

ANTENATAL OUTPATIENT CARE FOR GESTATIONAL DIABETES

A condition of high Blood Glucose (BG) in pregnancy due to increased insulin resistance. If not addressed high BG can result in significant fetal and neonatal adverse outcomes and longer-term sequelae for the woman and baby. Therefore, an individualised plan for glucose testing, education, management and treatment is recommended if glucose targets are not achieved.

A management plan, in partnership with women, including diet and lifestyle modification can often achieve improved glucose levels, however most will require medication in the form of metformin and or insulin.

DIAGNOSIS

SCREEN ALL WOMEN AT BOOKING WITH GLYCATED HAEMAGLOBIN (HbA1c)

- Those with an elevated booking HbA1c ≥ 41 to 49 mmol/mol refer to the **Diabetes in Pregnancy Team** at Christchurch Women's Hospital (CWH).
 - one week home BG testing QID at diagnosis, if normal further week of testing between 24-28 weeks and at any stage if clinical concern
 - those who decline testing, offer dietary education/advice and organise oral glucose tolerance test (OGTT) at 24 weeks. Repeat OGTT at 30 weeks' gestation if there are clinical concerns
 - health coaching to improve diet and activity levels. Enquire about other social determinants of disease – such as disrupted sleep, stress, food security, transport
 - those with BG readings outside the targets follow the gestational diabetes treatment pathway (Appendix C)

Targets	Fasting BG (FBG) ≤ 5 mmol/L one-hour post meal ≤ 7.4 mmol/L
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- Those with a booking HbA1c ≥ 50 mmol/mol, commence BG testing and refer to physician clinic at CWH for assessment as likely pre-existing diabetes.

AT RISK GROUPS OFFER OGTT BETWEEN 24-28 WEEKS GESTATION

- BMI > 30 kg/m²
- Previous macrosomic baby weighing > 4.5 kg or $> 90^{\text{th}}$ centile customised
- Previous gestational diabetes mellitus (GDM) * (**offer OGTT at 24 weeks and repeat at 30 weeks if negative**)

- Family history of diabetes (first-degree relative with diabetes)
- An ethnicity with a high prevalence of diabetes such as Māori, Pacific, Indian, Middle Eastern, African, Filipino and other Asian ethnicities
- Polycystic ovarian syndrome

OTHER SITUATIONS THAT NEED SCREENING FOR GDM

- Glycosuria detected by routine antenatal testing
 - 2+ or above on 1 occasion
 - 1+ or above on 2 or more occasions
- Women with a macrosomic baby > 90th centile customised or polyhydramnios
 - OGTT if ≤ 32 weeks
 - seven days of BG testing QID if > 32 weeks

BG testing offered up until 36 weeks for diagnosis and further management.

PREVIOUS BARIATRIC SURGERY

These women do not tolerate OGTT, so offer BG testing QID for 1 week from 24-28 weeks.

DIAGNOSIS OF GDM

- 75 g OGTT

FBG ≥ 5.5 mmol/L
OR
2 hr BG ≥ 9.0 mmol/L

- BG testing QID and review BG results

FBG > 5.0 mmol/L
One-hour post meal > 7.4 mmol/L

- If ≥ 3/7 days FBG levels are elevated, refer to diabetes in pregnancy team at CWH
- If ≥ 3/7 days post-meal BG levels are elevated at one or more given time points, ie. at breakfast, lunch, or dinner refer to diabetes in pregnancy team at CWH

At the time of diagnosis of GDM:

- Women will require a script for BG meter, test strips, PET screen (due to the higher incidence of developing PET)
- Referral to the diabetes in pregnancy team with the women's e-mail address, height and weight and if any of the above has been done
- Growth scans at 28 weeks (or at time of diagnosis if later) and at 36-37 weeks in the community if there are no barriers, otherwise through CWH
- Women will be sent a diabetes package by e-mail or by post. Option given of video link or face to face for teaching/coaching

The following will be provided by the Diabetes in Pregnancy Team:

- Script for BG meter, test strips, PET screen if not already done by LMC
- Explain BG testing and targets
- Provide initial dietary, exercise and meter information
- In the diabetes package will be lifestyle post baby information sheet/notification letter to GP for HBA1c

Glucose targets	<ul style="list-style-type: none">• FBG/waking BG \leq 5.0 mmol/L• One-hour post meal \leq 7.4 mmol/L (preferred) OR <ul style="list-style-type: none">• Two-hour post meal $<$ 6.7 mmol/L (if unable to do one hour post-meal)
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Diabetes in Pregnancy Team will offer face-to-face appointment under these circumstances:

1. Women who need interpreters for health education
2. Women with poor health literacy

DIABETES IN PREGNANCY TEAM

After one week of BG testing, the dietitian will review BG levels, reinforce lifestyle management and contact the women one to two weekly to assess if dietary control alone is adequate.

