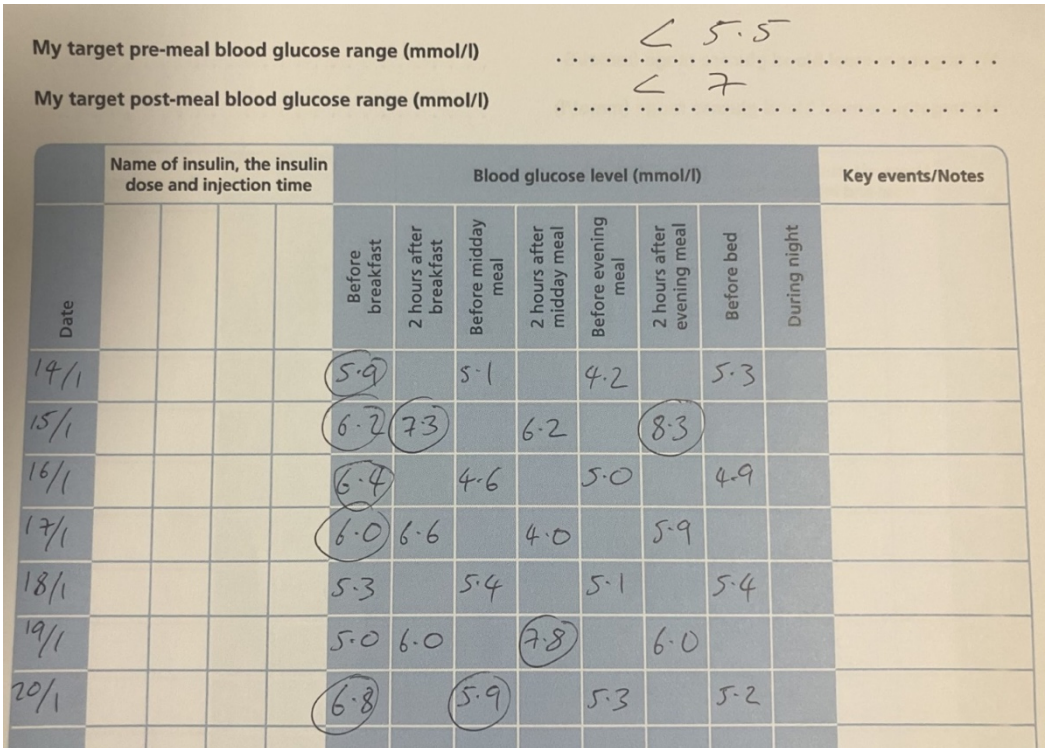


My target pre-meal blood glucose range (mmol/l) < 5.5

My target post-meal blood glucose range (mmol/l) < 7

| Date | Name of insulin, the insulin dose and injection time | Blood glucose level (mmol/l) | | | | | | | Key events/Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | Before breakfast | 2 hours after breakfast | Before midday meal | 2 hours after midday meal | Before evening meal | 2 hours after evening meal | Before bed | During night | |
| 14/1 | | 5.1 | | 4.6 | | 5.2 | | 5.3 | | |
| 15/1 | | 4.6 | 5.9 | | 5.7 | | 6.2 | | | |
| 16/1 | | 4.9 | | 4.0 | | (5.9) | | 4.9 | | |
| 17/1 | | 5.3 | 6.7 | | 6.6 | | 5.7 | | | |
| 18/1 | | (5.6) | | 5.0 | | 5.4 | | 5.4 | | |
| 19/1 | | 5.0 | 6.6 | | 5.9 | | 6.8 | | | |
| 20/1 | | 5.2 | | 4.2 | | 5.4 | | 4.2 | | |

The following example suggests sub-optimal control with >10% of readings above target despite good dietary adherence. This patient may be counselled and advised to commence on metformin 500mg twice daily (circled values are above target).



My target pre-meal blood glucose range (mmol/l) < 5.5

My target post-meal blood glucose range (mmol/l) < 7

| Date | Name of insulin, the insulin dose and injection time | Blood glucose level (mmol/l) | | | | | | | Key events/Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | Before breakfast | 2 hours after breakfast | Before midday meal | 2 hours after midday meal | Before evening meal | 2 hours after evening meal | Before bed | During night | |
| 14/1 | | (5.9) | | 5.1 | | 4.2 | | 5.3 | | |
| 15/1 | | (6.2) | (7.3) | | 6.2 | | (8.3) | | | |
| 16/1 | | (6.4) | | 4.6 | | 5.0 | | 4.9 | | |
| 17/1 | | (6.0) | 6.6 | | 4.0 | | 5.9 | | | |
| 18/1 | | 5.3 | | 5.4 | | 5.1 | | 5.4 | | |
| 19/1 | | 5.0 | 6.0 | | (7.8) | | 6.0 | | | |
| 20/1 | | (6.8) | | (5.9) | | 5.3 | | 5.2 | | |

