

Gestational Diabetes

Blood sugar shoots up during pregnancy when the pancreas cannot make enough insulin to keep up with the body's new, higher demand.

THE STORY IN ONE SENTENCE

Blood sugar shoots up during pregnancy when the pancreas cannot make enough insulin to keep up with the body's new, higher demand.

“Pregnancy hormones make the mom's body resist insulin so the baby gets extra sugar to grow. If her pancreas cannot keep up, blood sugar stays high—that is gestational diabetes. Treat it with food changes, movement, and insulin if needed to protect both mom and baby.”

Normal anatomy — the body's job

Normally during pregnancy, the placenta releases hormones—especially human placental lactogen and progesterone—that make the mother's cells resist insulin (they do not let sugar in as easily). This keeps more glucose in the mother's blood so the baby can pull what it needs through the placenta. The mother's pancreas detects the rising blood sugar and cranks out extra insulin to bring it back down, usually two to three times the normal amount by the third trimester.

BODY'S JOB

The pancreas is a soft organ tucked behind the stomach. Inside it are tiny clusters of cells called beta cells, and their only job is to sense blood sugar and release insulin—a hormone that unlocks the doors on muscle, fat, and liver cells so glucose can move from the blood inside to be burned for energy or stored. During pregnancy, those beta cells have to multiply and work harder because the placenta's hormones are pushing the doors half-shut. Think of insulin as a key: pregnancy changes the locks, so you need more keys (more insulin) to open the same number of doors.

1. Mom eats food, and her gut breaks it down into glucose, which enters the bloodstream.
2. Placenta hormones (human placental lactogen, progesterone, cortisol, and prolactin) circulate in mom's blood and make her muscle and fat cells less responsive to insulin—like putting a piece of tape over the lock so the key does not turn as easily.

3. Blood glucose rises a little because less sugar is moving into cells.
4. Beta cells in the pancreas sense the higher glucose and release extra insulin into the blood to push sugar into cells despite the resistance.
5. In a healthy pregnancy, the beta cells expand in number and output—like hiring extra workers—so blood sugar stays in the normal range (fasting below 95 mg/dL, one-hour after meals below 140 mg/dL).
6. Glucose crosses the placenta easily and feeds the baby, while insulin does not cross, so the baby makes its own insulin to handle the sugar it receives.

What breaks

The beta cells in the pancreas cannot multiply or pump out enough insulin to overcome the pregnancy hormones blocking insulin's action. Blood sugar climbs above the safe threshold and stays there, flooding both mother and baby with excess glucose.

CLINICAL TERM

Insufficient beta-cell reserve and function to compensate for pregnancy-induced insulin resistance; results in maternal high blood sugar (hyperglycemia) (high blood sugar) beginning in the second or third trimester, meeting diagnostic thresholds on oral glucose tolerance testing.

How the body compensates

The mother's body tries to protect itself and the baby by shifting fuel use and adjusting blood flow, but these attempts cannot fix the root problem and often make things worse downstream. Many women feel fine because symptoms are mild or absent, which is why screening at 24–28 weeks is critical.

1. {'what': 'Beta cells work overtime and may temporarily keep fasting glucose near-normal', 'why': 'The pancreas pushes out insulin in bigger and bigger bursts after meals, so fasting blood sugar might still look okay early on even though post-meal spikes are high. This is why a single fasting glucose can miss the diagnosis and a glucose challenge test (measuring sugar one or two hours after a drink) is needed.'}
2. {'what': 'Mother's liver makes extra glucose at night (gluconeogenesis)', 'why': 'Pregnancy hormones signal the liver to release stored sugar and make new sugar from protein so the baby never runs low overnight. In gestational diabetes, this pushes fasting glucose even higher because there is already too much sugar in the blood and not enough insulin to store it.'}

