



Diabetes before, during and after pregnancy

Prevalence of diabetes in pregnancy

- Diabetes is the commonest medical complication of pregnancy, affecting one in ten pregnant women by 30 years of age.¹
- The incidence of diabetes in pregnancy has doubled in the past two decades, with higher maternal age and rising rates of obesity and type 2 diabetes in young women.
- Gestational diabetes (GDM) is the commonest type of diabetes in pregnancy, accounting for ~85% of all diabetes pregnancies.

- Pregnancies complicated by type 1 and type 2 diabetes are also increasing, with a 33% increase in type 1 diabetes pregnancies and a 100% increase in type 2 diabetes pregnancies over the past 10–15 years.²

Why is it important?

Compared to the general maternity population, pregnant women with type 1 and type 2 diabetes:

- Are older, with higher rates of obesity, ethnic diversity and deprivation.
- Offspring have 3–4 times

higher rates of congenital heart disease and neural tube defects.

- Have 4 times higher rates of stillbirth and having a baby that dies in the first 28 days.
- Congenital anomaly rates are equivalent in women with type 1 and type 2 diabetes.
- Perinatal deaths are higher in babies of women with type 2 than type 1 diabetes.³

Congenital anomaly and perinatal death in those without diabetes and those with type 1 and type 2 diabetes

| Outcome | Outcome rates per 1000 births | | |
|--------------------|-------------------------------|-----------------|-----------------|
| | No diabetes | Type 1 diabetes | Type 2 diabetes |
| Congenital anomaly | 21 | 45 | 40 |
| Stillbirth | 5 | 10 | 13 |
| Neonatal death | 4 | 7 | 11 |

Adverse pregnancy outcomes are reduced by preparation for pregnancy

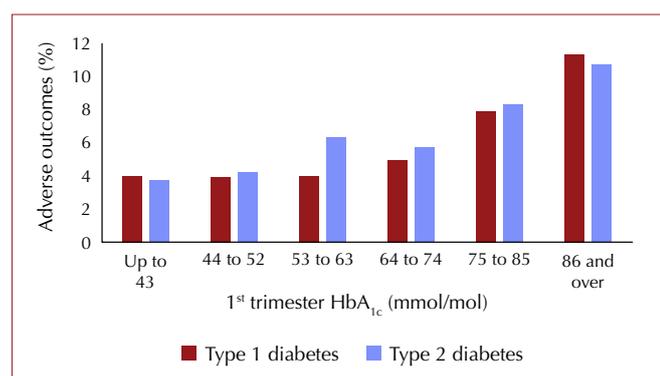
- Adverse pregnancy outcomes (congenital anomaly, perinatal death) are reduced by achievement of target HbA_{1c} (<48 mmol/mol) and taking 5 mg preconception folic acid.
- The National Pregnancy in Diabetes (NPID) Audit found that very few women, only one in eight, were well prepared for pregnancy.
- Women with type 2 diabetes were most likely

to be poorly prepared, with only a minority taking insulin or high dose 5 mg folic acid before pregnancy.

- Two thirds of women with type 2 diabetes were taking metformin before pregnancy.
- Many congenital malformations and perinatal deaths could be prevented by achieving target glycaemia (HbA_{1c} <48 mmol/mol) before pregnancy. This often requires insulin and metformin.

Preparing for pregnancy in women with type 1 and type 2 diabetes

- Optimise glycaemia, **aiming for HbA_{1c} <48 mmol/mol**, before stopping contraception.
- Start high-dose **5 mg folic acid** to reduce the risk of neural tube defects.
- Self-monitor blood glucose (SMBG) before and 1 hour after meals, and before bed (**7x daily**) aiming for pre-pregnancy glucose targets 3.9–10.0 mmol/L.
- **Stop or substitute potentially harmful medications** (ACE inhibitors, ARBs, statins, GLP-1 receptor agonists, SGLT2 inhibitors) for safer alternatives.
- Metformin can be safely continued, but **women with type 2 diabetes may also need insulin** to achieve HbA_{1c} <48 mmol/mol.
- Offer individualised dietary advice and support to **lose weight if BMI ≥27 kg/m²**.
- If HbA_{1c} is >86 mmol/mol, strongly advise not to get pregnant. **Avoid unplanned pregnancy** by continuing safe, effective contraception.
- All types of contraception, including oral contraceptives, are suitable until HbA_{1c} is lower.



Pre-pregnancy management and referral (type 1 and type 2 diabetes)

- Electronic systems and alerts to identify all women with diabetes aged 15–45 years.
- Safe, effective contraception (long-acting reversible contraception) should be offered to women not seeking pregnancy.
- Signpost women seeking pregnancy to online resources (e.g. Diabetes UK or Tommy's pregnancy planning tool; see [Resources](#)).
- Refer women with HbA_{1c} >48 mmol/mol for specialist pre-pregnancy care and support.

