ADIPS 2026 Consensus Recommendations for the Management of Gestational Diabetes

DRAFT FOR CONSULTATION

Disclaimer
This document is a draft of proposed clinical recommendations developed on behalf of the Australasian Diabetes in Pregnancy Society (ADIPS) Ltd. It is being circulated to invited stakeholders and ADIPS members for consultation and feedback.

The content has not yet been finalised or endorsed and may be revised following the consultation process. This document should not be used to guide clinical practice or policy until a final version has been formally approved and released by ADIPS.

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Contents

1. Recommendations Summary

Provision of person-centred, respectful care (Chapter 5)

1. Care for women with gestational diabetes (GDM) should consider the holistic needs of the woman.

Education (Chapter 6)

2. Education for women with GDM should be personalised, ongoing and multidisciplinary with due consideration of cultural and linguistic diversity.

Medical Nutrition therapy (Chapter 7)

3. Women with GDM should be referred to an Accredited Practicing Dietitian for individualised Medical Nutritional Therapy within one week of diagnosis with ongoing follow up according to clinical judgement.

4. Medical Nutritional Therapy for most women with GDM will be based on a diet aligning with Australian Dietary Guidelines.

5. With their consent, women with GDM may be offered individualised, culturally sensitive discussions about gestational weight gain. These discussions may be informed by the National Academy of Medicine (NAM) guidelines and the Australian pregnancy care guidelines. Intermittent weighing during pregnancy can help identify very low or very high gestational weight gain, which can prompt review of nutritional adequacy and restrictive eating behaviours.

Physical activity (Chapter 8)

6. Women with GDM should be supported to participate in moderate to vigorous intensity physical activities for 30 minutes or more on most days and several hours of light-intensity physical activity per day, which includes incidental activity. Advise women, where possible, to perform physical activity after meals.

7. Women with GDM should limit the amount of time spent being sedentary and break up prolonged periods of sedentary behaviour as often as possible.

Treatment Targets (Chapter 9)

8. The recommended capillary glucose treatment targets for women with GDM are:
   Fasting < 5.3 mmol/L
   1-hour postprandial < 7.8 mmol/L
   2-hour postprandial < 6.7 mmol/L

9. Test blood glucose before breakfast and postprandially at 1 or 2 hours after each main meal

10. There is insufficient evidence to recommend utilising ultrasound fetal biometry to guide GDM medication management or glucose targets.

11. There are currently insufficient data to recommend the use of continuous glucose monitoring (CGM) in women with GDM. CGM can be considered in the context of a woman's preference and circumstance.

Descalation of testing (Chapter 10)

12. In women with glycaemia consistently within the target range without medical therapy, it may be appropriate to de-escalate the frequency of self-monitoring of blood glucose (SMBG).

Pharmacotherapy (Chapter 11)

13. The first line pharmacotherapy for most women with GDM is insulin.

14. The decision to use metformin for the management of GDM should be individualised. Caution should be exercised for women who have or are considered at risk of fetal growth restriction.

15. In women with GDM who are treated with metformin, consider substituting insulin if there is fetal growth restriction.

16. Glucose-lowering medications, other than metformin and insulin, are not recommended for use in the management of GDM.

Glycaemic management following antenatal corticosteroids (Chapter 12)

17. In women with GDM, indications for antenatal steroids are as per standard practice for women without diabetes.

18. After glucocorticoid administration, women with GDM should check their fasting blood glucose, and 2-hours postprandial blood glucose TDS and adjust insulin doses accordingly.

19. If a woman with GDM usually manages GDM with metformin or medical nutrition therapy alone, mild hyperglycemia with fasting blood glucose < 6.0 mmol/L and 2-hour postprandial blood glucose < 8.0 mmol/L in the subsequent 72 hours is acceptable.

20. If the woman with GDM is usually managed on insulin, the following regimen may be followed:

    Day 1: Increase long-acting insulin with the first dose of glucocorticoid by 50%. Increase short-acting insulin administered at least 4 hours following the first glucocorticoid dose by 50%.

    Day 2: All insulin doses remain at 50% greater than pre-glucocorticoid insulin doses.

    Day 3: All insulin doses should be 30% greater than pre-glucocorticoid insulin doses.

    Day 4: All insulin doses should return to pre-glucocorticoid insulin doses.

Models of care (Chapter 13)

21. Models of care for women with GDM should be individualised, taking into account the population profile, geography, service capacity, staffing and women's preferences.

Mobile health (mHealth) apps (Chapter 14)

22. mHealth apps can be useful for women and clinicians.

Antenatal expressing (Chapter 15)

23. Antenatal expressing of breast milk for women with GDM is not harmful.

Obstetric surveillance (Chapter 16)

24. Women with comorbidities, suboptimal blood glucose levels or overt diabetes in pregnancy may warrant additional ultrasound surveillance of fetal growth and wellbeing. For women with a diagnosis of uncomplicated GDM, routine ultrasound or CTG based assessment of fetal growth and wellbeing is not recommended.

Timing and mode of birth (Chapter 17)

25. Timing of delivery in women with GDM should consider all relevant clinical factors and shared decision making. In women with uncomplicated GDM, the usual guidance for timing of birth independent from GDM should apply.

26. If there is clinical suspicion for LGA, women with GDM may benefit from ultrasound assessment of fetal growth at 36 weeks' gestation, to diagnose macrosomia and inform decision making around the mode of delivery.

27. Consider caesarean section for estimated fetal weight $\geq$ 4500g.

Management of GDM before and during birth (Chapter 18)

28. Intrapartum care should include 4 hourly glucose testing in latent labour and 2 hourly in active labour aiming for blood glucose levels from 4 to 8 mmol/L.

Postpartum care (Chapter 19)

29. Women with GDM should stop glucose lowering therapies after birth.

30. Blood glucose monitoring should cease immediately postpartum for women managed with non-pharmacological therapy.

31. Women managed with pharmacological therapy should perform blood glucose monitoring in the immediate postpartum period.

32. Encourage and support breastfeeding.

33. Women are advised to have testing for hyperglycaemia postpartum. The preferred test is a 75g oral glucose tolerance test (OGTT) at least 6 weeks post-partum. Haemoglobin

A1c (HbA1c) at least 3 months postpartum is an acceptable alternative, and the choice should consider women's circumstances and preferences. Diagnostic thresholds for intermediate hyperglycaemia ("pre-diabetes") and type 2 diabetes should be as per relevant guidelines for non-pregnant populations.

34. Women should be offered advice on type 2 diabetes risk reduction and referred to risk reduction programs.

Differential diagnoses of GDM (Chapter 20)

35. Consider alternative diabetes diagnoses in women with an atypical clinical picture.

Neonatal care (Chapter 21)

36. Where possible, infants should be positioned skin-to-skin and supported to breastfeed within the first hour of life to reduce the chance of hypoglycaemia.

37. After receiving a feed, initial blood glucose concentration should be checked between 1 and 3 hours of age; then rechecked 3-4 hourly for at least 12 hours. Blood glucose concentrations should no longer be checked in the well baby once blood glucose concentrations >= 2.6 mmol/L on 3 consecutive occasions AND the baby is feeding regularly AND the baby is more than 12 hours old

38. For well, term infants with low blood glucose concentrations (< 2.6 mmol/L or as per local guidelines), 40% oral dextrose gel is the first-line treatment.

39. Infants with severe hypoglycaemia should be admitted to a neonatal unit and managed as an emergency.

40. Blood glucose concentrations should be checked using a glucose oxidase method, or other system validated for neonatal use.

2. Acknowledgements

The Australasian Diabetes in Pregnancy Society (ADIPS) acknowledges the voluntary contributions of the GDM Management Consensus Recommendations Development Committee:

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Draft statement - to be updated following consultation period:
ADIPS is grateful to the many ADIPS members, representatives of key stakeholder organisations, consumers and policy makers who provided feedback on these consensus recommendations. In particular, we thank the consumer panel with lived experience of gestational diabetes, who provided detailed review.

Organisations who provided feedback included: …

The following organisations formally endorsed the recommendations prior to publication: …

ADIPS received no funding to develop these consensus recommendations.

3. Introduction

This document relates to women with a diagnosis of GDM. For care of women with preexisting diabetes see published ADIPS guidance (1) or local guidelines where available. For information regarding the screening for and diagnosis of GDM, see the recently published ADIPS consensus statement (2). Routine aspects of antenatal care have not been included in these consensus recommendations.

These are the recommendations of a multidisciplinary working party convened by ADIPS. They reflect a thorough assessment of the current health and medical literature and the clinical experience of members of the working party. This guidance document is based upon literature searches last conducted in November 2025. It is designed to assist with decision-making in matters related to the care of women with GDM. It is not intended to define the standard of care but rather should be interpreted by clinicians based on the individual needs, preferences and values of the women they care for, the resources available to them and other constraints to practice that can be unique to an institution. It is not compulsory to apply these recommendations and they do not override the responsibility of the clinician to make decisions appropriately based on clinical judgement.

The terms “pregnant woman” and “pregnant women” are used throughout the guideline. ADIPS notes and affirms that maternity care for individuals should be inclusive and respectful of the terms that are preferred by individuals.