ONGOING MANAGEMENT OF DIET CONTROL GDM

If BG targets are managed on diet alone, LMC to organise growth scan at 36-37 weeks in the community if no barriers, or by diabetes in pregnancy team at CWH. If any abnormality with scan to be seen by obstetrician.

PARAMETERS FOR TREATMENT

Determined by BG levels and potential fetal adverse effects.

- Women with frequently elevated BG levels (3 out of 7 days) after meals despite lifestyle (diet and exercise) modification will be offered an appointment with the diabetes in pregnancy team to commence metformin
- If pre- and post-meal BG targets are not met within one to two weeks after lifestyle modifications and metformin, offer insulin in addition to metformin → for physician appointment
- Those who have a FBG level of 7.0 mmol/L or above (three out of seven days) may require insulin treatment, with or without metformin → physician appointment
- Those who have a FBG level of between 6.0 and 6.9 mmol/L (three out of seven days) and complications such as macrosomia or polyhydramnios, consider immediate treatment with insulin, with or without metformin → physician appointment.

Metformin:	Diabetes midwife or physician to prescribe
Insulin:	Physician consultation

METFORMIN PRESCRIBING FOR GDM

Metformin may be offered to women with confirmed GDM who have not achieved adequate control of BG levels on diet alone. Metformin is a safe and effective alternative to insulin for glycaemic control. Women treated with metformin have reduced weight gain in pregnancy, reduced risk of hypertension and neonatal hypoglycaemia compared to women treated with insulin.

Inadequate control is defined as three or more BG levels outside the target of FBG \leq 5mmol/L and/or one-hour post meal of \leq 7.4mmol/L over seven days.

If FBG is $>$ 7mmol/L, metformin alone is unlikely to be sufficient to control glucose levels and insulin should be initiated, with or without metformin.

Metformin should be avoided if there is evidence of significant renal impairment (eGFR $<$ 45 mLs/minute), ongoing maternal weight loss, sepsis, significant gastrointestinal upset, pre-eclampsia or conditions putting women at increased risk of lactic acidosis such as prolonged fasting and hepatic insufficiency (LFTS 2 x upper limit normal).

Avoid metformin if evidence of fetal growth restriction on a customised GROW chart, as this may be an indication of a placental problem. Metformin can still be used if a constitutionally small fetus but seek physician advice if $<$ 30th centile.

Dose should be commenced at 500 mg daily increasing to 500 mg twice daily with further increases to a maximum of 2.5 g daily in divided doses as required to achieve BG targets and as tolerated.

Metformin should be ceased if there are significant gastrointestinal side effects such as vomiting and persistent diarrhoea.

METFORMIN IMPORTANT PRESCRIBING POINTS

Avoid if:

- Significant fetal growth restriction which may reflect placental insufficiency (can use if constitutionally small fetus)
- Ongoing maternal weight loss
- Maternal contraindications such as sepsis, significant GI upset, pre-eclampsia, renal failure or conditions that put women at risk of lactic acidosis

****Check renal and liver function before starting**

OBSTETRIC REVIEW FOR WOMEN WITH GDM ON TREATMENT:

- At 36-37 weeks with a scan
- Generally OG1/OG3 team

TIMING OF BIRTH

All women referred for induction of labour or elective caesarean section will follow the Timing of Birth for specific Obstetric Indications (TOBA) multidisciplinary team criteria, to optimise gestation at birth.

MATERNAL CONDITIONS	TIMING OF BIRTH
GDM – diet controlled	41 weeks
GDM – metformin or insulin well-controlled	40 weeks
Type 2 DM – good control	39-40 weeks
Type 2 DM – poor control	38-39 weeks
Type 1 DM	38-39 weeks

BREASTFEEDING AND GDM

For people with GDM, breastfeeding can reduce the chance of developing Type 2 Diabetes.

- People with GDM are 1.84 times more likely to experience a delay in onset of lactation (DOL) than people without GDM
- Delay in lactation > 72 hours
- Maintaining a stable BSL reduces the chance of DOL

Providing there are no contraindications, from 36 weeks gestation, teach all people with GDM about antenatal colostrum harvesting (ACH).

