

# Gestational diabetes mellitus (GDM)

Clinical Guideline Presentation v2.0



45 minutes

Towards CPD Hours

## References:

Queensland Clinical Guideline: Gestational diabetes mellitus is the primary reference for this package.

## Recommended citation:

Queensland Clinical Guidelines. Gestational diabetes mellitus clinical guideline education presentation E21.33-1-V2-R26. Queensland Health. 2021.

## Disclaimer:

This presentation is an implementation tool and should be used in conjunction with the published guideline. This information does not supersede or replace the guideline. Consult the guideline for further information and references.

## Feedback and contact details:

**M:** GPO Box 48 Brisbane QLD 4001 | **E:** [guidelines@health.qld.gov.au](mailto:guidelines@health.qld.gov.au) | **URL:** [www.health.qld.gov.au/qcg](http://www.health.qld.gov.au/qcg)

**Funding:** Queensland Clinical Guidelines is supported by the Queensland Health, Healthcare Improvement Unit.

## Copyright:

© State of Queensland (Queensland Health) 2021



icensed under a Creative Commons Attribution-NonCommercial-NoDerivatives V4.0 International licence. In essence, you are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute Queensland Clinical Guidelines, Queensland Health and abide by the licence terms. You may not alter or adapt the work in any way. To view a copy of this licence, visit <https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en>

For further information, contact Queensland Clinical Guidelines, RBWH Post Office, Herston Qld 4029, email [Guidelines@health.qld.gov.au](mailto:Guidelines@health.qld.gov.au) For permissions beyond the scope of this licence, contact: Intellectual Property Officer, Queensland Health, GPO Box 48, Brisbane Qld 4001, email [ip\\_officer@health.qld.gov.au](mailto:ip_officer@health.qld.gov.au) phone (07) 3234 1479.

Images are property of State of Queensland (Queensland Health) unless otherwise cited.

# Objectives

In relation to GDM outline:

- Risk factors
- Appropriate screening and testing methods
- Classification of types of diabetes
- Risks for mother and fetus/baby
- Education and management
- Pharmacotherapy options
- Intrapartum care
- Post partum and discharge care

# Abbreviations

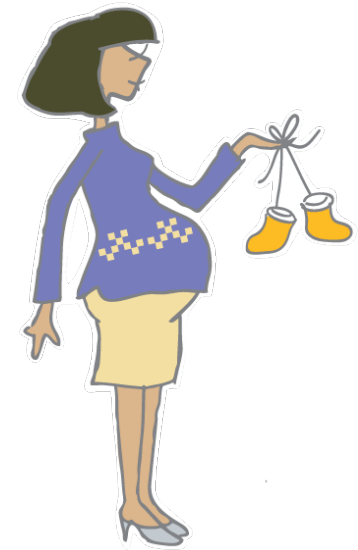
AC	Abdominal circumference
ADIPS	Australasian Diabetes in Pregnancy Society
BGL	Blood glucose level
BMI	Body mass index
CDE	Credentialed diabetes educator
CI	Confidence interval
CS	Caesarean section
DIP	Diabetes in pregnancy
GDM	Gestational diabetes mellitus

GI	Glycaemic Index
GWG	Gestational weight gain
IOL	Induction of labour
IOM	Institute of Medicine
LGA	Large for gestational age
MNT	Medical nutrition therapy
NDSS	National Diabetes Services Scheme
OGTT	Oral glucose tolerance test
USS	Ultrasound scan

# Introduction

Gestational diabetes mellitus (GDM) is:

- One of the most common medical complications of pregnancy
- Glucose intolerance first recognised in pregnancy
- Usually resolves postpartum



Diabetes in pregnancy (DIP) if:

- Glucose level high enough to be diabetes mellitus diagnosis outside pregnancy

# Prevalence

- In 2018 incidence:
  - Queensland 13%
  - Australia 14%
- Rate has tripled since 2000–2001
- Incidence increases with socio-economic disadvantage (21% v 13%)
- In 2016/2017
  - 32% required insulin
  - 8% required oral hypoglycaemic

# Risk factors

Assess all women early for risk factors

Ethnicity	Previous perinatal loss
Age $\geq$ 40 years	Multiple pregnancy
Previous elevated BGL	BMI $>$ 30kg/m <sup>2</sup>
Previous GDM	Previous LGA baby
Family history of diabetes	
<ul style="list-style-type: none"><li>• 1st degree relative with diabetes or sister with GDM</li></ul>	
Medications	
<ul style="list-style-type: none"><li>• Corticosteroids, antipsychotics</li></ul>	
Polycystic ovarian syndrome	