4. Methods

This document was produced by consensus. Consensus was selected due to there being a significant number of relevant subject matters where high quality evidence is lacking, and to take into consideration the differing needs and range of settings in which maternity care takes place in Australia and New Zealand. A formal assessment of evidence level was not performed. We created a consensus statement referencing international guidelines, meta-analyses, systematic reviews and randomised controlled studies where available. Where available, evidence from randomised controlled studies was given greater consideration than the findings of cohort studies and case-controlled studies were excluded.

The guidance development group was recruited by a call for expressions of interest via the ADIPS mailing list, and then selected by the ADIPS Board, aiming to represent diverse craft groups and geographic locations. The group included expertise in endocrinology, midwifery, diabetes education, nutrition and dietetics, obstetrics, maternal-fetal medicine, obstetric medicine, general practice, neonatology and public health. The first meeting of the working group was July 2025. Meetings were held online, and transcripts provided to those unable to attend. Members contributed voluntarily.

ADIPS has made every effort to ensure there were no conflicts of interest between the members of the working group and their personal, professional or business interests. All members of the

working group were required to complete, sign, and submit a disclosure and attestation form showing all such relationships that might be perceived as, or be actual conflicts of interest. No major conflicts of interest were disclosed. Disclosures are held on file at ADIPS.

In March 2026, following review by the ADIPS Board (comprising voluntary, elected health professional members from multiple disciplines across Australia and New Zealand), the draft consensus statement was circulated to the ADIPS membership and other key health professional societies and Colleges in Australia and New Zealand for consultation including individuals and advocacy groups for women with lived experience. Written submissions were considered by the writing group with any modifications decided by consensus. Decisions relating to feedback received during the consultation process were documented and kept on file at ADIPS. The final consensus statement was reviewed and approved by the ADIPS Board and circulated to other key stakeholder organisations for consideration of endorsement.

5. Provision of person-centred, respectful care

Women with GDM consistently express a desire for person-centred, holistic care which appreciates the potential psychological impact of a GDM diagnosis, provides information tailored to individual needs, and ensures continuity of care through pregnancy and into the postnatal period (3,4). In reviews of women's experience of GDM, recurrent themes include lack of individualised care and continuity of care, lack of choice regarding important aspects of care such as birthing options, and poor comprehensive follow up (4,5).

A GDM diagnosis is associated with an increase in perinatal mental health disorders and specific GDM stigma (6–8). The diagnosis of GDM can be associated with reactions such as self-blame, failure, fear, sadness and confusion. However, some women report viewing the diagnosis as a "wake up" call, and feeling motivated to try to reduce the risk to the fetus in the short- and long-term (9). Previous research has reported improved quality of life measures and reduced depression following a diagnosis of GDM (10,11). Women have reported significant burdens relating to GDM, including monitoring BGL and diet changes, meal planning, additional hospital appointments and financial impacts (5). Communication with women with GDM should include provision of appropriate information, consideration of language to avoid promoting self-blame and recognition of the complex societal factors that contribute to a GDM diagnosis (8) (Table 1).

5.1. Notification of diagnosis of GDM

Notification of a diagnosis of GDM should consider the experience of the woman receiving the diagnosis, and the skill set of the clinician providing the notification. Options to improve the experience of notification of GDM will be site specific but may include a combination of:

- Providing culturally appropriate pretest information about the diagnosis and the planned process for notification.

- Communication of the diagnosis of GDM by a known and trusted health care provider with content expertise. In some settings, this may require upskilling of maternity providers.
- Communication of the diagnosis of GDM by a content expert such as a diabetes nurse educator or diabetes midwifery specialist.

Table 1. Holistic care needs of women with GDM

Psychological • Support for psychological impact of diagnosis • Support to manage anxieties and fears • Non-judgmental, respectful care
Information and education • Access to high quality information from credible sources to enable informed choices • Tailored information that facilitates understanding of the risks and consequences of GDM • Consistency of information and advice from healthcare professionals • Adequate time with healthcare professionals
Self-management and nutrition and physical activity • Provision of timely, accessible healthcare • Tailored information, education and practical strategies that facilitate nutrition and physical activity changes to manage blood glucose levels and meet the nutritional needs of pregnancy • Financial support/assistance to manage additional costs
Support • To feel like a valued partner in their healthcare • Connection to others with lived experience of GDM • Motivational / appreciative approach by healthcare professionals
Care transition • Seamless transfer of care and communication between acute and primary healthcare service providers • Postpartum reminders for diabetes screening

Table adapted from Davis et al (4).

Recommendation

1. Care for women with GDM should consider the holistic needs of the woman.

6. Education

Education forms an important part of care for women with GDM. A better understanding of GDM helps a woman to achieve better glycaemic levels and obstetric outcomes (12,13). There are limited published data on the optimal strategies or delivery model for GDM education.

Education should include supporting a woman to make positive long-term health behaviour changes, using evidenced based behaviour change techniques including self-monitoring, goal setting, problem solving and motivational interviewing.

Commonly used methods to provide education include individual teaching, structured group education, provision of video and/or written education materials, provision of mobile health applications (mHealth apps) and combinations of these (14). The education can take place in person or via telehealth and should be provided within 1 to 2 weeks of diagnosis. Initial education can be provided by nurses, midwives, dietitians or other health professionals trained in diabetes management. One-to-one consultations can assist evaluation and management of women with more complex needs, while group sessions can efficiently convey core health behaviour information and promote peer support. Clinicians should consider the cultural and personal needs, and the educational level of women with GDM when providing education (15,16). Integrating online education alongside standard care may provide additional benefits for women with GDM (17). Supplementing group education with personalised follow-up, clinical appointments or digital platforms may improve engagement, and support behavior modification.

Recommendation

2. Education for women with GDM should be personalised, ongoing and multidisciplinary with due consideration of cultural and linguistic diversity.

7. Medical Nutrition Therapy

Medical nutrition therapy (MNT) paired with physical activity is a cornerstone of managing GDM, aiming to maintain glycemic targets, with adequate energy to support nutritional needs, appropriate maternal weight gain and fetal growth (18).

The concept of a single “ideal” diet for managing GDM is inherently complex as women’s glycaemic responses vary widely depending on factors such as carbohydrate quality and quantity, cultural food patterns and preferences, individual biological variation to food components, and the underlying degree of insulin resistance (19). The amount of protein, fat and fibre in a meal all impact on the postprandial glycaemic response and need to be considered when exploring postprandial blood glucose levels (20). Clinicians should tailor energy and macronutrient recommendations to maternal weight status, weight gain, glycaemic patterns, cultural patterns and food preferences. To achieve this, referral to an Accredited Practising Dietitian for individualised MNT within one week of diagnosis with ongoing follow up is strongly recommended. An ongoing schedule of follow up with a dietitian is associated with reduced pharmacotherapy needs (18).

Carbohydrate is the primary nutrient that impacts blood glucose levels and has been the traditional focus for dietary modification. Low carbohydrate diets (<40% total energy) do not appear to improve glycaemia or outcomes, may reduce fibre and micronutrient intake, diet quality, and increase saturated fat consumption and insulin resistance (21–24). It is therefore difficult to justify their use. The American Institute of Medicine (renamed National Academy of

Medicine, NAM) Recommended Dietary Allowance for carbohydrate in pregnancy is 175g per day, consistent with a moderate carbohydrate diet (25). Carbohydrate intake should usually be spread across the day and tailored to individual needs. The broad structure of MNT for many women with GDM will be based on a diet aligning with Australian Dietary Guidelines, incorporating low Glycaemic Index (GI) wholegrain breads and cereals; adequate fruit, vegetables and dairy; lean meat and alternatives protein sources; and adequate carbohydrates (26).

Low GI foods are an accepted approach to managing postprandial glycaemic excursions and show higher nutrient intake, improvements in postprandial glucose, reduced insulin needs and a lower risk of macrosomia (27).

Adherence to dietary patterns consistent with the DASH (Dietary Approaches to Stop Hypertension) and Mediterranean Diet may reduce fasting and 2-hour postprandial blood glucose, and reduce the rate of caesarean section and macrosomia (28–31). Both these dietary patterns are characterised by whole food, high fibre eating principles including fruits, vegetables, whole grains, legumes, pulses, lean protein and unsaturated fats from nuts, seeds and fish; while limiting intake of processed, sweetened foods and beverages (32). The National Diabetes Services Scheme (NDSS) provides extensive consumer focused resources on diet in pregnancy (33).

Dietary behaviour change can be associated with considerable challenges and negative experiences commonly reported by women with GDM (34). Women may find themselves deprived of enjoyable food and frequently hungry, leading to dissatisfaction and concern for their own and their baby's health. In addition, women, particularly those from culturally and linguistically diverse populations, experience frustration with unpredictable glucose levels despite managing carbohydrate intake, and a lack of tailored support for dietary change (5,19).

Recommendations

3. Women with GDM should be referred to an Accredited Practicing Dietitian for individualised Medical Nutritional Therapy within one week of diagnosis with ongoing follow up according to clinical judgement.

4. Medical Nutritional Therapy for most women with GDM will be based on a diet aligning with Australian Dietary Guidelines.

