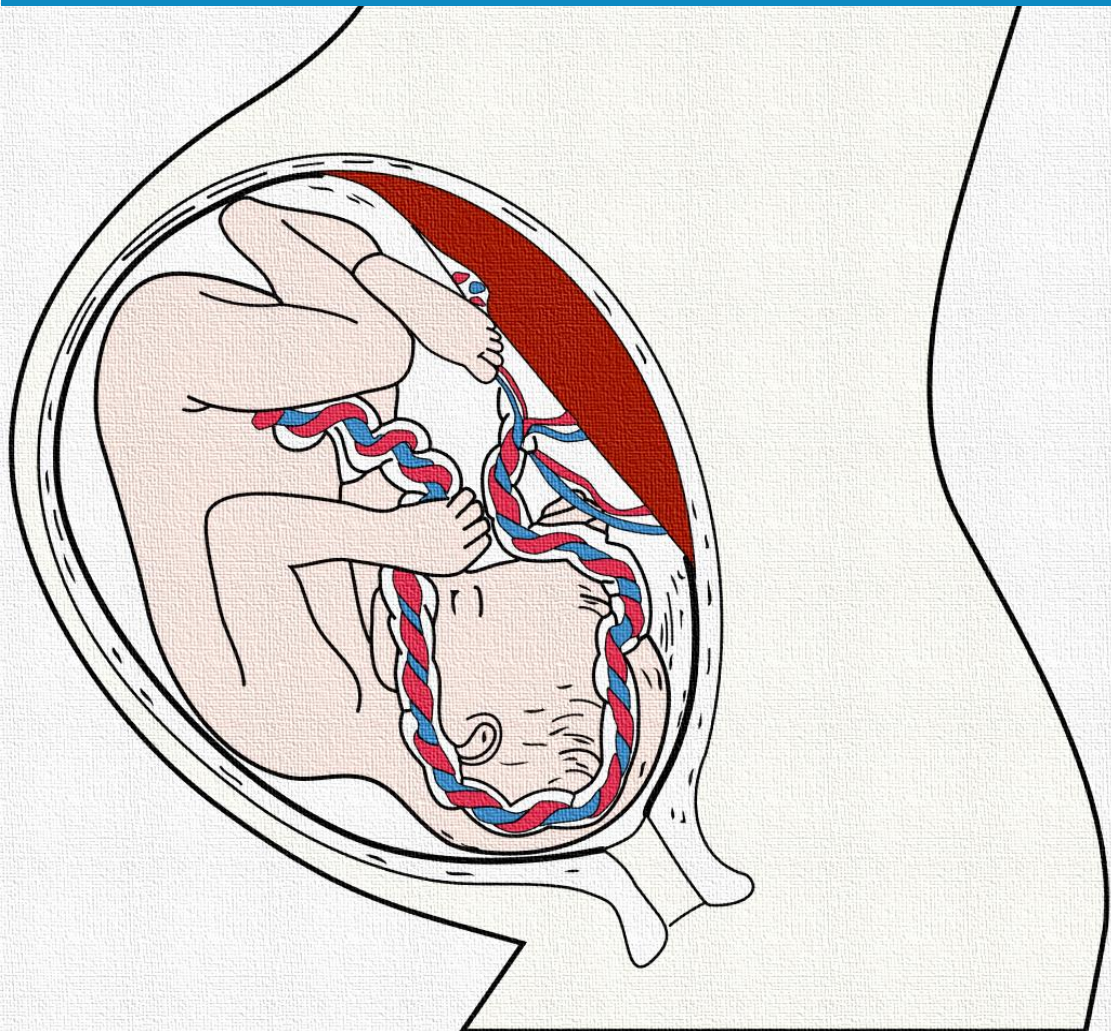


GESTATIONAL DIABETES MELLITUS

Patient Information from the Norwegian Society for Gynecology and Obstetrics



Norsk gynekologisk
forening

DEN NORSKE LEGEFORENING

Attachment to the Obstetric Guidelines
by The Norwegian Society for
Gynecology and Obstetrics

WHAT IS GESTATIONAL DIABETES?