3. {'what': "Mother's kidneys lower the threshold for spilling glucose into urine", 'why': 'The kidneys try to dump excess sugar into the urine to bring blood levels down, which is why some women notice sugary-smelling or sticky urine, but this also pulls water out with the sugar, raising the risk of dehydration.'}
4. {'what': "Baby's pancreas ramps up its own insulin production", 'why': 'Glucose crosses the placenta freely, so the baby is swimming in high sugar and its beta cells grow larger and pump out extra insulin (fetal hyperinsulinemia) to try to store it as fat and glycogen. This is why babies of mothers with gestational diabetes often grow too big (macrosomia, birthweight over 4000 grams or 8 pounds 13 ounces).'} }
5. {'what': 'Amniotic fluid volume increases (polyhydramnios)', 'why': 'High fetal blood sugar makes the fetus pee more because its kidneys are trying to get rid of the extra glucose, and fetal urine is the main source of amniotic fluid after the first trimester. Too much fluid can stretch the uterus and trigger early labor.'}
6. {'what': 'Placenta works harder and releases stress signals', 'why': "The placenta has to move more glucose and oxygen to keep up with the baby's overgrowth and higher metabolic demands. This oxidative stress damages the lining of the mother's blood vessels and can cause preeclampsia (high blood pressure, protein in urine, and swelling) by making vessels leaky and constricted."}

Domino effect

1. Placenta releases human placental lactogen, progesterone, cortisol, and prolactin starting around week 20 and peaking in the third trimester. — These hormones make the mother's muscle, fat, and liver cells resist insulin so more glucose stays in her blood and crosses the placenta to fuel the baby's rapid growth—this is the normal, intended physiology of pregnancy.
2. Mother's pancreas tries to compensate by expanding beta-cell mass and doubling or tripling insulin output. — Rising blood glucose triggers beta cells to release more insulin and even multiply (hyperplasia). In most pregnancies, this works and glucose stays under 95 mg/dL fasting and under 140 mg/dL after meals.
3. In gestational diabetes, beta cells cannot keep up—either because the woman started with less reserve (genetics, obesity, age over 35, polycystic ovary syndrome) or because insulin resistance becomes too severe—so blood glucose climbs above the safe range. — The pancreas hits its ceiling; it cannot make or release enough insulin to match the demand. Blood sugar stays high in both mother and baby because glucose crosses the placenta but insulin does not.

4. High maternal glucose floods the fetus, triggering fetal hyperinsulinemia and macrosomia. — The baby's pancreas responds to the extra sugar by making extra insulin, which acts like a growth hormone: it pushes glucose into fat and muscle cells and makes the baby store excess energy as fat, especially around the shoulders and trunk. Birthweight can climb above 4000 grams (8 lb 13 oz), raising the risk of shoulder dystocia (shoulder gets stuck behind the pubic bone during delivery) and birth injury.
5. Excess fetal urine production causes polyhydramnios (too much amniotic fluid). — High fetal blood sugar makes the fetal kidneys filter more and pee more to try to get rid of the glucose. Since fetal urine is the main source of amniotic fluid in the second and third trimesters, the amniotic sac swells (fluid index over 25 cm). This stretches the uterus, raises the risk of preterm labor, and can cause the umbilical cord to prolapse (slip out before the baby) if the water breaks.
6. Placenta stress and oxidative damage trigger preeclampsia in some women. — The placenta is working overtime to deliver extra glucose and oxygen to an overgrown baby, and that metabolic stress releases inflammatory signals and free radicals that injure the lining of the mother's blood vessels (endothelium). Damaged vessels leak protein into urine, constrict to raise blood pressure ($\geq 140/90$), and cause swelling. Preeclampsia threatens both mother (seizures, stroke, liver rupture) and baby (poor oxygen delivery, placental abruption).
7. After birth, the newborn's insulin stays high even though the glucose supply from mom is suddenly gone, causing neonatal low blood sugar (hypoglycemia) in the first hours of life. — The baby's beta cells were working overtime for months and cannot shut off instantly. The baby's blood sugar can drop below 40–45 mg/dL within one to three hours after delivery, risking seizures, brain injury, and poor feeding. This is why babies of mothers with gestational diabetes need blood sugar checks every few hours and early, frequent feeding or IV glucose if levels fall.
8. Long-term, both mother and child face higher risks of type 2 diabetes and metabolic syndrome. — Gestational diabetes unmasks the mother's underlying beta-cell weakness and insulin resistance, which do not disappear after pregnancy. About 50% of women with gestational diabetes develop type 2 diabetes within 5–10 years. The baby, programmed in the womb by high glucose and high insulin, is at increased risk for obesity, insulin resistance, and type 2 diabetes later in childhood and adulthood—this is called metabolic programming or the developmental origins of health and disease.