7.1. Gestational weight gain

The National Academy of Medicine (formally Institute of Medicine) 2009 guidelines for weight gain targets based on BMI in singleton pregnancies are the most commonly used guidelines globally (35) (Table 2). These guidelines may not be applicable for non-caucasian populations (Appendix C). The Australian Pregnancy Care Guidelines (36) recommend using these guidelines to support discussions about weight gain during pregnancy, with the woman's consent, and using non-stigmatising holistic communication. These guidelines were developed for the general population, not specifically for women with GDM. Evidence guiding optimal

weight gain for women with GDM is limited, relying on systematic reviews of observational studies.

Table 2. National Academy of Medicine gestational weight gain guidelines for singleton pregnancies (35)

Pre-pregnancy BMI classification (kg/m²)	Total GWG (kg)	Mean rate of weekly weight gain in 2nd and 3rd trimester (kg)
< 18.5	12.5-18	0.51
18.5-24.9	11.5-16	0.42
25-29.9	7-11.5	0.28
≥30	5-9	0.22

Medical nutrition therapy and pharmacotherapy following a GDM diagnosis may influence gestational weight gain. Weight loss from dietary restriction may lead to maternal and infant risks including low birth weight, preterm birth, small for gestational age, respiratory distress and is not recommended (37,38).

For women with obesity, gestational weight gain below guidelines or weight loss has been associated with an increased risk of caesarean delivery, low birthweight and a reduced risk of large for gestational age and macrosomia. Most studies show weight gain below guidelines or weight loss is associated with increased risk of SGA (38–40). One study (40) found the association was no longer significant after adjustment for covariates. At this point, the safety of weight loss during pregnancy in women with obesity is uncertain and should not be recommended.

Recommendation:

5. With their consent, women with GDM may be offered individualised, culturally sensitive discussions about gestational weight gain. These discussions may be informed by the NAM guidelines and the Australian pregnancy care guidelines. Intermittent weighing during pregnancy can help identify very low or very high gestational weight gain, which can prompt review of nutritional adequacy and restrictive eating behaviours.

8. Physical activity

Physical activity in pregnancy is safe for most women and is beneficial for mother and baby (41–43). Women with complicated pregnancies should discuss the safety of physical activity

with their treating team. Physical activity in women with GDM is associated with a reduced risk of delivering a LGA infant (44), improved maternal fasting and postprandial glucose levels (45–47), possible reduction in insulin requirements (46), lower risk for postpartum depression and increased likelihood of achieving postpartum weight targets (44).

Physical activity is any movement of the body that uses energy, and pregnancy options include: walking, active playing with children, exercise classes, cleaning, swimming, yoga or muscle strengthening training (48,49). All movement across the day counts towards the recommendations for physical activity and during pregnancy (44,50). In addition to regular physical activity, limiting prolonged periods of sedentary behaviour by regularly moving is associated with health benefits (51,52). There is insufficient or low-quality evidence regarding the optimal frequency and duration of breaks in sedentary behaviour.

When possible, it is recommended that physical activity is performed after meals because an acute bout of physical activity significantly increases muscle glucose uptake and lowers circulating glucose concentrations (46,48,53–55). Post-meal activity, such as walking soon after eating, carries a low risk of hypoglycemic events (46,48).

Women with GDM without medical or obstetric contraindications are advised to follow the recommendations for physical activity during pregnancy (56), which align with the national recommendations for all adults**.** Previously inactive women are encouraged to start physical activity slowly and gradually progress towards meeting the Australian Physical Activity and Sedentary Behaviour Guidelines for Adults (57). Previously active women are encouraged to continue with their activities in accordance with the guidelines, but may need to modify their activities as pregnancy progresses. If obstetric complications arise during the pregnancy, women should discuss their exercise program with their treating team

Recommendations:

6. Women with GDM should be supported to participate in moderate to vigorous intensity physical activities for 30 minutes or more on most days and several hours of light-intensity physical activity per day, which includes incidental activity. Advise women, where possible, to perform physical activity after meals.

7. Women with GDM should limit the amount of time spent being sedentary and break up prolonged periods of sedentary behaviour as often as possible.

9. Treatment targets

An important aspect of care for women with GDM is defining clear glucose threshold targets ("glycaemic targets") to guide management. A range of targets have been suggested, sometimes described as "tight" or "less tight" targets. These glycaemic targets influence when intensification of care occurs, which includes initiation of pharmacological management. Historically, the classification into GDM managed with MNT and GDM managed with pharmacological treatment (White classification A1 or A2 (58)) has been used to determine

models of care, the degree of obstetric surveillance, the timing of birth and the facility in which the woman has care. However, there can be limitations with this classification, where policies may prevent appropriate prescription of pharmacotherapy, thereby increasing risk of delivering in those facilities.

There are a range of glycaemic targets used in different countries (Appendix A) which have been established based on consensus, on diagnostic criteria for diabetes, or on similarity to blood glucose levels in women without diabetes. The thresholds selected aim to find a balance between providing management which improves clinical outcomes, avoids over treatment without improving outcomes, and may be associated with increased treatment burden for the patient and health service.

There is no published evidence to support any defined number of measurements above the target as an indicator to review diet and physical activity, and consider pharmacological therapy, however common pathways include 2 or 3 measurements above target at a particular time of day i.e. fasting or after the same meal, in the last one or 2 weeks (59–62). In the largest published trials of GDM management, insulin was commenced when "the majority" of blood glucose levels were elevated (63), or if 2 blood glucose levels were elevated in 2 weeks (10).

Blood glucose data should be reviewed at regular intervals to observe trends in the timing and frequency of hyperglycaemia. For most women, this will be required 2-4 weekly with self-reporting between reviews if 3 or more blood sugar levels are above target. Frequency of reviews should be based upon previous blood glucose levels, insulin use and capacity for self-titration of insulin. The standard of care to measure glucose levels is self-monitoring of blood glucose (SMBG) using POC (point of care) meters.

9.1. Treatment targets and pregnancy outcomes

Clinical outcomes of treatment to tighter or less tight targets have been reviewed in a recent Cochrane meta-analysis which included 4 RCTs (64). The majority of data were derived from the New Zealand cluster-randomised TARGET trial, with data from 2 of the trials published only as abstracts (65). This meta-analysis concluded that tighter glycaemic targets likely do not affect the rate of caesarean section birth, perinatal mortality, infant hypoglycaemia, or the proportion of neonates born LGA (64). The review also showed that tighter glycaemic targets may be associated with an increase in the use of medication and lower adherence to treatment. The certainty of the evidence was assessed as low to moderate. The TARGET trial, comparing tighter targets (FPG < 5.5 mmol/L, 1 hour < 8.0 mmol/L, 2 hour < 7.0 mmol/L compared to fasting ≤ 5.0 mmol/L, 1 hour ≤ 7.4 mmol/L, 2 hour ≤ 6.7 mmol/L) demonstrated an improved neonatal composite outcome, (perinatal death or birth trauma (nerve palsy, bone fracture), or shoulder dystocia), but an increased adverse maternal composite outcome, primarily driven by major postpartum haemorrhage (PPH), with the use of tighter targets (65). A further trial is planned in women with GDM and obesity (66).

In addition, 2 large observational studies have been published from Australian population datasets (67,68). The observational studies did not find differences in the primary outcome of LGA infants with tighter targets. The larger paper, including a broader range of hospitals, and 25,000 women with GDM, did not find any differences in outcomes according to tighter and less tight fasting targets, except an increased use of medication (68). In the absence of clear evidence demonstrating neonatal benefit from tighter targets, it is reasonable for the fasting target to align with the current diagnostic threshold of 5.3 mmol/L. Glucose goals of fasting < 5.3 mmol/L, 1 hour < 7.8 mmol/L or 2 hour < 6.7 mmol/L have been suggested in the American Diabetes Association (ADA) Standards of care (69).

In previous large trials of treatment of GDM, pharmacological treatment was commenced at different thresholds. In ACHOIS, treatment was initiated when fasting blood glucose levels were ≥ 5.5 mmol/L or the 2 hour postprandial level ≥ 7.0 mmol/L at 35 weeks' gestation or less; or if the 2 hour postprandial level was ≥ 8.0 mmol/L at more than 35 weeks' gestation; or if one capillary-blood glucose result during the 2-week period was ≥ 9.0 mmol/L (10). Landon et al added insulin with fasting ≥ 5.3 mmol/L or 2-hour ≥ 6.7 mmol/L (63). Psychological wellbeing has been reported for a subset of participants from the TARGET trial. Tighter glucose targets were not associated with vulnerability to depression or anxiety, or poorer health-related quality of life either antenatally or at six months after birth (70). The optimal glucose treatment targets for women with GDM remain uncertain and require further research.

Recommendation

8. The recommended capillary glucose treatment target for women with GDM are:
   Fasting < 5.3 mmol/L
   1-hour postprandial < 7.8 mmol/L
   2-hour postprandial < 6.7 mmol/L

9.2. Timing of postprandial testing

Timing for the testing of blood sugar after meals has varied practice around Australia and New Zealand and there is limited data to support a particular time frame. A number of authorities, including the previous ADIPS consensus guidance, support testing at either 1 hour or 2 hours (60,69,71,72) however NICE recommended testing at 1 hour (53). A systematic review comparing testing times found minimal differences between the 2 regimens (73). Timing should commence from the beginning of the meal.