Gestational diabetes (mellitus) describes the condition in which a woman develops diabetes while pregnant. Gestational diabetes is characterised by levels of high blood sugar detected during pregnancy. Pregnancy results in an increased demand for insulin production by the woman's body. In gestational diabetes, the body cannot produce enough insulin to meet this need, resulting in high blood sugar levels.

Gestational diabetes may increase the risk of complications for both the mother and the baby, however effective treatment is available.

The diagnosis is based upon a blood test: fasting blood sugar value and/or a blood sugar value 2 hours after drinking 75g of glucose (sugar) above the defined normal range, but below the values for "true" (type 1 and type 2) diabetes mellitus.

Diagnostic blood sugar levels for gestational diabetes: Fasting blood glucose: ≥ 5.3 mmol/l up to 6.9 mmol/l and/or 2-hour value: ≥ 9.0 mmol/l up to 11.0 mmol/l.

Diagnostic blood sugar levels for diabetes in pregnancy (values suspicious of "true" type 1 or type 2 diabetes mellitus, suggestive of a diabetic condition also present outside of pregnancy): Fasting blood glucose: ≥ 7.0 mmol/l and/or 2-hour value: ≥ 11.1 mmol/l.

WHAT CAUSES GESTATIONAL DIABETES?

The placenta is important in the development of gestational diabetes. It releases factors into the mother's blood that help ensure that the fetus obtains enough nutrients for growth and development. This reprogramming of the maternal metabolism during pregnancy ensures that sugar from the the pregnant woman's circulation is prioritised to the fetus, instead of being taken up by the woman's body organs. By so doing, the placenta contributes to a normal physiological state in the pregnant woman called "insulin resistance".

Gestational diabetes occurs when the pregnant woman's own insulin production is insufficient in response to the normal "insulin resistance" that affects all pregnancies. Both lifestyle and genetic factors play a role in the development of gestational diabetes.

CAN GESTATIONAL DIABETES BE PREVENTED?

In many women, known risk factors for gestational diabetes will not be present (upon diagnosis).

Some individuals have a genetic predisposition to developing gestational diabetes. For others, obesity, an unhealthy diet, and lack of physical activity can contribute to an increased risk. It is highly recommended and beneficial to modify these lifestyle factors before becoming pregnant.

At the first antenatal visit, all pregnant women should be offered a conversation about recommended weight gain, dietary advice, and physical activity in pregnancy, so as to reduce the risk of gestational diabetes, childbirth complications (such as hypertension/preeclampsia, gestational diabetes, large birth weight), and the development of diabetes and obesity later in life, for both mother and child.

HOW FREQUENT IS GESTATIONAL DIABETES?

The prevalence of medically treated gestational diabetes has increased in recent years, likely due to lifestyle changes along with changes in screening and diagnostic methods.

In Norway, the prevalence in 2021 is around 6%. In certain ethnic populations, the prevalence can be as high as 20%.

IS GESTATIONAL DIABETES DANGEROUS?

Gestational diabetes increases the risk of complications during pregnancy and childbirth. Appropriate follow-up and treatment reduce the risk of pregnancy complications, including the risk of preeclampsia. Gestational diabetes also increases the risk of a large birth weight for the baby, which can contribute to a greater risk of tears to the mother's birth canal during childbirth. There is also a slightly increased risk of birth injuries to the baby (such as shoulder/neurological injuries) as well as complications in the neonatal period, including low blood sugar, jaundice (high bilirubin), or breathing difficulties. Both the risk of cesarean section and the need for premature delivery increases for pregnancies affected by gestational diabetes.

In the long term, women who have had gestational diabetes have a significantly increased risk of developing type 2 diabetes later in life, as well as an increased risk of cardiovascular diseases. Children born to mothers with gestational diabetes also have a slightly increased risk of obesity and problems related to blood sugar regulation in puberty and adulthood.

WHAT ARE THE SYMPTOMS OF GESTATIONAL DIABETES?

Most pregnant women with gestational diabetes do not experience any noticeable symptoms. This is one of the reasons why it is important to follow recommendations for antenatal visits and to undergo blood sugar testing (oral glucose tolerance test), or measurement of long-term blood sugar level (HbA1c), if advised to do so by your healthcare provider (e.g. general practitioner or midwife).