## Metformin

Metformin is a biguanide medication used in gestational diabetes, as well as type 2 diabetes. It works by increasing the patient's sensitivity to insulin, so glucose is more easily transported into cells in the body. Metformin typically takes around 10-14 days to work and reduces elevated blood glucose to a healthier level. The reduction in maternal blood glucose levels consequently decreases the amount of excess glucose delivered to the fetus, via the placenta. The decrease in excess blood glucose reduces fetal and obstetric complications and improves obstetric outcomes.

Metformin has shown to be safe in pregnancy for both the mother and baby with no evidence of short or long term complications.

Patients should have an estimated glomerular filtation rate (eGFR) >30ml/min prior to starting metformin.

Metformin is contraindicated if patients have significant liver disease in pregnancy. If alanine aminotransferase (ALT) or bilirubin is more than twice the upper limit of normal, discuss with medical obstetric team prior to starting metformin.

The recommended starting dose of metformin in pregnancy is 500mg twice daily taken at breakfast and dinner. A prescription request should be made to the patient's GP via email (from medical staff). This should be followed up with a dictated letter to the GP, including that the request for metformin has been made by email.

Patients should be aware that approximately 30% of patients can experience side-effects of gastrointestinal upset/nausea/diarrhoea. If these symptoms do not improve after 1-2 weeks they should be switched to slow/modified release metformin, which can be prescribed as once daily metformin 1 gram modified release at breakfast. If patients cannot tolerate modified release metformin, due to gastrointestinal upset, they should be referred to UHW medical obstetric clinic to consider starting insulin.

Patients starting on metformin 500mg twice daily should be reviewed after 2 weeks face-to-face or virtually to see if the blood glucose measurements are now at target. If not, metformin should be increased to a maximum dosage of 1 gram twice daily (breakfast/dinner) or 2 grams once daily (modified release) at breakfast.

If not at target 2 weeks after increasing metformin to 1g twice daily (maximum dose) patients should be referred to UHW medical obstetric clinic for consideration of starting insulin in pregnancy.

Women who develop GDM in pregnancy and are commenced on metformin for this reason, routinely stop metformin after the birth of baby. This information should be included in the dictated letter to the women's GP at the time metformin is first commenced.