Recommendation

9. Test blood glucose before breakfast and postprandially at 1 or 2 hours after each main meal.

9.3. Ultrasound biometry to guide pharmacological management of GDM

The use of ultrasound biometry to assess fetal growth with increased dose of pharmacological agents in the setting of higher abdominal circumference (AC) or estimated fetal weight (EFW)

has been suggested, in conjunction with measured blood glucose or in isolation. Two systematic reviews of a small number of randomised trials have demonstrated that ultrasound guided blood glucose management results in less macrosomia but no change in other important clinical outcomes including LGA, birthweight, caesarean section or NICU admission (74,75). There is currently insufficient evidence to recommend utilising ultrasound fetal biometry to guide GDM medication management or glucose targets. An economic analysis has not been performed but it is likely that ultrasound assessment as often as fortnightly for the purposes of medication management would have significant resource implications in many settings.

Recommendation

10. There is insufficient evidence to recommend utilising ultrasound fetal biometry to guide GDM medication management or glucose targets.

9.4. Continuous Glucose Monitoring

Continuous Glucose Monitoring (CGM) is widely accepted for glucose monitoring in type 1 diabetes and increasingly for type 2 diabetes in pregnancy (although the evidence is limited for the latter). There are rapidly evolving data about the use of CGM in women with GDM. The target thresholds for women with GDM are still evolving and may change. Furthermore, in Australia, diabetes technology including CGM is not subsidised for women with GDM and diabetes education may be variable. The international consensus on CGM endorses the same threshold CGM goals (3.5 to 7.8 mmol/L) for women with GDM as for women with type 1 diabetes. Some expert groups have suggested a goal of 90-95% TIR (time in range) but opinion varies and data are limited (76–78).

9.4.1. Pregnancy outcomes with CGM use

A recent systematic review compared CGM (both intermittently scanned and real-time) to SMBG. There was significant variation in study design and the review included studies where CGM was only used for brief periods through the pregnancy (79). There was no difference demonstrated in obstetric outcomes, however insulin use was higher and third trimester HbA1c was lower in CGM users.

Two published RCTs have compared use of CGM for extended periods in pregnancy and in both there were no differences in obstetric or neonatal outcomes but increased time in range. Participants found CGM easier to use than SMBG (80,81). Further research, including both intervention and observational studies are underway which may provide more information (82–85).

9.4.2. Practical Considerations of using CGM

SMBG remains the standard of care. CGM may be appropriate for some women such as those with fear of hypoglycaemia and those women who have barriers to performing SMBG (86). However, women using CGM need education and support and failure to do this may increase diabetes distress and result in iatrogenic hypoglycaemia due to over-treatment of

hyperglycaemia (87). To avoid alarm fatigue, alarms need to be set to balance optimisation of glucose levels with safety. Women also need to be able to trouble-shoot common CGM issues such as “compression lows” and the lag time (86). In Australia, CGM is not currently subsidised for women with GDM.

Recommendation

11. There are currently insufficient data to recommend the use of continuous glucose monitoring (CGM) in women with GDM. CGM can be considered in the context of a woman's preference and circumstance.

10. De-escalation of testing

Most guidelines for GDM suggest that SMBG should occur four times per day: fasting and postprandially after each meal (88). However, in a non-inferiority RCT including 286 women with GDM, there was no difference in the rate of LGA or macrosomia between women who tested 4 times per day compared to 4 times per day on alternate days (89). These results were replicated in another RCT including 197 women which showed alternate day testing was non-inferior to daily testing (90). In both studies there was increased adherence in testing when women tested on alternate days but no difference in overall satisfaction. In a Canadian RCT, women with GDM had no difference in HbA1c at 36 weeks or in maternal and neonatal outcomes when 4 times daily testing occurred daily compared to 3 days per week (91).

In women with well-controlled GDM, not on pharmacotherapy, it may be appropriate to de-escalate the frequency of SMBG to alternate daily testing (or less), but testing should still be carried out at a range of timepoints through the day across a number of days.

Recommendation

12. In women with glycaemia consistently within the target range without medical therapy, it may be appropriate to de-escalate the frequency of SMBG.

11. Pharmacotherapy

Insulin and metformin are the most common pharmacotherapeutic agents used to treat GDM and have the best evidence for effectiveness and safety. International opinion varies on the best first line treatment to manage blood glucose levels when medical nutrition therapy is insufficient. The ADA suggests insulin as the first line agent, while the Scottish and Queensland guidance support either insulin or metformin (60,69,71). The NICE and the proposed NZ guidelines recommend metformin as first line treatment (53,92). For women using pharmacotherapy, education should occur on the importance of maintaining appropriate weight gain, avoidance of over-restricting carbohydrate and caloric intake, and seeking additional advice at times of fasting, including Ramadan.

11.1. Insulin

Insulin has traditionally been used in Australia as the first line pharmacotherapy in GDM and has a well-established safety profile. Suggested insulin regimens are provided in Table 3. On an individualised basis, taking into consideration a woman's glycaemic profile and preferences, mixed insulins (such as NovoMix30 or HumalogMix25) may sometimes be prescribed. Insulin doses should be titrated by 1 to 4 units initially every 2 to 3 days until glucose targets are achieved.

Table 3: Suggested insulin regimens for hyperglycaemia in GDM

Timing of hyperglycaemia	Suggested initial insulin regimen	Action profile
Fasting hyperglycaemia	Bedtime dose of intermediate or long acting insulin: Protaphane® (insulin isophane), Humulin NPH® (insulin isophane) or Optisulin®/Lantus® (insulin glargine) 6-8 units	Onset: 1-2.5 hours Peak: 4-12 hours Duration: 16-24 hours
Postprandial hyperglycaemia	Pre-meal rapid acting insulin: NovoRapid® (insulin aspart), Humalog® (insulin lispro) or Fiasp® (insulin aspart (rys)) 4-6 units with meals.	Onset: 10-20 minutes Peak: 0.5-1.5 hours Duration: 3-5 hours
Both fasting and postprandial hyperglycaemia	Both pre-meal rapid acting insulin and bed-time intermediate or long acting insulin	

11.2. Metformin

Metformin is a biguanide, glycemic lowering agent that improves insulin sensitivity and lowers glycemia by reducing hepatic gluconeogenesis and increasing peripheral glucose uptake and utilisation. Metformin has potential advantages in the treatment of GDM due to patient preference, lower cost, avoidance of injections, reduced risk of hypoglycaemia and lower weight gain compared with insulin (93). However, unlike insulin, metformin crosses the placenta. Gastrointestinal side effects are the most common adverse effect, but are usually mild and transient.

Treatment is usually initiated with a dose of 500 mg a day for the first week and can be titrated up by 500 mg each week to a maximum of 2000 mg a day as tolerated.

Metformin should be considered as the first line pharmacotherapy agent for women with GDM not meeting glycaemic targets with MNT who decline insulin, or where insulin is not considered

the preferred option due to safety concerns, or due to patient preference (Table 4). Local protocols that are designed to meet the needs of particular population groups may recommend metformin as the first line. Consideration should be given to the woman's preferences, her obstetric and medical history, and her broader biopsychosocial context. The treatment options, potential benefits, risks and areas where evidence remains limited should be discussed with the woman to support informed decision making.

Table 4: Concerns about insulin safety or adherence which may indicate preference for metformin as initial pharmacotherapeutic agent

Inability to regularly monitor BGL
Over-crowded housing
Provider concern regarding ability to safely administer
Family and domestic violence
Safe environment for medication, needle and sharps storage
Food insecurity
Needle phobia

11.2.1. Glycaemic outcomes

Metformin has been shown to be effective for glycaemic lowering in GDM (94). Supplemental insulin is required to maintain glycaemic targets in up to half of women, however those receiving both metformin and insulin have lower median insulin requirements than women treated with insulin alone (95).

11.2.2. Maternal and Neonatal outcomes

Multiple systematic reviews and meta-analyses, incorporating overlapping trials, indicate that pregnancy outcomes are largely comparable between women with GDM treated with metformin and those receiving insulin, with some suggesting improved maternal and neonatal outcomes with metformin (94,96–100). Lower GWG and reduced rates of preeclampsia have been reported among women treated with metformin without differences in a range of other outcomes (97). Infants had lower birth weight and were less likely to be macrosomic, but were not more likely to be small for gestational age (98). Metformin is not associated with increased risk of congenital anomalies (101,102).

The largest New Zealand and Australian RCT, the MiG Trial, which enrolled 750 women, reported no significant difference in the composite primary outcome of neonatal hypoglycaemia, respiratory distress, need for phototherapy, birth trauma, 5-minute Apgar score < 7 or prematurity, however there was a higher rate of SGA infants (95).