Symptoms · what the patient feels, and why

- Often no symptoms at all: Blood sugar is high but usually not so high that you feel sick — the body is still making insulin, just not enough to keep up with pregnancy's extra demands.

- Feeling thirsty more than usual: High blood sugar pulls extra water out of cells and into the blood, so the kidneys make more urine and the body signals you to drink more to replace what's being lost.
- Needing to pee more often: The kidneys filter out the extra sugar by dumping it into urine, which means more urine is made and the bladder fills faster.
- Feeling very tired: Cells can't use the sugar in the blood for energy because there isn't enough insulin to unlock the door and let it in, so you feel drained even though fuel is floating around.
- Blurry vision: High blood sugar causes fluid to shift in and out of the lens of the eye, changing its shape and making it harder to focus clearly.
- Baby measuring larger than expected on ultrasound: Extra sugar crosses the placenta to the baby, which triggers the baby's pancreas to make extra insulin — that insulin acts like a growth signal and the baby stores more fat and grows bigger.
- More amniotic fluid than normal (polyhydramnios) on ultrasound: High blood sugar in mom means high sugar in baby, which makes the baby pee more sugar and water into the amniotic sac, filling it beyond the usual amount.
- Sugar found in the urine on a routine prenatal visit: When blood sugar rises above a threshold (usually around 180 mg/dL), the kidneys can't reabsorb all the sugar they filter, so it spills into the urine.

Focused exam

- Abnormal glucose tolerance test (OGTT) at 24–28 weeks: fasting ≥ 92 mg/dL, 1-hour ≥ 180 mg/dL, or 2-hour ≥ 153 mg/dL: The OGTT checks if the pancreas can handle a sugar drink. In gestational diabetes, the pancreas (the organ behind your stomach that makes insulin) cannot make enough insulin to push the sugar into cells, so blood sugar stays high too long. This test catches the problem before the baby gets hurt.
- Baby is bigger than expected for how far along the pregnancy is (macrosomia on ultrasound, estimated weight above 90th percentile): High blood sugar in mom crosses the placenta (the organ that feeds the baby) and gives the baby extra sugar. The baby's pancreas pumps out insulin to handle it, and insulin stores that sugar as fat and muscle. The baby grows too big — this is the downstream result of mom's high blood sugar.
- Too much amniotic fluid (polyhydramnios on ultrasound, single deepest pocket > 8 cm or amniotic fluid index > 24 cm): High blood sugar makes the baby pee more because the baby's kidneys try to get rid of extra glucose in the urine. More pee means more amniotic fluid (the liquid around the baby). This signals that mom's glucose is running too high.

- High blood pressure ($\geq 140/90$ mmHg) or protein in urine (≥ 300 mg in 24 hours or urine protein/creatinine ratio ≥ 0.3), especially in the third trimester: Gestational diabetes damages the tiny blood vessels in the placenta over time. The body reacts by raising blood pressure to force blood through — this is preeclampsia. High pressure can hurt mom's brain, liver, and kidneys and cut off oxygen to the baby.
- Baby's blood sugar is very low right after birth (neonatal low blood sugar (hypoglycemia), glucose <40 mg/dL in the first hours of life): In the womb, the baby got high glucose from mom all the time, so the baby's pancreas made tons of insulin to handle it. At birth, that high glucose stops suddenly, but the baby's insulin is still high, so the baby's own blood sugar crashes. This is the newborn paying the price for gestational diabetes.
- Risk factors present: BMI ≥ 25 (or ≥ 23 in Asian women), age ≥ 35 , family history of type 2 diabetes, previous gestational diabetes, polycystic ovary syndrome, or prior baby weighing >9 pounds: These women's pancreases start pregnancy with less reserve — fewer beta cells (the cells in the pancreas that make insulin) to ramp up insulin production. Pregnancy hormones push them over the edge. Finding risk factors early means testing sooner, not waiting until 24–28 weeks.