Clinical features of pregnant women with type 1 and type 2 diabetes³

| Clinical feature | Type 1 diabetes | Type 2 diabetes |
|--------------------------------|-----------------|-----------------|
| Maternal age (average) | 30 years | 34 years |
| Duration of diabetes (avg) | 13 years | 3 years |
| Weight at booking (average) | 70 kg | 86 kg |
| Overweight and obese BMI | 60% | 90% |
| BAME ethnicity | 10% | 50% |
| Deprivation quintile 4–5 | 50% | 70% |
| 5 mg preconception folic acid | 40% | 20% |
| HbA _{1c} <48 mmol/mol | 16% | 36% |
| Treated hypertension | 4% | 10% |
| ACE inhibitor/ARB therapy | 1% | 4% |
| Statin therapy | 1% | 5% |

Obstetric and neonatal outcomes of women with type 1 and type 2 diabetes

| Outcome | Type 1 diabetes* | Type 2 diabetes |
|---------------------------------------|------------------|-----------------|
| Gestational age at delivery (average) | 37 weeks | 38 weeks |
| Preterm births <37 weeks | 50% | 25% |
| Caesarean section delivery | >60% | >50% |
| Large birthweight baby | >50% | 25% |
| Small birthweight baby | 5% | 15% |
| Neonatal care admission | 45% | 25% |

*Pregnant women with type 1 diabetes will now be offered continuous glucose monitoring (CGM) to help them meet their pregnancy glucose targets: <https://abcd.care/dtn/CGM>

Gestational diabetes

- GDM affects 5–25% of all pregnant women, depending on the diagnostic criteria used.
- Antenatal clinical management of GDM improves maternal and perinatal outcomes.
- GDM is associated with longer-term cardiometabolic health risks for mother and baby, with up to 50% of women developing pre-diabetes or diabetes within 10 years.
- Children of mothers with GDM have high rates of overweight (40%) and obesity (20%) by 11 years of age.
- Many women with type 2 diabetes (between one third and half) have had previous GDM pregnancies. Assistance with weight reduction between pregnancies can reduce GDM risk.
- Women with GDM are 10 times more likely to develop type 2 diabetes, with incidence highest in the first 5 years after a GDM pregnancy.⁴

Summary of NICE guideline recommendations⁵

- Use the 75-g 2-hour oral glucose tolerance test to test for GDM at 24–28 weeks, if:
 - BMI >30 kg/m²
 - Previous macrosomic baby, weighing 4.5 kg or more
 - Previous GDM
 - Family history of diabetes (first degree relative with diabetes)
 - Ethnicity with a high prevalence of diabetes.
- GDM is diagnosed if fasting plasma glucose ≥5.6 mmol/L or 2-hour glucose ≥7.8 mmol/L.
- Offer CGM to all pregnant women with type 1 diabetes to help them meet their pregnancy glucose targets and improve neonatal outcomes.
- Offer intermittently scanned CGM (flash) to pregnant women with type 1 diabetes who are unable to use CGM or prefer to use flash.
- Consider CGM for other pregnant women on insulin therapy, if:
 - They have problematic severe hypoglycaemia (with or without impaired awareness of hypoglycaemia), or
 - They have unstable blood glucose levels that are causing concern despite efforts to optimise glycaemic control.

References

- 1 Feig DS et al (2014) Trends in incidence of diabetes in pregnancy and serious perinatal outcomes: a large, population-based study in Ontario, Canada, 1996–2010. *Diabetes Care* **37**: 1590–6
- 2 Mackinnon ST et al (2018) Diabetes and pregnancy: national trends over a 15 year period. *Diabetologia* **61**: 1081–8
- 3 Murphy HR et al (2021) Characteristics and outcomes of pregnant women with type 1 or type 2 diabetes: a 5-year national population-based cohort study. *Lancet Diabetes Endocrinol* **9**: 153–64
- 4 Vounzoulaki E et al (2020) Progression to type 2 diabetes in women with a known history of gestational diabetes: systematic review and meta-analysis. *BMJ* **369**: m13616
- 5 NICE (2020) *Diabetes in pregnancy: management from preconception to the postnatal period (NG3)*. www.nice.org.uk/guidance/ng3

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Resources

For women with diabetes

- Diabetes UK. Planning for a pregnancy when you have diabetes: <https://bit.ly/3x11z5o>
- Tommy's. Planning for pregnancy tool: <https://bit.ly/3x3zfiQ>

For women and HCPs

- ABCD. Continuous glucose monitoring programme: <https://abcd.care/dtn/CGM>
- UK Medical Eligibility Criteria for Contraceptive Use: <https://bit.ly/3aiY9RT>

For HCPs

- Diabetes UK. Information prescription – diabetes, contraception and pregnancy: <https://bit.ly/3spMJ4X>
- National Pregnancy in Diabetes Audit Report 2018: <https://bit.ly/3uW05Yy>

Post-pregnancy management

- Postnatal check at 6–8 weeks: ensure safe, effective contraception.
- If GDM during pregnancy, arrange maternal glucose test to exclude type 2 diabetes (fasting glucose before 12 weeks or HbA_{1c} at 3–6 months).
- Offer referral to NHS Diabetes Prevention Programme (in England) for all women with GDM, including those with normoglycaemia (FPG <5.5 mmol/L or HbA_{1c} <42 mmol/mol).
- Women with GDM are 10 times more likely to develop type 2 diabetes, so encouraging breastfeeding, weight management and diabetes prevention (e.g. NHS DPP) is a national priority.