BENEFITS OF ACH

- Hand expressing, an important skill for breastfeeding is learned
- Use of colostrum harvested antenatally helps support and treat neonatal hypoglycemia

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<http://nationalwomenshealth.adhb.govt.nz/assets/Womens-health/Documents/Policies-and-guidelines/Diabetes-in-Pregnancy-.pdf>
3. Diabetes in pregnancy: management from preconception to the postnatal period NICE guideline [NG3] Published: 25 February 2015 Last updated: 16 December 2020
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BREASTFEEDING REFERENCES

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5. Matias, S.L., Dewey, K.G., Quesenberry, C.P., & Gunderson, E.P. (2014) Maternal obesity and insulin treatment during pregnancy are independently associated with delayed lactogenesis in women with recent gestational diabetes mellitus. *American Journal of Clinical Nutrition*, 99 (pp115-121).
6. Collecting Colostrum Before You Give Birth. Information for Women (Wahine). Maternity Services. (Ref.6926)

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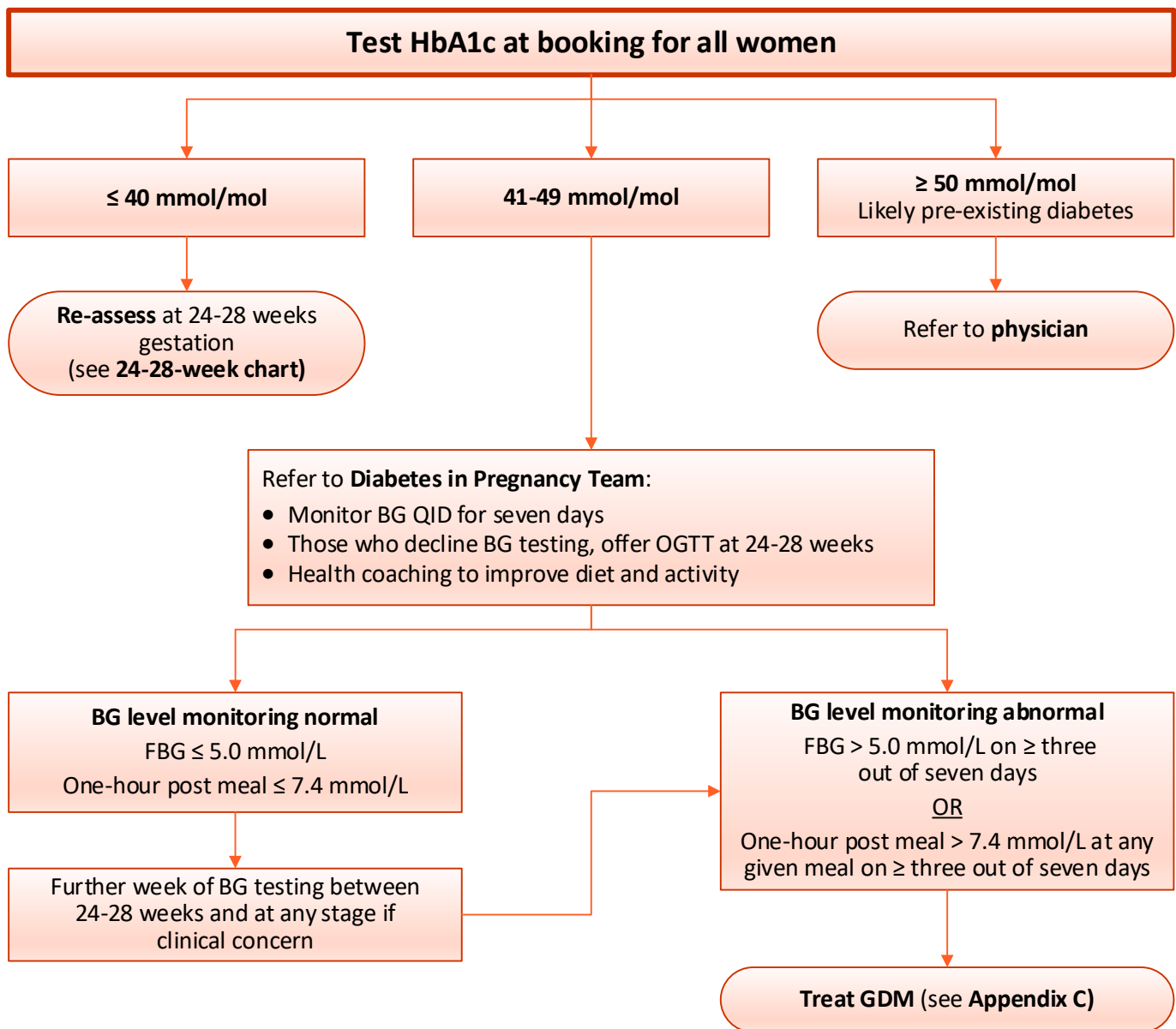
Antenatal Outpatient Care for Gestational Diabetes