Diagnostics · every test answers a question

- 75-gram oral glucose tolerance test (OGTT) at 24–28 weeks → Can the pancreas make enough insulin to handle a big sugar load during pregnancy?
- Hemoglobin A1c (HbA1c) at first prenatal visit if risk factors are present → Did this woman already have undiagnosed type 2 diabetes before she got pregnant?
- Fasting plasma glucose at first prenatal visit if risk factors are present → Is blood sugar already high this early in pregnancy, before the big hormone surge hits?
- Self-monitored capillary blood glucose (fingerstick) four or more times daily: fasting and 1 or 2 hours after each meal → Are diet and exercise keeping blood sugar in the safe range, or does the woman need insulin?
- Fetal ultrasound for estimated weight and amniotic fluid volume at 28–32 weeks (earlier if blood sugar is hard to control) → Is the baby getting too much glucose and growing too big, or is fluid building up?
- Non-stress test (NST) and biophysical profile (BPP) starting at 32–34 weeks if insulin is needed or blood sugar is hard to control → Is the placenta still delivering enough oxygen to the baby, or is it starting to fail?
- 75-gram oral glucose tolerance test at 6–12 weeks postpartum → Did the woman's pancreas recover after pregnancy, or does she still have diabetes?

Treatment logic

- Dietary modification: eat three meals and two to three snacks per day, limit carbohydrates to 35–45% of calories (focus on whole grains, vegetables, lean protein), and avoid sugary drinks and simple carbs → Lowers the peak blood sugar after meals so the pancreas does not have to work as hard to make insulin. This buys time and protects the limited beta cell reserve (the storage space for making insulin).
- Regular exercise: 30 minutes of moderate activity (brisk walking, swimming) most days of the week → Muscles pull glucose out of the blood and burn it for energy without needing insulin. This lowers blood sugar and makes cells more sensitive to insulin. Less work for exhausted beta cells.
- Self-monitored blood glucose (fingerstick) four or more times daily: fasting and 1 or 2 hours after the start of each meal → Shows whether diet and exercise alone are enough to keep blood sugar in the safe range (fasting <95 mg/dL, 1-hour post-meal <140 mg/dL, 2-hour post-meal <120 mg/dL), or whether insulin is needed. This keeps treatment matched to what the pancreas can actually do.
- Insulin injection (most commonly NPH or long-acting insulin such as detemir at bedtime for fasting glucose, plus rapid-acting insulin such as lispro or aspart before meals for post-meal glucose if needed) → Replaces the insulin the pancreas cannot make enough of, so blood sugar stays in the safe range. This stops the fetus from getting excess glucose that causes overgrowth (macrosomia), fluid buildup (polyhydramnios), placenta damage (preeclampsia), and newborn low blood sugar (neonatal low blood sugar (hypoglycemia)).
- Metformin (500–2500 mg daily in divided doses) as second-line if woman refuses insulin or cannot afford it → Lowers blood sugar by making the liver release less glucose and helping cells use insulin better. Some studies show it works as well as insulin for many women with gestational diabetes.
- Delivery planning: schedule delivery at 39 weeks 0 days to 39 weeks 6 days if insulin or medication is needed and blood sugar is controlled; earlier (37–38 weeks) if blood sugar is hard to control, preeclampsia develops, or fetal testing is abnormal → Removes the pregnancy hormones and insulin resistance before the fetus grows too large or the placenta fails. This prevents shoulder dystocia (baby's shoulder getting stuck during birth), birth trauma, stillbirth, and severe neonatal low blood sugar (hypoglycemia).
- Postpartum follow-up: 75-gram OGTT at 6–12 weeks after delivery, then screen every 1–3 years for life with fasting glucose, HbA1c, or OGTT → Identifies whether the broken beta cell reserve persisted after pregnancy (type 2 diabetes) or whether the insulin resistance was truly temporary. Women with gestational diabetes have a 50% chance of developing type 2 diabetes within 10 years. Catching it early means treatment can start before heart disease, kidney damage, and nerve damage occur.