# Maternal risks

## Short term

Pre-eclampsia

Induced labour

Operative birth

Caesarean section

Preterm labour and birth

Hydramnios

Postpartum haemorrhage

Infection

## Long term

Recurrent GDM

Increased risk of type 2 diabetes

Cardiovascular disease

Risk of glucose metabolism disorder

Development of metabolic disorder

Renal disease

Development of cardiovascular disease



# Fetal and baby risks from GDM

## Short term

Macrosomia

Hypoglycaemia

Increased weight and adiposity

Polycythaemia

Prematurity

Birth trauma

Respiratory distress

Hypocalcaemia

Jaundice

Cardiac anomalies

## Long term

Impaired glucose tolerance

Type 2 diabetes

Overweight and besity

# Screening

## If risk factors

- OGTT (75 g) (or HbA1c) in first trimester with first antenatal bloods
- If normal, OGTT at 24–28 weeks gestation

## If maternal medications

- Do not perform OGTT within one week of steroids
- If having steroids monitor BGLs
- Metformin (for PCOS) may affect OGTT result

# Screening

If no risk factors and not diagnosed with GDM

- OGTT at 24–28 weeks gestation
- If testing is declined consider fasting plasma glucose

# Previous bariatric surgery

If previous bariatric surgery

- 1st trimester fasting PGL and HbA1c
- 2nd trimester fasting BGL at 24–28 weeks
  - If 4.6–5 mmol/L fasting and postprandial self-monitoring BGL for 1–2 weeks
- 3rd trimester if evidence of fetal hyperinsulinaemia on USS repeat testing

# GDM diagnosis

Time	Plasma glucose level (one or more)
Fasting	5.1–6.9 mmol/L
1 hour	≥ 10.0 mmol/L
2 hour	8.5–11.0 mmol/L

## 1st trimester only

HbA1c	> 41 to < 48 mmol/mol
-------	-----------------------

# Diabetes in pregnancy

Time	Plasma glucose level (one or more)
Fasting	$\geq 7.0$ mmol/L
1 hour	<i>A one hour level is not used</i>
2 hour	$\geq 11.1$ mmol/L
Random	$\geq 11.1$ mmol/L (confirm diagnosis with additional standardised testing)
Hb1Ac	$\geq 48$ mmol/mol

## 1st trimester only

HbA1c	$\geq 48$ mmol/mol
-------	--------------------

# Antenatal care

- Individualise care for each woman
- Collaborative model with midwifery  
continuity of care gives best outcomes
- Education and dietician advice within one week of diagnosis
- Individualise schedule of contact—increase frequently if suboptimal BGLs or other complications
- If diagnosed < 16 weeks increase contact

# Education at GDM diagnosis

- May be group or individual session
- Individualise considering cultural background, learning style, family and social circumstances
- Encourage partner or support person to attend
- Provide psychosocial support and advice



# Initial education

- Overview of GDM and effects for woman and baby
- Dietary, physical activity and lifestyle recommendations
- Self-monitoring and BGL targets
- Registration with National Diabetes Scheme Service (NDSS) by CDE or doctor
- Dietician input

# Self monitoring BGL

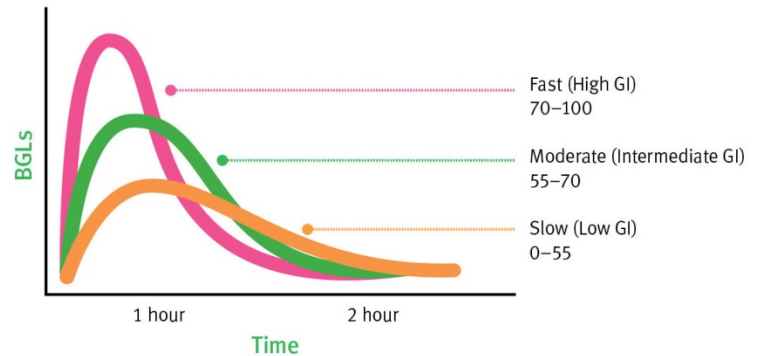
- Hand washing
- Targets and interpretation of BGLs
- Meter use
- Times to test

Time	Target BGL (mmol/L)
Fasting	< 5
1 hour postprandial	< 7.4
2 hours postprandial	< 6.7

- Lancet device use and safe disposal

# Medical nutrition therapy

- Food choices for optimal nutrition for maternal and fetal health
- Promotes:
  - Appropriate GWG
  - Target BGLs
  - Absence of ketones
- Includes:
  - Minimum 175 g carbohydrates per day
  - Low GI diet