If you notice reduced fetal movements after 24 weeks of pregnancy, you should always contact your local maternity ward for advice. If you're unsure what constitutes normal fetal movements, you can find information [in English](#) on the Norwegian website www.kjennliv.no.

HOW DOES A WOMAN KNOW IF SHE HAS DIABETES MELLITUS?

Gestational diabetes is diagnosed (and managed through) blood sugar measurements during pregnancy. The screening process for gestational diabetes can vary between different countries. The recommended screening process in Norway can be found on the web site for the Norwegian Directorate of Health: [Svangerskapsdiabetes - Helsedirektoratet](#).

HOW IS GESTATIONAL DIABETES TREATED?

The primary treatment for gestational diabetes are dietary and lifestyle measures. As a pregnant woman, you will be instructed on how to monitor blood sugar levels. Some women may need to start medication to regulate blood sugar levels if lifestyle changes alone are not sufficient in achieving satisfactory blood sugar control.

- **Diet:** Pregnant women diagnosed with gestational diabetes are advised to follow the dietary recommendations in the brochure "Gravid" (Pregnant) provided by the Norwegian Directorate of Health (www.helsedirektoratet.no). The goal is a diet that provides necessary nutrients for both mother and the growing fetus, whilst maintaining blood sugar levels within a healthy range.
- **Physical activity:** It is recommended to engage in at least 30 minutes (preferably 1 hour) of moderate-intensity physical activity daily during pregnancy.
- **Instruction on blood sugar monitoring:** Women with gestational diabetes are provided with their own blood glucose-meter and a prescription for the additional supplies. It is recommended that during the first 1-2 weeks after diagnosis, daily blood sugar levels are measured, including a fasting level, 2 hours following breakfast, and 2 hours following dinner.
- **Medication:** If lifestyle changes alone are not sufficient for maintaining satisfactory blood sugar control, then medication (such as diabetes medication like Metformin tablets, or insulin injections) may be considered by an endocrinologist.

HOW IS PREGNANCY FOLLOW-UP FOLLOWING A DIAGNOSIS OF GESTATIONAL DIABETES?

Pregnant women who are diagnosed with gestational diabetes are closely monitored in the primary healthcare system. Those who experience difficulty in maintaining target blood sugar levels, through diet and lifestyle changes alone, will be referred for specialist follow-up.

Pregnant women who have maintained target blood sugar levels, through diet and lifestyle changes alone, followed in primary healthcare setting, are recommended referred for assessment at the hospital antenatal clinic around 36 completed weeks of pregnancy. The doctor will perform an ultrasound examination of the fetus to check for signs of abnormal growth, and for other factors affecting the fetus or the pregnant woman (such as significant overweight or other risk conditions), that suggest a need for further hospital monitoring before delivery. This may include a possible consideration of induction of labour before the expected date of delivery. If the findings of this assessment are normal, the pregnant woman will continue with weekly follow-up by the primary healthcare provider, before being referred back to the hospital if required, or for a reassessment regarding induction of labour 2 to 6 days after the expected date of delivery.

Pregnant women with gestational diabetes who are on medication for their diabetes will usually have their labour induced sometime between 38 completed weeks and their expected date of delivery.

WHAT HAPPENS DURING CHILDBIRTH IN GESTATIONAL DIABETES?

Pregnant women with gestational diabetes can usually deliver their child vaginally. Sometimes, it may be necessary to induce labour. It is recommended to monitor the baby's heart rate (cardiotocography (CTG)) upon arrival at the hospital, and to continuously monitor the CTG during labor. If the gestational diabetes is well controlled through diet and there are no other risk factors, the midwife/doctor may make an individual assessment as to whether continuous CTG monitoring is necessary during labour.

Usually, any oral medication (such as Metformin) taken for diabetes is stopped when labour begins or before a planned cesarean section. Blood sugar levels will be monitored during labour to ensure they remain within the desired range. If the pregnant woman requires insulin, the dosage will be adjusted based on blood sugar measurements during labour. Hospitals have established protocols for this, including those for planned and emergency cesarean sections.