11.2.3. Longer-term outcomes

With respect to childhood outcomes among offspring of women with GDM treated with metformin, a meta-analysis including the MiG trial and one other RCT reported increased offspring BMI but no difference in weight (98). Two more recent trials from India and Finland report no differences in childhood anthropometry (103,104). A review of long term outcomes in offspring of women treated for a range of indications, including obesity, PCOS and type 2 diabetes, in both observational and randomised trials, found that these children may have increased adiposity but not cardiometabolic dysfunction (105). A recent meta-analysis showed no difference in offspring adiposity measures (106). However most follow up studies do not continue into adulthood, and do not all include the significant antenatal and postnatal confounders. Neurodevelopmental outcomes do not appear to be impaired for offspring of women treated with metformin (107). The consequences of metformin exposure on long-term offspring health remains unclear.

11.2.4. Patient reported outcomes

Women with GDM receiving pharmacotherapy report similar satisfaction and decisional comfort when treated with metformin or insulin, although their treatment priorities differ (108). However, in the randomised MiG trial, women preferred metformin to insulin, such that 76% of women randomised to metformin responded that they would use it again, compared to only 27% of those randomised to insulin (95). In addition to considering women's medical and obstetric history, shared decision-making should consider women's preferences regarding method of administration, convenience, and perceived safety and effectiveness, to tailor therapy to individual needs.

Recommendation:

13. The first line pharmacotherapy for most women with GDM is insulin.

14. The decision to use metformin for the management of GDM should be individualised. Caution should be exercised for women who have or are considered at risk of fetal growth restriction.

15. In women with GDM who are treated with metformin, consider substituting insulin if there is fetal growth restriction.

11.3. Other agents

Glyburide and glibenclamide have been used as third line agents, however are less commonly used in Australia and New Zealand. The published evidence suggests no indication for the use of sulfonylureas in GDM except in unusual circumstances and if commenced and monitored by a specialist physician (96,109,110). There is increasing use of other newer anti-diabetic agents among women of child-bearing age (including for non-diabetes indications) such as GLP-1 RA (glucagon like peptides) and SGLT2i (sodium-glucose cotransporter 2 inhibitors). Current advice is to discontinue these medications prior to conception, due to evidence of potential harm,

primarily from animal studies (111), however a more recent large population-based cohort study failed to find statistically significant increases of major congenital malformations (112).

Recommendation

16. Glucose-lowering medications, other than metformin and insulin, are not recommended for use in the management of GDM.

12. Special scenarios

12.1. Steroids for fetal lung maturation before elective cesarean section

The use of maternally administered steroids is accepted for anticipated preterm birth before 35+0 weeks to reduce respiratory distress and perinatal mortality (113), however the use of steroids to reduce respiratory distress after caesarean section at term remains a topic of investigation. In women without diabetes, antenatal steroid administration prior to caesarean section at term has demonstrated benefits of reduced respiratory disease (114), however women with diabetes were excluded from much of this research (115). Systematic review of the use of steroids in later preterm or term in women with diabetes concluded that there was limited and heterogenous data, but there were no clear benefits in reduction of respiratory distress, and may be an increase in neonatal hypoglycaemia. Ongoing studies addressing these questions continue, and may have implications for practice in the future (115,116).

Recommendation

17. In women with GDM, indications for antenatal steroids are as per standard practice for women without diabetes.

12.2. Management of GDM after the administration of glucocorticoids

Antenatal glucocorticoids can contribute to hyperglycaemia in women with GDM for approximately 72 hours post-administration with the initial peak at 9-27 hours (117,118). A scoping review of mostly observational single-centre studies following antenatal glucocorticoids reported higher maternal insulin requirements and varied findings regarding neonatal hypoglycaemia (116). There are currently no validated guidelines to manage glucocorticoid induced hyperglycaemia and practices vary across Australia and New Zealand including proactive insulin therapy and reactive approaches with different insulin dosages and subcutaneous or intravenous administration (119–121).

After glucocorticoid administration, women with GDM should check their fasting blood glucose, and 2-hours postprandial TDS. Some sites also recommend checking preprandial glucose to guide pre meal insulin dosing. Management of maternal hyperglycaemia should be balanced with risk of maternal hypoglycaemia. A specialist diabetes team should be involved in the management of insulin dosing following antenatal glucocorticoids. The Joint British Diabetes

Society guidelines suggest that women receiving insulin prior to antenatal glucocorticoids should increase the total daily insulin dose by 50% (122). The suggested dose changes below will often need to be individually tailored according to blood glucose levels.

Recommendations

18. After glucocorticoid administration, women with GDM should check their fasting blood glucose, and 2-hours postprandial blood glucose TDS and adjust insulin doses accordingly.

19. If a woman with GDM usually manages GDM with metformin or medical nutrition therapy alone, mild hyperglycemia with fasting blood glucose < 6.0 mmol/L and 2-hour postprandial blood glucose < 8.0 mmol/L in the subsequent 72 hours is acceptable.

20. If the woman with GDM is usually managed on insulin, the following regimen may be followed:

Day 1: Increase long-acting insulin with the first dose of glucocorticoid by 50%. Increase short-acting insulin administered at least 4 hours following the first glucocorticoid dose by 50%.
Day 2: All insulin doses remain at 50% greater than pre-glucocorticoid insulin doses.
Day 3: All insulin doses should be 30% greater than pre-glucocorticoid insulin doses
Day 4: All insulin doses should return to pre-glucocorticoid insulin doses.

12.3. GDM care for Aboriginal and Torres Strait Islander women and rural and remote communities

Due to the impacts of colonisation and inter- and intra-generational trauma, Aboriginal and Torres Strait Islander Australians are overrepresented in their risk for diabetes in pregnancy and associated adverse birth outcomes. Aboriginal and Torres Strait Islander women experience a higher rate of pre-existing type 2 diabetes, overt diabetes in pregnancy, and higher rates of postpartum type 2 diabetes diagnosis after GDM compared to non-Indigenous Australians (123–125). Similar challenges are experienced by Māori wāhine in Aotearoa New Zealand. In recognition of the comprehensive GDM guideline development process underway in Aotearoa New Zealand, a thorough review of Māori hauora and kaupapa Māori models of care was not undertaken as part of this ADIPS guidance development.

Barriers to adopting dietary and physical activity recommendations for Aboriginal and Torres Strait Islander women in rural communities can include food insecurity, use of traditional food sources, fewer dietary options and less infrastructure to support physical activity, and housing issues with overcrowding (126–128). All women living in remote areas face a potential lack of access to local care options and the need to travel long distances to access care (129).

A systematic review on rural healthcare delivery for women with any type of diabetes in pregnancy, and subsequent maternal and infant outcomes identified a significant gap in evidence and was unable to provide any recommendations on specific health service design for

rural areas (130). Qualitative research with women who have experienced GDM makes up the current evidence basis for program design. For Aboriginal and Torres Strait Islander women, interventions that support connection to Country have been recommended (126,127). Education that incorporates visual elements and local language is desirable as is improved access to healthy food through supply chain interventions and food preparation skill building (127).

Clinical registers and multi-component interventions have been used in some jurisdictions to improve identification of GDM and postpartum follow-up (131). Co-designed culturally appropriate resources were used in this and other programs and are an important enabler of health literacy interventions (132). Co-design of GDM management programs with Aboriginal and Torres Strait Islander people more generally is desirable.

Multidisciplinary care can be difficult to achieve in some rural areas without consideration of remote delivery options. Telehealth is one option that can be used to overcome rural health workforce shortages, but may not be acceptable to all women. There is a lack of data on what services are being used by women managing GDM and what service modifications can be successful to support best practice care in rural environments (130).

CGM or clinic supported BGL monitoring can be considered where attempts to achieve SMBG have failed due to such barriers. Metformin may be considered as a first line agent for women who have increased risk of hypoglycaemia from food security issues or concerns regarding safe storage of medications that raise concerns for use of insulin. In the absence of evidence to support modifications to standard treatment pathways, these decisions remain individualised to the patient and their needs.

In remote areas, the need to travel from the home community to a delivery centre for “sit down” in anticipation of the onset of labour is important to consider. “Childbirth evacuation” has been identified as a stressful and isolating experience, especially for women who have a strong preference for birthing on country (133). Discussions with women regarding the timing and indication for relocation are important and must include appropriate staff members and support persons to avoid disengagement during late pregnancy. Women need an adequate supply of medications and blood glucose monitoring equipment for the duration of their travel, and clinical handover should consider any additional logistics women may face navigating the healthcare system of their destination hospital.

Given the high background rate of type 2 diabetes in the Aboriginal and Torres Strait Islander population, there is an added importance of ensuring post-GDM care by promoting a 6 week check, breastfeeding and ongoing follow up for dysglycaemia.

13. Model of care

Following a diagnosis of GDM, decisions need to be made about the most appropriate team to provide GDM and antenatal care, and whether the woman's planned place of birth and existing maternity care pathway should change. Models of care for women with GDM vary greatly, depending on location, resources, service capacity, and clinician preferences (134). The

integration of telehealth and digital solutions for remote patient monitoring provides further opportunities to modify GDM service models.