Medications

Insulin (various types: rapid-acting, short-acting, intermediate, long-acting) · Injected hormone replacement

Insulin is the key that unlocks cells so sugar from your blood can go inside and feed them. In gestational diabetes, your body does not make enough insulin to handle the extra sugar that comes from pregnancy hormones blocking insulin's action. Injected insulin gives your body the extra keys it needs to move sugar out of your blood and into your muscles, liver, and fat cells, keeping your blood sugar in the safe range for you and your baby.

1. You inject insulin under your skin; it enters your bloodstream.
2. Insulin travels to cells all over your body and lands on insulin receptors (docking spots on the cell surface).
3. The receptor signals the cell to move GLUT4 transporters (sugar doors) to the cell's outer wall.
4. Sugar (glucose) flows from your blood through these doors into the cell.
5. Your blood sugar drops to a safer level; the baby gets steady, not too-high, sugar through the placenta.

SAFETY WATCH

Low blood sugar (hypoglycemia) if you inject too much or skip a meal—you may feel shaky, sweaty, confused, or very hungry. Keep a fast sugar source (juice, glucose tablets) with you. · Injection-site reactions—redness, lumps, or itching where you inject. Rotate injection spots to prevent this. · Weight gain—insulin helps store energy, so some women gain a bit more weight. Your care team will guide safe pregnancy weight gain. · Never share insulin pens or needles—each person needs their own to avoid infection.

Metformin (Glucophage) · Biguanide (oral pill that lowers blood sugar)

Metformin works mainly in your liver to stop it from dumping too much sugar into your blood overnight and between meals. Normally your liver stores sugar and releases it when you need energy; in gestational diabetes, pregnancy hormones make the liver release too much. Metformin tells the liver to calm down and release less sugar. It also helps your muscle cells become a bit more sensitive to insulin (so the insulin you do make works better), but its biggest job is turning down the liver's sugar output.

1. You swallow the pill; it is absorbed in your small intestine and travels to your liver.
2. Metformin enters liver cells and blocks an enzyme (a protein machine) that makes new sugar from stored building blocks.
3. The liver releases much less sugar into your blood, especially overnight.

4. Your fasting blood sugar (the morning number before you eat) drops into the safe range.
5. Because there is less sugar flooding your blood, your pancreas does not have to work as hard to make insulin.

SAFETY WATCH

Stomach upset—nausea, diarrhea, or belly cramps, especially in the first few weeks. Taking it with food and starting with a low dose helps. The extended-release form (Glucophage XR) is gentler. · Vitamin B12 can run low with long-term use—your doctor may check your level and suggest a B12 supplement. · Very rare risk of lactic acidosis (acid from oxygen-starved tissues) (a dangerous acid buildup) if you have severe kidney or liver disease, so your doctor will check your kidney function before prescribing metformin. · Not recommended if you are dehydrated or very sick—tell your doctor right away if you have severe vomiting, diarrhea, or signs of infection.

Glyburide (Micronase, DiaBeta) · Sulfonylurea (oral pill that boosts insulin release)

Glyburide pushes your pancreas to squeeze out more insulin from the beta cells (the insulin factories inside your pancreas). In gestational diabetes, your beta cells are working hard but cannot keep up with the extra demand from pregnancy hormones. Glyburide gives them a nudge to release more insulin into your blood, which then moves sugar from your blood into your cells. This is most helpful if your pancreas still has some reserve insulin to release—if your beta cells are completely exhausted, glyburide will not work well and you will need insulin injections instead.

1. You swallow the pill; it is absorbed in your intestine and travels through your blood to your pancreas.
2. Glyburide enters beta cells and closes potassium channels (tiny gates in the cell wall that usually let potassium leak out).
3. Closing these gates changes the electrical charge inside the cell, which opens calcium channels (other gates that let calcium rush in).
4. The burst of calcium inside the cell triggers packets of stored insulin to fuse with the cell wall and dump insulin into your bloodstream.
5. The extra insulin moves sugar from your blood into your cells, lowering your blood sugar.