WHAT HAPPENS IN THE POSTNATAL PERIOD FOLLOWING GESTATIONAL DIABETES?

For the **baby**: during admission, blood glucose levels in the newborns are monitored according to the established routine of the respective maternity ward.

For the **woman**:

-Diet-treated gestational diabetes: No specific measures are usually required.

-Insulin- or metformin-treated gestational diabetes: Most women will be able to discontinue medication for blood sugar control following delivery. Blood sugar levels are recommended to be monitored in a fasting state, and 2 hours after meals, during the first few days postpartum. If either or both of these measurements are high, it may be necessary to contact an internal medicine physician for further evaluation.

ARE THERE ANY LONG-TERM EFFECTS OF GESTATIONAL DIABETES?

Women who have experienced gestational diabetes should be offered lifestyle advice regarding healthy eating, physical activity, and maintaining a normal weight. These lifestyle recommendations apply to both optimizing conditions for the fetus and the woman herself in any future pregnancies and reducing the risk of developing maternal type 2 diabetes and obesity in the long term.

Following a pregnancy complicated by gestational diabetes, it is recommended to screen for diabetes around 4 months after delivery (using a blood test for HbA1c). HbA1c should be monitored annually thereafter to diagnose any potential development of type 2 diabetes as early as possible. The affected pregnant woman is recommended to take responsibility for following this up, in collaboration with her own doctor.

As a group, women who have experienced gestational diabetes have a slightly increased risk of developing premature cardiovascular disease later in life. This is similar to women with a history of preterm birth, growth-restricted babies, preeclampsia or pregnancy-induced hypertension.

There are currently no validated guidelines for the follow-up of women who have had gestational diabetes to prevent early cardiovascular disease. A flowchart that can be used for follow-up by the general practitioner, can be found in the proposed guidelines for follow-up after preeclampsia in Norway ("[Hypertensive pregnancy complications and eclampsia](#)").

Women are advised to discuss their history of gestational diabetes during routine check-ups with their general practitioner, for example, during the recommended 6-12 week postpartum visit.

The general practitioner can propose a specific follow-up plan based on the woman's history of gestational diabetes and overall health status. For example, coupling this follow-up to the recommended intervals for cervical cancer screening in Norway. The general practitioner should offer HbA1c testing annually, as recommended in the [guidelines](#). Additionally, we recommend that women with a history of gestational diabetes have their blood pressure checked at least every 3-5 years, but potentially more frequently if they have doctor visits for other reasons, or if any other risk factors for cardiovascular disease are identified (e.g. obesity, hyperlipidemia, family history of cardiovascular disease at a young age). This is because managing high blood pressure is important for reducing the risk of complications from cardiovascular disease. Below is a general flowchart for follow-up, which the women (diagnosed with gestational diabetes) can discuss with their healthcare provider upon discharge from the maternity ward at the hospital, or with their general practitioner after childbirth.

Primary prevention of cardiovascular disease following gestational diabetes

Pregnancy complicated by gestational diabetes*
(or preeclampsia/gestational hypertension or preterm birth or birth of a growth-restricted newborn)

2-4 months postpartum follow-up
-HbA1c (following gestational diabetes)
-Cardiovascular risk evaluation- simple
-Lifestyle advice

Approximately 1 year postpartum
-HbA1c
-Cardiovascular risk evaluation- extended
-Evaluate need for drug therapy

Every year or more seldom
(i.e. every 2-5 year: make a plan with your GP depending on risk factors for CVD) until 50 years of age
-HbA1c
-Cardiovascular risk evaluation- simple
-Lifestyle advice

50+ years of age
-Cardiovascular risk evaluation-extended and NORRISK2^c
-Lifestyle advice
-Evaluate need for drug therapy
-Further check-ups according to guidelines in Norway^c