When determining the optimal model and location of care, factors to consider include individual obstetric risk stratification and the level of neonatal care which may be required. Variations in care delivery are necessary to meet the needs of women living in rural and remote communities, where there is greater ethnic diversity, where socioeconomic disadvantage is prevalent or where staffing or resource limitations exist (134). While traditional profiling has looked at gestation at diagnosis of GDM, the need for pharmacotherapy and pharmacotherapy dosage required, there is little published evidence to support their use. Australian data looking at care for women with GDM in higher risk obstetric models of care versus continuation in the original model of care with additional support or review, are limited to two observational papers (135,136).

Centering a woman's preferences is essential. Pregnant women consistently express continuity of care as a priority. Alterations to model of care and place of birth can have significant financial and social implications for women, including a potential increase in the number of health-service visits if care is not well integrated, and the possibility of needing to relocate before birth.

Recommendation

21. Models of care for women with GDM should be individualised, taking into account the population profile, geography, service capacity, staffing and women's preferences.

14. Mobile Health (mHealth) apps

A number of mobile health phone applications (mHealth apps) have been developed which include features for women with diabetes such as automated feedback mechanisms and real-time data visualisation and for clinicians, access to web-based administrative portals to review glucose readings, and provide individualised treatment adjustments and counseling. mHealth apps may enhance the care of women with GDM by supporting patient education, reducing the self-monitoring burden, reinforcing adherence to blood glucose monitoring, promoting dietary and lifestyle modifications, reducing the need for in-person clinic visits, reducing staff time required and facilitating both clinical oversight and social support.

In comparison with historical controls, mHealth apps have shown improved glucose control and in some papers, improved perinatal outcomes (137–139). A 2021 systematic review of 6 publications including 813 women, including 5 RCTs, showed improved glycemic parameters among participants using mHealth apps (140). Two further RCTS not included in that review have also shown improved glycaemic parameters (141,142). A German RCT in adults with type 1 diabetes, type 2 diabetes and GDM showed a reduction in diabetes distress in participants assigned to an mHealth app (143).

In qualitative data regarding the use of mHealth apps, women with GDM reported that an app increased their confidence and motivation for self-managing blood glucose levels. However,

some experienced frustration due to technological issues and limited healthcare professional support (144–146). A systematic review of qualitative outcomes in non-pregnant adults with type 1 and type 2 diabetes, and women with GDM described a favourable perception of mHealth apps features relating to monitoring blood glucose, diet and exercise. Consumers recognised the importance of customising apps and unfavourable aspects related to uploading of excessive information, monitoring device incompatibility, and technological problems (146). Clinicians also indicated satisfaction with mHealth platforms, with some technological challenges (139). Local data supports the use of mHealth apps to support women with GDM (14).

mHealth apps have potential as supportive tools for GDM management, but successful implementation requires strong collaboration between healthcare providers and patients to address technical challenges and enhance user engagement. There is an overall positive perception by pregnant women and likely improved glucose outcomes, but improved perinatal outcomes are not clearly documented at this time.

Recommendation

22. mHealth apps can be useful for women and clinicians.

15. Antenatal Expressing

Antenatal expressing of colostrum has been suggested for women with diabetes to reduce neonatal hypoglycaemia, requirement for complementary feeds or admission to special care nursery and to promote ongoing breastfeeding. Concerns have also been raised that expressing may increase the rates of preterm birth.

Based on one large Australian randomised trial, which included predominantly women with GDM, antenatal expressing did not reduce infant admission to special care nursery and had no impact on short or long term breastfeeding rates or the onset of lactogenesis (147–149), but did lead to lower use of artificial infant formula for management of neonatal hypoglycaemia. Antenatal expressing was not associated with increased risks to the woman or the baby. Women's experiences of antenatal expressing were mixed (150,151).

Recommendation

23. Antenatal expressing of breast milk for women with GDM is not harmful.

16. Obstetric surveillance

Strategies for obstetric surveillance of pregnancies affected by GDM should aim to detect fetal and maternal adverse consequences of hyperglycaemia, in order to plan timing of delivery, or increase fetal surveillance. This chapter does not cover routine obstetric surveillance or care for other complications of pregnancy.

16.1. Assessment of fetal wellbeing

There is no high quality evidence for routine or repeated ultrasound for fetal growth and/or wellbeing surveillance in women with GDM to improve maternal or infant outcomes. A number of published papers suggest surveillance using methods including assessment of amniotic fluid volume, CTG (non stress), contraction stress tests, biophysical profile and umbilical or other fetal vascular Doppler assessment, however these results are limited by concerns of blinding, small sample size, discordant findings and intervention effect (152–157). Recommendations are confounded by the fact that GDM commonly coexists with other conditions, such as obesity, which may require fetal assessment. In addition, recommendations for surveillance are often extrapolated from care for women with pre-existing diabetes (42,53,92,158)
Routine third trimester ultrasound in the standard risk obstetric community has not shown benefit in prevention of poor neonatal outcomes (159–161).

Recommendations for ultrasound assessment of fetal growth and wellbeing should be individualised and based on early and ongoing risk assessment, including the woman's obstetric and medical history, and clinical and biochemical findings throughout pregnancy. Proposed models combining maternal clinical factors, biometry and angiogenic markers may improve the specificity of assessment in the future (162,163). Women with comorbidities, suboptimal blood glucose levels or overt diabetes in pregnancy may warrant additional surveillance.

Recommendation

24. Women with comorbidities, suboptimal blood glucose levels or overt diabetes in pregnancy may warrant additional ultrasound surveillance of fetal growth and wellbeing. For women with a diagnosis of uncomplicated GDM, routine ultrasound or CTG based assessment of fetal growth and wellbeing is not recommended.

17. Timing and mode of birth

17.1. Timing

Decisions around the timing of birth in women with GDM are complex due to limitations in the available data, and increasing national and international efforts to reduce planned early term birth (164–166). A driving factor in recommending planned birth is to prevent stillbirth, and reduce other important morbidities such as hypertensive disorders of pregnancy and neonatal intensive care or special care nursery admission. However there is no published evidence that planned birth is associated with an improvement in rates of stillbirth or maternal or infant morbidity among women with GDM.

Stillbirth at term is uncommon, affecting approximately 1 in 500 families, thus appropriately powered trials to demonstrate the impact of timing of birth on stillbirth are lacking and will likely remain so. Evidence regarding the risks of stillbirth specifically in women with GDM is mixed. Large observational datasets do not suggest an increase in perinatal mortality at term, compared to women without GDM, or small increases in subgroups of women with GDM (167–173). In the large HAPO trial, where GDM status was concealed from care providers, there was

no increase in perinatal mortality in women with hyperglycaemia (174) but in many of these cohorts, earlier delivery was recommended, obfuscating the risk of stillbirth at term in the absence of such policies. Women with GDM are at an increased risk of complications such as hypertensive disorders of pregnancy that are independent indicators for timed birth.

International guidelines have inconsistent advice regarding timing of birth with GDM (53,71,158,175). The Australian Preterm Birth Prevention Alliance has advised that for women with GDM, if insulin is required but blood glucose levels are on target and fetal growth is within the normal range, initiate shared decision-making regarding birth from 39+0 weeks. The recent NZ guideline suggests that decision-making about birth be made on an individualised basis including likelihood of macrosomia, level of glycemic control and maternal or fetal complications. (92)

A suggested algorithm, adapted from the proposed NZ diabetes guideline, is given below (Table 5).

Table 5: Timing of birth for women with GDM

	Factors favouring expectant management until 40+6	**Factors favouring birth at 39/40**	**Factors favouring birth before 39/40**
Maternal blood glucose	Fasting is always in range. Postprandial in range most of the time	Fasting > 5.3 most days	Blood glucose out of range most days, requiring high dose insulin and/or difficulty adhering to medication
Treatment	Diet +/- metformin	Insulin	High dose insulin, or missing medication most days
Growth	10-90th centile, no concern about fetus or placenta	> 90th centile	> 95th or < 10th centile
Maternal health	No concerns		High BMI, hypertension, polyhydramnios
Other	No concerns	Past obstetric risk	Past obstetric risk

17.2. Shoulder dystocia

Women with GDM have an increased chance of fetal macrosomia or large for gestational age fetuses, and an increased chance of shoulder dystocia. LGA is variably defined as an estimated

fetal weight greater than the 90th, 95th or 97th percentile for gestational age and macrosomia as >4000gm or >4500gm.

Debate continues regarding the advantages of earlier planned delivery to reduce harms from shoulder dystocia in the broader obstetric population, and evidence is very limited in the setting of GDM. Women with GDM requiring medication were excluded from the Big Baby trial (176), and were represented in small numbers in an earlier trial (177). In addition, the accuracy of ultrasound to diagnose macrosomia in women with diabetes is limited, with sensitivity as low as 22% (66,175,178–180). In the setting of clinical suspicion of macrosomia, ultrasound to assess fetal weight may be helpful to guide mode of delivery. ACOG suggest that with an estimated fetal weight above 4500g, caesarean section should be discussed, aiming to reduce fetal harm secondary to shoulder dystocia, but that up to 588 caesarean deliveries would be needed to prevent a single case of permanent brachial plexus palsy (175). Shared decision making with the woman and consideration of other obstetric factors should inform decisions about mode of delivery.