# MNT (continued)

- Individualise eating plan—use food diary
- Culturally appropriate
- Discuss:
  - Carbohydrate food and influence on BGL
  - Glycaemic index
  - Portion size
  - Safe foods and label reading
- GWG—weight loss not recommended



# Physical activity



- Helpful adjunctive therapy
- Assess current activity level
- Consider exercise snacking for 10 minute periods
- Suggest aerobic exercise—
  - Walking, exercise bike, swimming, other aquatic activities, prenatal exercise classes



# Pharmacological therapy

- If not achieving optimal BGLs with lifestyle changes
  - Metformin or insulin
- Decision to commence based on:
  - Degree and pattern of hypoglycaemia
  - Maternal choice
  - Gestational age
  - Fetal growth

# Metformin

- Improves insulin resistance
- Preferred by women
- May also need insulin added
- Maximum dose—2500 mg SR or 2000 mg XR orally per day
- Titrate based on BGLs
- Review BGLs within 3 days of commencing

# Insulin therapy

## Indications:

- BGLs above targets
- Sub-optimal BGLs with metformin
- Maternal preference
- Metformin not tolerated
- Fetal macrosomia



# Insulin therapy

- Consult with expert clinician about dose and type
- Individualise regimen
- Titrate every 2–3 days with increments of 2–4 units
- Education:
  - Clinician trained in teaching women to self-administer
  - Hypoglycaemia management

# Insulin type

Indication	Insulin type
Elevated fasting glucose	<ul style="list-style-type: none"><li>• Intermediate acting at bedtime</li></ul>
Postprandial hyperglycaemia	<ul style="list-style-type: none"><li>• Rapid acting at meal times</li></ul>
Fasting <b>and</b> postprandial hyperglycaemia	<ul style="list-style-type: none"><li>• Basal bolus regimen<ul style="list-style-type: none"><li>○ Rapid acting at meal times <b>and</b> intermediate acting at bedtime <b>or</b></li><li>○ Mixed twice daily (if woman reluctant to have injection four times per day)</li></ul></li></ul>

# Birthing

- GDM well managed with no complications
  - Expectant management
- If estimated fetal weight:
  - < 4000 g vaginal birth usually appropriate
  - 4000–4500 g consider other factors (e.g. maternal stature and history)
  - $\geq 4501$  g consider CS
- Document birth and pharmacotherapy plans

# Metformin as birth approaches

Birth	Action
Spontaneous onset	<ul style="list-style-type: none"><li>• Cease when in established labour</li></ul>
IOL	<ul style="list-style-type: none"><li>• Cease when in established labour</li></ul>
CS	<ul style="list-style-type: none"><li>• Cease evening before elective CS</li></ul>

# Insulin as birth approaches

Birth	Action
Spontaneous onset	<ul style="list-style-type: none"><li>• Titrate insulin according to BGLs during labour</li></ul>
IOL (morning)	<ul style="list-style-type: none"><li>• Eat early morning breakfast</li><li>• Usual rapid acting insulin</li><li>• Omit morning dose of long or intermediate insulin</li><li>• Cease all insulin when in established labour</li></ul>
CS	<ul style="list-style-type: none"><li>• Usual rapid, long or intermediate insulin night before</li><li>• Fast for six hours</li><li>• Omit morning insulin dose</li></ul>

# Intrapartum BGL monitoring

- Aim to maintain BGL 4–7 mmol/L (optimal)

BGL	Action
> 7.0 mmol/L	Consider stage of labour/imminency of birth Repeat BGL in 1 hour Consider insulin infusion
< 4.0 mmol/L	Cease insulin therapy Treat if symptomatic Repeat BGL

# Postpartum care

Therapy	Recommendation
Non-pharmacological	Cease BGLs
Pharmacological	<ul style="list-style-type: none"><li>• Cease metformin and insulin immediately after birth</li><li>• BGLs<ul style="list-style-type: none"><li>○ Check for 24 hours pre-prandial and before bed</li><li>○ If all are 4–8 mmol/L cease after 24 hours</li><li>○ If elevated:<ul style="list-style-type: none"><li>▪ Medical review</li><li>▪ Continue BGLs</li><li>▪ If indicated (rarely) lower dose than in pregnancy</li></ul></li></ul></li></ul>

# Breastfeeding

- Discuss short and long term benefits for woman and baby
- Encourage all women to breastfeed
- Offer early skilled lactation support and assistance



# Discharge planning

- Discuss:
  - Optimal postpartum and inter-pregnancy weight
  - Contraception
  - OGTT at 6–12 weeks postpartum
  - Lifestyle interventions—weight management, eating patterns, physical activity
  - Early screening in future pregnancies
  - Lifelong diabetes screening