- Lifestyle advices
 - No smoking^a
 - Physical activity according to guidelines^b
 - Normal weight^c
 - Healthy diet according to guidelines^b
- Cardiovascular risk evaluation- simple
 - Body Mass Index
 - Smoking habit
 - Physical activity levels
 - Blood pressure
- Cardiovascular risk evaluation- extended
 - As in «simple», in addition:
 - Hereditary risk of cardiovascular disease
 - Dyslipidemia (LDL and total cholesterol)
 - Glucose intolerance (HbA1c)
- Drug therapy
 - According to Norwegian Directorate of Health guidelines^a

*Comments:

- Women with persistently elevated blood sugar values following childbirth, will be recommended additional follow-up before discharge from the hospital postpartum. If they later on obtain normal blood glucose values, they can follow the flow chart to the left.
- Women who have (or develop postpartum) clinical cardiovascular disease, hypertension, overweight or dyslipidemia are recommended follow-up according to existing guidelines.^{a,c} The flow chart to the left would represent a minimum follow-up for these women.

^a<https://helsedirektoratet.no/retningslinjer/forebygging-av-hjerste-og-karsvkdrom>

^b<https://helsedirektoratet.no/publikasjoner/anbefalinger-om-kosthold-erenering-og-fysisk-aktivitet>

^c<https://helsedirektoratet.no/retningslinjer/nasjonalt-faglig-retningslinje-for-forebygging-utredning-og-behandling-av-overvekt-og-fedme-hos-voksne>^c

Based on current knowledge, we recommend that women who have had gestational diabetes strive to adopt a lifestyle that can help prevent heart disease and stroke, following the guidelines from the [Norwegian Directorate of Health](#):

- **Be physically active:** (for non-pregnant adults) at least 150-300 minutes a week of moderate physical activity, or at least 75-150 minutes of high intensity physical activity, or a combination.
- **Reduce sedentary time.**
- Choose a **varied and balanced diet** with an increased proportion of:
 - plant-based foods containing unsaturated fat, including plant oils such as olive oil and rapeseed oil, and nuts, while reducing the consumption of foods with saturated fat from meat products.
 - vegetables, salad, legumes, fruit, and whole grain products, while reducing the intake of refined grain products such as white bread and sweet breakfast cereals.
 - white meat (chicken, turkey), fish, and shellfish is preferable to red meat. Limit the intake of salt, butter, sugar, high-sugar food and drinks, and processed meat products.
- **Avoid smoking.**
- Maintain a normal weight (body mass index 18.5-24.9 kg/m²).
- Limit alcohol intake.

Continued medical monitoring after gestational diabetes should include an overall assessment of the risk of heart disease and stroke, as outlined in the flowchart on the previous page:

- family history of heart disease, stroke, and diabetes
- physical activity
- diet
- smoking/alcohol habits
- other diseases (such as diabetes)
- body mass index (BMI) and waist/hip ratio
- blood lipids
- fasting blood sugar or "long-term blood sugar" (HbA1c: to check for diabetes development)
- blood pressure measurement

Women with chronic diseases that can affect the heart and blood circulation are advised to be monitored by a general practitioner/specialist in preparation for future pregnancies and long-term health.

FURTHER INFORMATION

Guidelines for diagnosis, treatment and follow-up of gestational diabetes:

In Norwegian:

- Norsk gynekologisk forening: [svangerskapsdiabetes.pdf \(legeforeningen.no\)](https://svangerskapsdiabetes.pdf(legeforeningen.no))
- HelseNorge: [Svangerskapsdiabetes - Helsenorge](#)
- Chatbot DINA (In Norwegian): [DINA \(ihelse.net\)](#)

In English:

- National Institute for Health and Care Excellence (NICE): [Overview | Diabetes in pregnancy: management from preconception to the postnatal period | Guidance | NICE](#)
- Royal College of Obstetrician and Gynaecologists: [Gestational diabetes | RCOG](#)

Patient organisations:

Norway: Diabetesforbundet: [Svangerskapsdiabetes | Diabetesforbundet](#)

United Kingdom: Diabetes UK:

[Gestational diabetes | Causes and symptoms | Diabetes UK](#)

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**Annetine Staff, Meryam Sugulle, Bendik S. Fiskå, Patji Alnæs-Katjavivi,
Camilla M. Friis**

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