Recommendations

25. Timing of delivery in women with GDM should consider all relevant clinical factors and shared decision making. In women with uncomplicated GDM, the usual guidance for timing of birth independent from GDM should apply.

26. If there is clinical suspicion for LGA, women with GDM may benefit from ultrasound assessment of fetal growth at 36 weeks gestation, to diagnose macrosomia and inform decision making around the mode of delivery

27. Consider caesarean section for estimated fetal weight $\geq$ 4500 g.

18. Management of GDM before and during birth

18.1. Management of hypoglycaemic medication before planned birth

Management of hypoglycaemic medication is recommended prior to planned induction of labour or caesarean section to reduce the risks of maternal hypoglycaemia during periods of reduced oral intake. A range of practices are used across Australia, with the main variation in practice of prescribing the usual long-acting insulin the night prior to planned, or 10-30% reduction, or 50% reduction depending on insulin dose (Appendix B). Consideration around medication provision before caesarean section will need to take into consideration local regimens for fasting, which are variable between hospitals.

18.2. Intrapartum management of blood glucose

Traditionally, expert opinion has recommended intensive glycaemic control during labour to decrease the risk of neonatal hypoglycaemia (53).

A 2024 systematic review of neonatal hypoglycaemia compared tight to less tight blood glucose targets in labour in women with gestational and prepregnancy diabetes (181). The majority of participants in the review were contributed by a Canadian retrospective study of 3256 women with GDM which showed no difference in rates of neonatal hypoglycaemia related to maternal intrapartum hyperglycaemia after adjustment for neonatal factors including birthweight (182) however overall the evidence was very uncertain. Further recently published observational data in 508 women with GDM in China has demonstrated that hyperglycaemia is common in labour, but maternal hypoglycaemia had the strongest association with neonatal hypoglycaemia (183).

There are 2 RCTs of tight vs less tight blood glucose control in labour. The first, included in the systematic review, included 76 women with GDM, and compared both frequency of testing (every hour compared to 4 hourly) and blood glucose targets (3.3 mmol/L to 5.5 mmol/L compared to 3.3 mmol/L to 6.7 mmol/L) (184). Neonates in the tighter control group had the same initial blood glucose level, but lower mean glucose across the first 24 hours. A more recent RCT, where most participants had GDM, compared intrapartum blood glucose thresholds of 3.9 to 10 mmol/L compared to 3.9 to 6.1 mmol/L with testing 4 hourly in latent phase and 2 hourly in active labour and demonstrated no difference in rates of neonatal hypoglycaemia or other outcomes (185). A further RCT is planned (186).

Recommendation

28. Intrapartum care should include 4 hourly glucose testing in latent labour and 2 hourly in active labour aiming for blood glucose levels from 4 to 8 mmol/L.

19. Postpartum care

Care for women after GDM includes care in the immediate postpartum period and long-term care to prevent and detect hyperglycaemia. Most published recommendations are based on lower quality evidence (187).

19.1. Medication and blood glucose testing

Women should stop glucose lowering therapies after birth. Women who were taking Metformin before pregnancy to manage other conditions (e.g. PCOS) may continue as per usual management. There is limited evidence regarding the need for postpartum glucose monitoring in women managed with non-pharmacological therapy. For women managed with pharmacological therapy, New Zealand and Australian guidelines recommend blood glucose testing in the first 24-72 hours to screen for persisting hyperglycaemia. The recommendations vary amongst centres. Many suggest fasting and either pre or 2-hours post-meal, with acceptable levels from 4 to 8 mmol/L, and recommendations to seek medical advice if fasting levels are above 6 mmol/L or postprandial > 9.9 mmol/L. Testing can cease if 2 levels are below 8 mmol/L in 24 hours.

Recommendations

29. Women with GDM should stop glucose lowering therapies after birth.

30. Blood glucose monitoring should cease immediately postpartum for women managed with non-pharmacological therapy.

31. Women managed with pharmacological therapy should perform blood glucose monitoring in the immediate postpartum period.

19.2. Breastfeeding:

Women with GDM can have delayed breastfeeding initiation and may be less likely to continue breastfeeding. Maternal obesity, insulin use and suboptimal in-hospital breastfeeding are risk factors for delayed breastfeeding (188,189).

Observational studies demonstrate that breastfeeding decreases the incidence of development of type 2 diabetes, specifically when women have higher lactation intensity and longer duration (190). The Nurses' Health Study observed women for a 25 year period and longer duration of breastfeeding was associated with lower risk of type 2 diabetes, lower HbA1C, and lower fasting plasma insulin and C-peptide (191). Breastfeeding for longer than one month may also reduce the recurrence rate of GDM (192).

Breastfeeding and medications: Since women with GDM would cease any insulin or metformin at delivery, there are no specific recommendations.

Recommendation

32. Encourage and support breastfeeding.

19.3. Screening for type 2 diabetes

Previously undiagnosed prediabetes or diabetes, can present and first be detected as GDM, and women who have had GDM are at increased risk of Type 2 diabetes later in life. Therefore women with GDM should be screened in the postpartum period and lifelong for prediabetes or diabetes.

Suggested pathways for postpartum dysglycaemia screening include a 6-12 week postpartum OGTT (175,193), or fasting blood glucose (53,71) and/or HbA1c (92). OGTT has the advantage of detecting IGT as well as type 2 diabetes and can be performed at 6 weeks postpartum. HbA1c may be lowered by the increased red blood cell turnover in pregnancy or by blood loss at delivery, and so should not be tested before 12 weeks postpartum. HbA1c 3-12 months postpartum is an alternative to OGTT, noting the lower capacity to diagnose impaired glucose tolerance.

The National Gestational Diabetes Register reminds women to have diabetes checks postpartum, however uptake of postnatal screening after GDM is universally low, and this is more marked in high risk populations (194,195). In the PANDORA study, Aboriginal and/or Torres Strait Islander women with GDM had similar rates of screening as non-Indigenous

women when screening options included a 75-g oral glucose tolerance test (OGTT), HbA1c, or fasting plasma glucose (196).

Given the low postpartum uptake of OGTT, HbA1c has been offered as an alternative as postpartum screening. However, there is limited evidence to demonstrate that it is effective. In a direct comparison of HbA1c and OGTT in a small number GDM women 1 year postpartum, HbA1c had lower sensitivity and specificity for diagnosing impaired carbohydrate metabolism compared to the OGTT (197). A large data analysis of more than 50,000 women post-GDM found that HbA1c had limited sensitivity compared with OGTT for detecting impaired glucose tolerance, but had high sensitivity and specificity for detecting diabetes at an HbA1c above 5.7% at 3-12 months postpartum.

Women should also be offered advice on healthy eating, physical activity and weight management to support type 2 diabetes risk reduction. Referral to appropriate prevention programs, including state-based programs, can be offered and dissemination of resources from the National Diabetes Support Scheme (NDSS) in Australia. Ongoing evaluation for glucose intolerance or type 2 diabetes is recommended every 1-3 years (69).

Recommendation

33. Women are advised to have testing for hyperglycaemia postpartum. The preferred test is a 75g oral glucose tolerance test (OGTT) at least 6 weeks postpartum. Haemoglobin A1c (HbA1c) at least 3 months postpartum is an acceptable alternative, and the choice should consider women's circumstances and preferences. Diagnostic thresholds for intermediate hyperglycaemia ("pre-diabetes") and type 2 diabetes should be as per relevant guidelines for non-pregnant populations.

34. Women should be offered advice on type 2 diabetes risk reduction and referred to risk reduction programs.

20. Differential diagnoses of GDM

Most women with GDM are correctly diagnosed, however a small number of women will have an alternative cause of hyperglycaemia in pregnancy including type 1 diabetes and monogenic diabetes. Review of the clinical picture and results of the OGTT can aid in consideration of alternative diagnoses.

20.1. Type 1 diabetes

Testing for T1D autoantibodies may be indicated if the clinical picture is suspicious for T1D and there are two or more of the following: age <30 years, low BMI, early insulin therapy or the presence of significant ketosis (198). Up to 10% of women with GDM will have diabetes auto-antibodies (198,199). In some populations, the presence of auto-antibodies identifies women who will develop diabetes within the next 5-10 years, with approximately half developing type 1 diabetes and half developing type 2 diabetes (200). ZnT8 antibodies are the most commonly

detected antibody in GDM, but the clinical relevance of these antibodies in isolation in predicting future diabetes is less robust (201). GDM treatment tools and treatment targets for women with GDM with autoimmunity should not differ to women with GDM without autoimmunity. However, these women require close observation postpartum for persistent hyperglycaemia and the development of ketosis, particularly if they are taking insulin.

20.2. Monogenic diabetes

Monogenic diabetes is a group of uncommon forms of diabetes caused by a variant in a single gene (202). Mature-onset diabetes of the young (MODY) and neonatal diabetes mellitus are the two main forms of monogenic diabetes. MODY typically results in hyperglycaemia in adolescence or early adulthood and accounts for 1-2% of cases of diabetes in pregnancy (203). MODY is often inherited in an autosomal dominant pattern such that 50% of offspring are affected. Neonatal diabetes mellitus typically results in diabetes onset before 6 months of age (204).