SAFETY WATCH

Low blood sugar (hypoglycemia)—because glyburide forces insulin release even if you skip a meal or exercise hard, your blood sugar can drop too low. You may feel shaky, sweaty, dizzy, or confused. Always carry a fast sugar source (juice, glucose tablets). · Weight gain—extra insulin helps store energy, so you may gain a bit more weight. · Does NOT work well if your pancreas is too tired—if your blood sugar stays high on glyburide, your doctor will switch you to insulin. · Take it 30 minutes before a meal so the insulin release matches when sugar from your food enters your blood. · Tell your doctor if you have kidney or liver disease—glyburide is cleared by these organs, and problems can raise your risk of low blood sugar.

Red flags

- Blood sugar over 200 mg/dL at any time — may mean pre-existing diabetes, not just gestational.
- Baby growing much larger than dates suggest — raises the risk of a difficult delivery and low blood sugar in the baby right after birth.
- High blood pressure or protein in urine appearing alongside high blood sugar — may signal preeclampsia, which is dangerous for both mom and baby.
- Sudden severe headache, vision changes, or belly pain in a mom with gestational diabetes — can mean preeclampsia or another urgent complication.

Nursing priorities

1. Check capillary blood glucose before meals and 1 to 2 hours after the first bite of each meal, recording all values in a logbook with the food eaten. — Frequent monitoring catches blood sugar spikes before they harm the baby and shows which foods or meals cause problems so the care team can adjust the meal plan or insulin dose.
2. Teach the patient to count carbohydrates and plan meals with 30 to 45 grams of carbs at breakfast, 45 to 60 grams at lunch and dinner, and 15 grams at snacks, spreading carbs evenly through the day. — The placenta makes hormones that block insulin, so spreading carbs prevents big glucose spikes while still giving enough calories for the baby to grow properly.
3. Teach and supervise subcutaneous insulin injection technique if prescribed, emphasizing injection sites in the abdomen or thigh and proper storage of insulin vials. — Insulin does not cross the placenta so it safely lowers maternal blood sugar without affecting the baby, but wrong injection technique causes unpredictable absorption and dangerous blood sugar swings.

4. Monitor for signs of low blood sugar (hypoglycemia) including shakiness, sweating, confusion, and fast heartbeat, especially 1 to 2 hours after insulin injection. — Insulin or skipped meals can drop blood sugar below 60 which reduces oxygen to the baby's brain and can cause maternal seizures or loss of consciousness.
5. Teach the patient to do kick counts starting at 28 weeks, feeling for 10 movements in 2 hours once daily, and to call immediately if movements decrease. — High blood sugar damages the placenta and reduces oxygen delivery, so decreased fetal movement is an early warning that the baby is not getting enough oxygen and may need emergency delivery.
6. Schedule and confirm attendance at all non-stress tests and biophysical profiles ordered by the provider, typically starting at 32 to 36 weeks. — Gestational diabetes increases risk of stillbirth in the last weeks of pregnancy, so these tests check that the placenta is still delivering enough oxygen to keep the baby safe.
7. Explain that the baby will need blood sugar checks right after birth and may need formula or IV dextrose if glucose drops below 40. — The baby's pancreas makes extra insulin in response to maternal high blood sugar, then after birth when maternal glucose stops crossing the placenta the baby's high insulin causes dangerous low blood sugar (hypoglycemia).
8. Remind the patient that she must return for a 75-gram oral glucose tolerance test at 6 to 12 weeks postpartum to check if diabetes has resolved. — Fifty percent of women with gestational diabetes develop type 2 diabetes within 10 years, so the postpartum test finds women who need ongoing diabetes treatment and prevention counseling.

Sources

- ACOG Practice Bulletin No. 190: Gestational Diabetes Mellitus (2018)
- American Diabetes Association Standards of Care in Diabetes (2023)
- US Preventive Services Task Force (USPSTF) Gestational Diabetes Screening Recommendation (2021)
- Cochrane Review: Screening and Treatment for Gestational Diabetes

Last reviewed: 2026-07-07