# Appendix 1 – patients who should attend the UHW medical obstetric clinics

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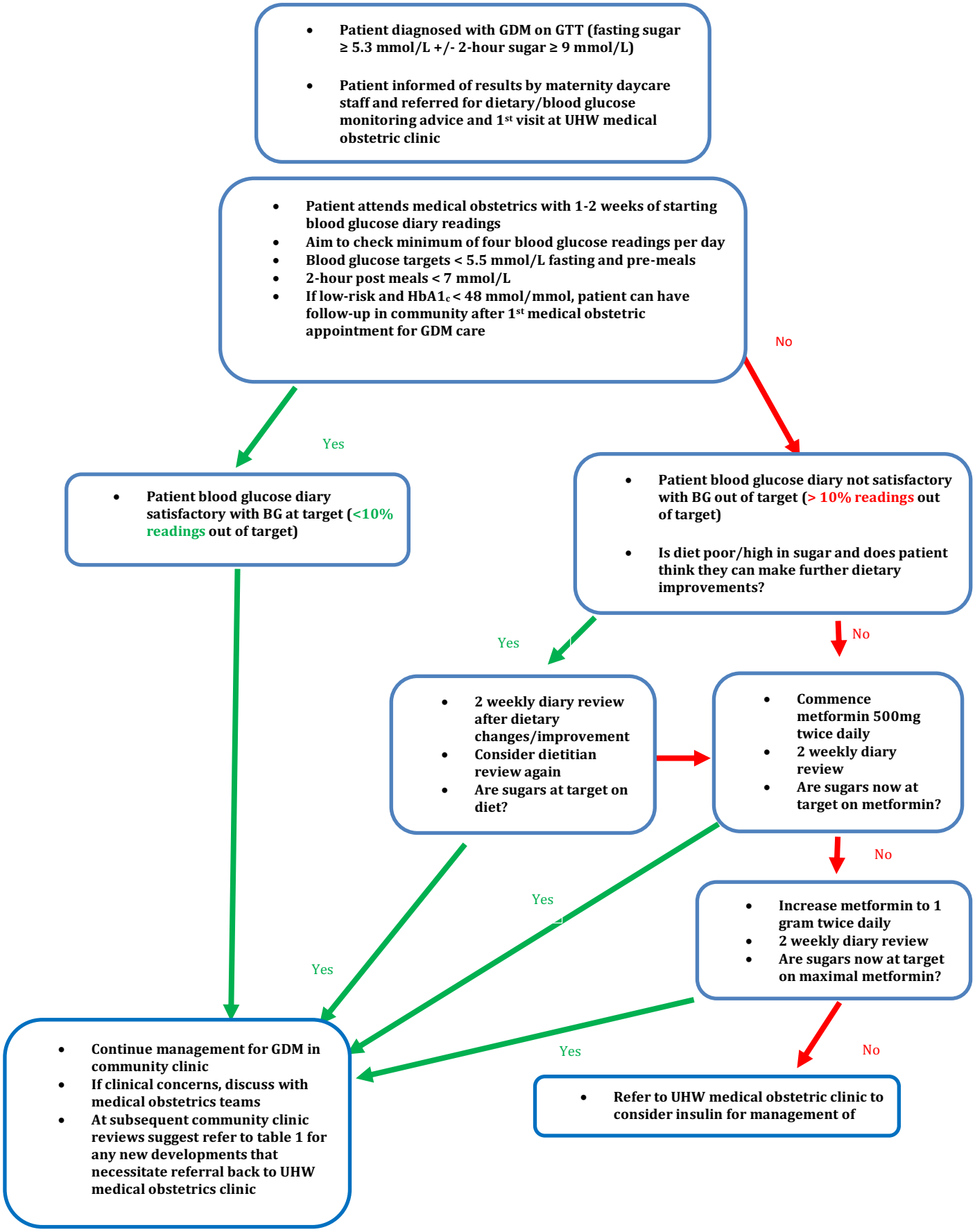
| • Patients where blood glucose measurements remain above target despite maximum metformin 1gram twice daily. |
| • Patients who cannot tolerate metformin, due to ongoing gastrointestinal upset/side-effects, with blood glucose measurements above target on diet only. |
| • If HbA1c ≥48 mmol/mmol (indicative of undiagnosed type 2 diabetes). |
| • Any patients whose blood glucose measurements are unusually high (>10mmol/L) on three or more occasions. Most patients with GDM on diet +/- metformin tend to have blood glucose measurements in single digits and blood glucoses > 10mmol/L, on three or more occasions, should be discussed with diabetes teams as may need seen in medical obstetric clinic. |
| • Patients who develop additional obstetric complications such as sudden accelerative fetal growth velocity, severe polyhydramnios or maternal concerns (obstetric cholestasis or hypertension) should be discussed with the medical obstetric team. |
| • Patients requesting care out with guidelines in relation to GDM (e.g. homebirth, declining glycaemic monitoring). |
| • If concerns from local obstetric consultant. |
| • If referral back to medical obstetrics clinic is indicated, the patient should be referred to either the Monday or Thursday clinic depending on which clinic they attended for their first medical obstetric appointment, prior to community follow-up. |

# Appendix 2 – GDM management flowchart



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## Useful contacts

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|---|---|
| **Medical obstetric scanning department (to book UHW medical obstetric clinic appointments)** | 01698 366340 |
| **Diabetes specialist nurses (DSN)** | 01698 752118 (Monklands)<br>01698 366361 (Wishaw)<br>01355 585230 (Hairmyres) |
| **Diabetes specialist dietitians (DSD)** | 01698 754890 |
| **UHW diabetes consultant/registrar inpatient review for maternity ward patients** | Refer online via TRAKCARE for diabetes doctor review. If need emergency/same day advice phone diabetes secretaries on extensions 5883/6063 at UHW to find which diabetes consultant on call/on site. |
| **Medical obstetric consultants** | Dr Colin Malcolm<br>Dr Eleanor Jarvie<br>Dr Hilary Godsman<br>Dr Gordon Buchanan<br>Dr Alison Duncan |

# References

SIGN guideline 171 – Management of diabetes in pregnancy (published 2024)

https://www.sign.ac.uk/media/2205/sign-171-management-of-diabetes-in-pregnancy.pdf

NICE guideline NG3: Diabetes in pregnancy: management from preconception to the postnatal period (guidance last updated 2020)

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

# Clinical governance

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