The most common form of MODY identified in pregnancy is GCK-MODY. It results in persistent mild hyperglycaemia and may be considered in women with a strong family history of early hyperglycaemia or diabetes across multiple generations, normal pre-pregnancy BMI (considering ethnicity), and a fasting glucose > 5.5 mmol/L (205,206). However, the diagnosis is ultimately made on genetic testing.

Genetic testing should only be performed on those with a strong clinical suspicion of monogenic diabetes. The use of a validated Exeter MODY calculator may be used to assist the decision to proceed with genetic testing, although it is less accurate in ethnically diverse populations and cannot detect rare forms of monogenic diabetes (207,208). If MODY is known to be present or there is a strong clinical suspicion, women require individualised assessment of fetal growth and BSL targets, and should be managed in a multidisciplinary specialist unit (209).

Recommendation

35. Consider alternative diabetes diagnoses in women with an atypical clinical picture.

21. Neonatal Care

Infants born to women with GDM are at higher risk of respiratory distress, hyperbilirubinaemia, and neonatal hypoglycaemia (210–212). Neonatal hypoglycaemia may develop rapidly following birth and so assessment and treatment for hypoglycaemia should take place within 4 hours of birth (213). Neonatal hypoglycaemia may be clinically asymptomatic but can lead to brain injury (214) and worsened long-term motor, cognitive and visual outcomes (211,215,216). Although blood glucose thresholds for the diagnosis of neonatal hypoglycaemia are not consistent in the literature, neonatal blood glucose concentrations < 2.0 mmol/L are associated with adverse long term outcomes, whereas active management of blood glucose concentrations < 2.6 mmol/L results in outcomes equivalent to infants who do not experience neonatal hypoglycaemia (215,217).

To prevent hypoglycaemia, infants should be positioned skin-to-skin and supported to breastfeed within the first hour of postnatal life (218). Direct suckling at the breast should be prioritised over expressed breastmilk. A breastmilk substitute may be offered at maternal preference, aiming for feed volumes of 40-60 ml/kg/day. After receiving a feed, initial blood glucose concentration should be checked between 1 and 3 hours of age; then rechecked 3-4 hourly for at least 12 hours. Blood glucose concentrations should no longer be checked in the well baby once blood glucose concentrations ≥ 2.6 mmol/L on 3 consecutive occasions AND the baby is feeding regularly AND the baby is more than 12 hours old (219).

Blood glucose concentrations should be checked using a glucose oxidase method, or other system validated for neonatal use (220,221).

For well, term infants with low blood glucose concentrations (< 2.6 mmol/L or as per local guidelines) 40% oral dextrose gel is the first-line treatment (222,223):

a. Rub 0.5ml/kg 40% oral dextrose gel into the buccal mucosa, and offer the infant a breastfeed or expressed EBM.
b. This step may be repeated if blood glucose concentrations remain low after 30-60 minutes.
c. Consider giving an artificial infant formula feed (40-60 ml/kg/day) if blood glucose concentrations remain low after 2 doses of 40% oral dextrose gel (224).
d. Do not allow low blood glucose concentrations to persist beyond 4 hours without definitive medical intervention.

Infants with severe hypoglycaemia (any blood glucose concentration < 1.5 mmol/L or defined as per local guidelines, or any low blood glucose associated with clinical signs) (213); prolonged hypoglycaemia lasting more than 4 hours; or recurrent episodes of hypoglycaemia (more than 3 episodes in 24 hours) should be admitted to a neonatal unit and managed as an emergency with intravenous glucose administration (219). Intramuscular glucagon may be given in situations where rapid intravenous access is not possible- its effect of increasing blood glucose is temporary and reliant on adequate hepatic glycogen stores (225). Infants with severe or persistent hypoglycaemia that cannot be managed with intravenous glucose solutions alone, or who have glucose requirements > 10 mcg/kg/min should be discussed with a Neonatal Intensive Care specialist.

These recommendations are for the care of well term babies. For preterm or unwell babies, use local paediatric guidance.

Recommendations

36. Where possible, infants should be positioned skin-to-skin and supported to breastfeed within the first hour of life to reduce the chance of hypoglycaemia.

37. After receiving a feed, initial blood glucose concentration should be checked between 1 and 3 hours of age; then rechecked 3-4 hourly for at least 12 hours. Blood glucose concentrations

should no longer be checked in the well baby once blood glucose concentrations ≥ 2.6 mmol/L on 3 consecutive occasions AND the baby is feeding regularly AND the baby is more than 12 hours old.

38. For well, term infants with low blood glucose concentrations (< 2.6 mmol/L or as per local guidelines), 40% oral dextrose gel is the first-line treatment.

39. Infants with severe hypoglycaemia should be admitted to a neonatal unit and managed as an emergency.

40. Blood glucose concentrations should be checked using a glucose oxidase method, or other system validated for neonatal use.

22. Appendices

22.1. Appendix A. Blood glucose targets in GDM - a selection of National and State guidelines

	Blood Glucose targets (mmol/L)		
	Fasting	**1 hour**	**2 hour**
ADA	<5.3	<7.8	<6.7
NICE	<5.3	<7.8	<6.4
SOGC	<5.3	<7.8	<6.7
SIGN	<5.5	<8.0	<7.0
New Zealand	<5.1	<7.5	<6.8
Queensland Health	<5.3	<7.5	<6.8

Acronyms: ADA, American Diabetes Association (69);NICE, National Institute for Health and Care Excellence (53); SOGC, Society Obstetrics and Gynecology Canada (158); SIGN, Scottish Intercollegiate Guidelines Network (71). Additional references: Queensland Health (60); New Zealand Draft Guideline (92)

22.2. Appendix B. A selection of published guidelines regarding managing medication before cesarean section or induction of labour

	Insulin		**Metformin**	
Jurisdiction	**Caesarean delivery**	**Induction of labour (IOL)**	**Caesarean delivery**	**Induction of labour**
Queensland Health	Night prior: usual dose. Consider individual clinical situation including fasting BGL. May require reduced dose of intermediate/ long acting insulin.	Morning IOL: Eat breakfast, administer usual dose of rapid acting insulin, omit or reduce long or intermediate acting insulin Afternoon or evening IOL: Usual dose of rapid acting insulin with evening meal. If not in established labour, administer long or intermediate acting insulin before bedtime		
RWH	Give usual nocte insulin or reduce dose by 10-30% in conjunction with an endocrinologist.	Reduce the usual nocte insulin by between 10-30% in conjunction with an endocrinologist. Cease insulin in established labour.	Cease 24 hours before	Cease 24 hours before
Monash	Usual insulin the night before (consider reduction dose of long acting insulin dose by 10-20% if very tightly controlled).	Usual insulin the night before (consider reduction dose of long acting insulin dose by 10-20% if very tightly controlled).		
Western Australia	Reduce nighttime long acting insulin by 50%.	Reduce nighttime long acting insulin by 50%.	Do not give nighttime oral hypoglycaemic agents	Do not give nighttime oral hypoglycaemic agents

South Australia		Morning IOL and labour not established - eat breakfast and give usual rapid acting insulin. Adjust intermediate or long acting insulin. If afternoon IOL and labour not established, give usual meal time and bedtime insulin.		Cease when labour established
South Eastern Sydney Local Health District	Continue usual insulin until fasting.	Continue usual insulin until in established labour.	Cease when fasting commences	Cease when in established labour
JBDS		The day prior to induction, and during cervical ripening, insulin should continue as usual.		The day prior to induction, and during cervical ripening, oral glucose lowering drugs should continue as usual

References and abbreviations: Queensland Health (60); RWH, Royal Womens Hospital Melbourne (61); Monash Medical Centre, Melbourne (62); Western Australia (226); South Australian Perinatal Guideline (59); South Eastern Sydney Local Health District (227); JBDS, Joint British Diabetes Society (228)

22.3. Appendix C Weight gain recommendations for Asian women for singleton pregnancies (229)

Pre-pregnancy BMI classification (kg/m²)	Total GWG (kg)	Mean rate of weekly weight gain in 2nd and 3rd trimester (kg)
<18.5	12.5-18.0	0.5
18.5-22.9	11.5-16.0	0.4
23-27.5	7.0-11.5	0.3
>27.5	≤ 7.0	

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24. Abbreviations

AC	Abdominal circumference
ACOG	American College Obstetrics and Gynecology
ADIPS	Australiasion Diabetes in Pregnancy Society
ADA	American Diabetes Association
CS	Cesarean section
CoC	Continuity of care
EFW	Estimated fetal wight
GDM	Gestational diabetes
GI	Glycaemic index
IOL	Induction of labour
LGA	Large for gestational age
mHealth app	Mobile health application
MNT	Medical nutrition therapy
NDSS	National Diabetes Service Scheme
POC	Point of care
PPH	Postpartum hemorrhage
RCT	Randomised controlled trial
RANZCOG	Royal Australasion College Obstetrics and Gynecology
SGA	Small for gestational age
SBGM	Self monitoring blood glucose
SIGN	Scottish Intercollegiate Guidelines Network
SOGC	Society Obstetrics and Gynecology Canada
NICE	National Institute for Health and Care Excellence