Maternity Guidelines

Christchurch Women's Hospital

Christchurch New Zealand

APPENDIX A HbA1c TESTING AT BOOKING

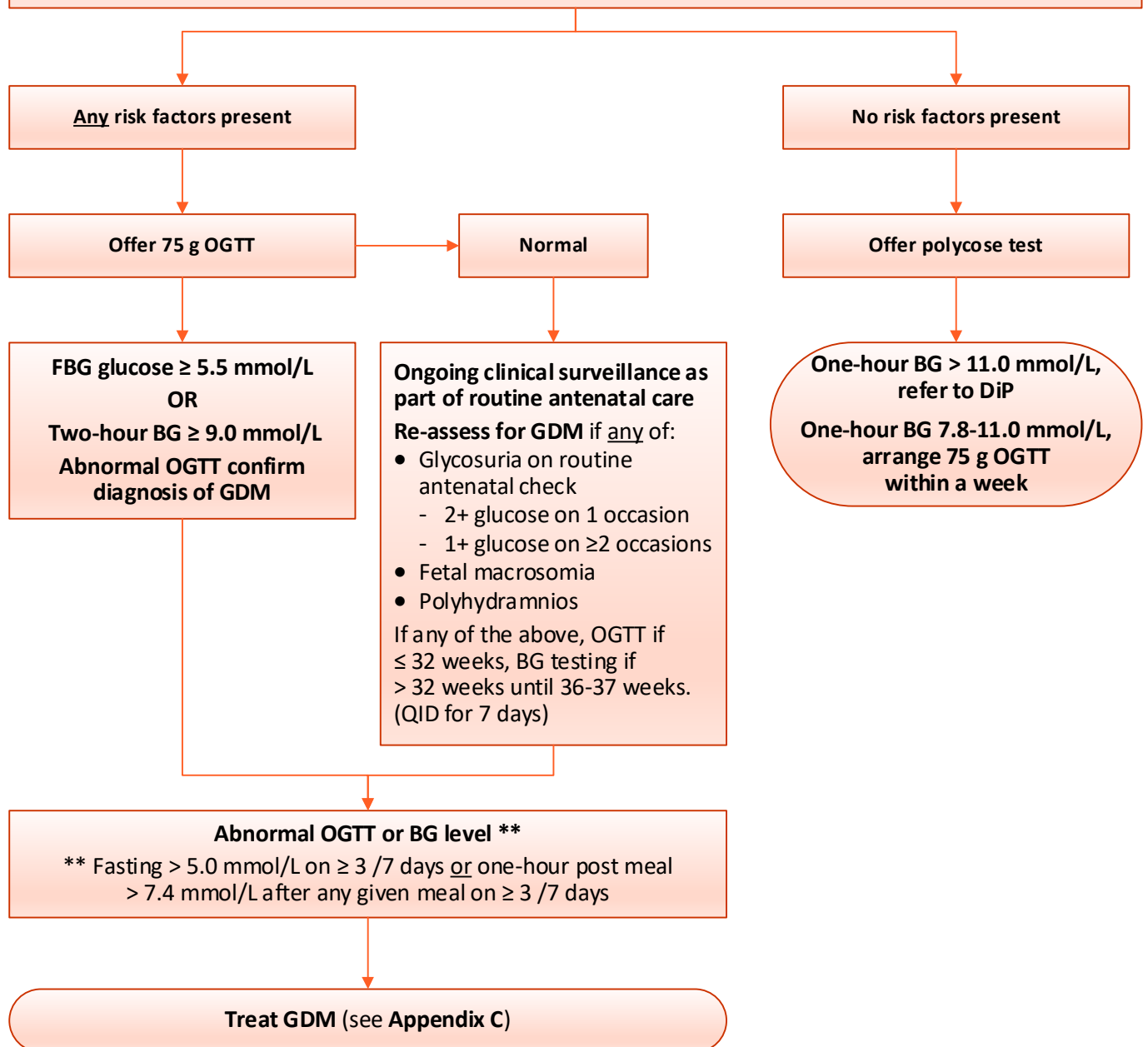


APPENDIX B RISK FACTORS FOR GDM AT 24-28 WEEKS GESTATION

Assess risk factors for GDM at 24 to 28 weeks gestation

- BMI > 30 kg/m²
- Previous GDM
- Previous macrosomic baby (birth weight > 4.5 kg or > 90th centile)
- First-degree relative with type 2 diabetes
- High-risk ethnicity (Māori, Pacific, Indian, Middle Eastern, African, Filipino and other Asian ethnicities)
- Polycystic ovarian syndrome
- Previous bariatric surgery*

*Women with previous bariatric surgery often don't tolerate OGTT: offer BG testing (QID for 7 days)



APPENDIX C GDM TREATMENT PATHWAY

LMC:

- Prescribe BG meter and test strips, PET screen
- Book growth scans (at diagnosis and 36-37 weeks)
- Initiate BG testing and explain targets (≤ 5.0 mmol/L fasting, ≤ 7.4 mmol/L at 1-hour postprandial)
- Refer to Diabetes in Pregnancy Team

Diabetes in Pregnancy Team:

- Provide education regarding gestational diabetes, blood glucose targets, and risks of uncontrolled hyperglycaemia
- Health coaching to improve diet and activity levels to help improve glycaemic control

